

JOURNAL OF THE MYANMAR ACADEMY OF ARTS AND SCIENCE



Educational Theory and Management, Curriculum and Methodology

Journal of the Myanmar Academy of Arts and Science, 2026, Vol. XXIII, No.9A

**Published in August, 2026, Educational Theory and Management,
Curriculum and Methodology**

Myanmar Academy of Arts and Science

Edition

2026, August, 280 Copies

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Ministry of Education

Published by

Dr Maung Kyaw (00322) Vice-President,
Myanmar Academy of Arts and Science

ISSN 2520-0186

LCCN 2003-323143

Printed by

U Tin Soe (00171), Manager

Universities Press, Yangon, Myanmar

FOREWORD

On 26 February 2026, the Myanmar Academy of Arts and Science (MAAS) was reconstituted to accelerate the implementation of four different strategies:

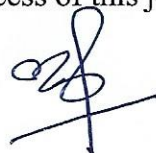
- (a) encouraging universities and colleges to engage in more research activities
- (b) organizing domestic and international research conferences
- (c) publishing research journals and proceedings, and
- (d) fostering research collaboration among local and international universities

Since the year 2001, the MAAS has been making every effort to fulfil these important functions in collaboration with universities and colleges across the country. As a result, the MAAS has published research papers in 23 volumes on diverse academic disciplines in the Journal of the Myanmar Academy of Arts and Science. It is a great honor to say that the 24th research conference was successfully held at the University of Yangon on 9–11 March 2024. The theme of this conference is '*Research and Innovation for Peace, Prosperity and Sustainability*'. A total of 369 research papers presented by both faculty and postgraduates at the conference have been published in Volume XXIII as follows:

Vol. XXIII, No. 1A	Chemistry
Vol. XXIII, No. 1B	Chemistry, Industrial Chemistry
Vol. XXIII, No. 2	Physics, Mathematics and Computer Studies
Vol. XXIII, No. 3	Zoology, Marine Science, Environment and Water Studies
Vol. XXIII, No. 4	Botany, Geology
Vol. XXIII, No. 5	English, History, Philosophy, Geography, Psychology, International Relations, Oriental Studies
Vol. XXIII, No. 6	Myanmar
Vol. XXIII, No. 7	Law, Library and Information Studies, Archaeology, Anthropology, Language and Linguistics
Vol. XXIII, No. 8	Applied Statistics, Management Studies, Statistics, Commerce, Economics, Journalism and Tourism
Vol. XXIII, No. 9A	Educational Theory and Management, Curriculum and Methodology
Vol. XXIII, No. 9B	Educational Psychology

I firmly believe that the empirical research findings from these papers will provide practical assistance for research candidates and those who are interested in research work. I am also hopeful that these findings will significantly contribute to the well-being of the community at large as well as the State's socio-economic development.

On behalf of the members of the MAAS, I would like to offer my special gratitude and thanks to those who have contributed their research papers to this journal. I also do appreciate the editing work done by senior professors and scholars of high standing as well as the members of the MAAS Editorial Board. Finally, my heartfelt thanks go to the members of the Publication Committee and the Department of Higher Education for their great dedication to the success of this journal.



Dr. Soe Win
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Journal of the Myanmar Academy of Arts and Science

Vol. XXIII. No.9A

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A STUDY OF SCHOOL LEADERS' PARTICIPATORY MANAGEMENT AND SCHOOL IMPROVEMENT*

Tin Nilar Aye¹, Su Chan Myae² & Phyu Zar Zar Theint³

Abstract

This study aimed to study school leaders' participatory management and school improvement. A mix-method design was used. The survey questionnaire was developed by the review of literature. Fifty-six school leaders and four hundred and eighty-one teachers from 56 Basic Education High Schools in Yangon Region were selected as samples by using simple random sampling. The content validity for the questionnaire was 0.95. The Cronbach's alpha was used to measure the reliability of the questionnaire. The internal consistency (Cronbach's alpha) for the level of practice was 0.96, the level of school improvement was 0.95 and the factors affecting school leaders' participatory management was 0.86. For the qualitative study, interview, observation and documentation was employed. Descriptive statistics, independent samples *t*-test, and multiple regression were used to analyze the quantitative data. The result of the study showed that school leaders practiced participatory management to a moderate extent. Moreover, the level of school improvement was moderate. Leadership process, motivational forces, communication process and goal-setting process appeared to be predictors of school improvement. School leaders' attitudes towards participatory management, school leaders' workload, and school climate appeared to be predictors of participatory management. Qualitative study appeared that the level of school improvement would be higher when school leaders practiced more participatory management.

Keyword: participatory management, school improvement

Introduction

Participatory management has been considered as a characteristic of effective schools. For effectiveness, school activities must be managed by participatory principles (Rossmiller & Holcomb, 1993, as cited in Stoll & Frink, 1996). A participative school refers to an organization where everyone is treated equally in participation, sharing of ideas and input when it comes to decision-making. A school that practices participatory management increases students' achievement (Njoroge & Kathuri, 2017), collaboration and discipline, and reduces problems because of the good atmosphere that exists among the members (Argyris, 1995). It is better suited for today because it empowers the members of the schools and helps in the development of members in schools. Moreover, the improvement of the school is essential for providing high-quality learning experiences, and adapting to changing needs to the world. The necessity for school improvement appears to be at the center of educational reform: staff dialogue about problems and issues, participation in decision-making, involvement in actions taken, and accountability for evaluating results were key components to include in any school improvement plan (Goodlad, 1984). Therefore, participatory management is a way to achieve effective school improvement through the participation of stakeholders in the decision-making process, delegation, and distribution of power. Although numerous studies explore participatory management and organizational improvement, there is little research concerning participatory management and school improvement. Therefore, the study of participatory management for improving schools needs to be considered an essential role in order to improve the quality of education.

Significance of the Study

The 21st century has brought about numerous changes in education towards a more adaptable, technology-driven, and learner-centered education system. With the increasing spread of education, organizations are also becoming increasingly democratized and need synergy. Participatory management provides exposure, synergy, and skills to be effective in

*First Prize(2024)

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participatively managed organizations. Moreover, researchers have indicated that individuals tend to work harder at attaining a goal when they are involved in setting it. This could be applied to the school system, whereby when the key stakeholders are involved in school management, there is a likelihood that it will impact of schools' performance (Fisher, 2009, as cited in Muruga, 2013). Gamage, et. al. (2006, as cited in Canaya, 2008) described that participatory management practice has been acknowledged as an essential ingredient in quest for better school performance. It can make educational changes and improve schools at all levels.

Johnson and Ledbetter (2004) argued that participatory management practice has been widely promoted as a means of formalizing a new conceptualization of management to bring about school improvement and academic performance. It can be said that participatory management is an effective management method required for school improvement. Therefore, this study aims to ascertain the contribution of school leaders' participatory management and school improvement. The information obtained in this research will contribute to providing a valuable insight into the dynamics involved in school structures and the measures taken to sustain school improvement. It can shed a flood of light on the factors that contribute to the success of participatory management and school improvement.

Theoretical Framework

The theoretical framework of this study comprises school leaders' participatory management, school improvement and the factors affecting school leaders' participatory management. To provide a sound theoretical framework, this study was based on the Likert Theory of Management, which was developed by Likert (1961), Theory Z by Quchi (1981), and Social System Theory by Lewin (1951). Participatory management is the practice of empowering employees to participate in decision making (Muruga, 2013). It involves leadership process, motivational forces, communication process, interaction-influence process, decision-making process, goal-setting process and control process were used in this study. School improvement includes learning teaching, professional development, leadership and management, infrastructures and resources, financial management and parent and community participation. There are factors that can increase or inhabit the school leaders' participatory management practice, which include school leaders' attitudes, school leaders' workload, school climate, and organizational trust.

Research Objectives

The general objective of this study was to study school leaders' participatory management and school improvement

The specific objectives were:

- To investigate the extent of school leaders' practices in participatory management as perceived by themselves and teachers
- To analyze the variations of school leaders' participatory management practices according to their attitudes towards participatory management, their workload, school climate and organizational trust
- To investigate the levels of school improvement as perceived by school leaders and teachers
- To investigate the predictors of school leaders' participatory management on school improvement
- To investigate the factors affecting school leaders' participatory management

Research Questions

1. To what extent do school leaders practice participatory management as perceived by themselves and teachers?
2. Is there any significant difference in school leaders' participatory management practices according to their attitudes towards participatory management, their workload, school climate and organizational trust?
3. What are the levels of school improvement as perceived by school leaders and teachers?
4. What are the predictors of school leaders' participatory management for school improvement?
5. What are the factors that affect school leaders' participatory management?

Definition of Key Terms

Participatory management refers to the management approach where the subordinates of an organization are fully involved in the management and decision-making processes of the organization (Ogbo et al., 2016).

School improvement can be defined as a multidimensional effort that includes all effective school practices to improve the human, material and instructional capacity of the school (Atasoy, 2023).

Limitation of the Study

This study is geographically limited to Yangon Region. The findings of this study are generalizable to Basic Education Schools in Yangon Region. The subjects of this study were school leaders who have at least 2 years in current school, primary teachers, junior teachers and senior teachers and school leaders from Basic Education High Schools in Yangon Region. This study was designed to analyze school leaders' participatory management and school improvement in Basic Education High School. In this study, school improvement was examined by six dimensions of School Quality Assurance Standard Framework (Ministry of Education in Myanmar [MOE], 2019) because the school improvement plan was drawn based on SQASF dimensions. The result of the school improvement was described based on the improvement of these six dimensions.

Operational Definition

Participatory management is a process in which all stakeholders are allowed to involve in leadership process, goal-setting process, decision making process and control process through motivation, communication and interaction influence. Perceived school leaders' participatory management will be assessed by the mean values. The higher the mean values, the greater the level of practice of participatory management.

School improvement is a multidimensional effort for better improvement in professional development, leadership and management, infrastructures and resources, financial management, learning and teaching, and parent and community participation. Perceived school improvement level will be examined by the mean values. The higher the mean value, the greater the level of school improvement.

Methodology

This study is mixed methods research design. For the quantitative study, questionnaire survey was used. For qualitative study, interview was employed to strengthen the results of data analysis. In this study, the sample included 56 Basic Education High Schools in Yangon Region in 2022-2023 Academic Year. There were 56 school leaders, 137 primary teachers, 150 junior teachers, and 194 senior teachers for quantitative study. For qualitative study, eight school

leaders, eight teachers and 8 stakeholders were involved. In this quantitative study, questionnaire survey was utilized to collect the required data. In addition to questionnaire, instruments for qualitative study; interview question was developed based on participatory management.

The content validity for the questionnaire is 0.95. the Cronbach's alpha was used to measure the reliability of the questionnaire. Based on the pilot test, the internal consistency (Cronbach's alpha) for the level of practice of participatory management was 0.96, for school improvement was 0.95 and the factors that affect the participatory management was 0.86. In the quantitative data analysis procedures, the Statistical Package for Social Science (SPSS version 26) was used. Descriptive statistics, Independent samples *t*-test, one-way ANOVA and multiple regression analysis was also utilized to find the best predictors of factors affecting school leaders' participatory management and school improvement. Before calculating multiple regression, the assumptions of multiple regression were assessed. According to Pallant (2016), multiple regression comprised five underlying assumptions: (1) linearity, (2) homoscedasticity, (3) independence of errors, (4) normality, and (5) independence of independent variables (multicollinearity). For both factors affecting school leaders' participatory management practice and predictors of school leaders' participatory management to school improvement, five assumptions were met. For qualitative study, school were grouped into Group A (the schools with high mean values for both participatory management and school improvement), Group B (high participatory management and low school improvement), Group C (low participatory management and high school improvement) and Group D (low for both participatory management and school improvement).

Findings

Research Question (1): Investigating School Leaders' Participatory Management Practices

Table 1 showed that the descriptive statistics of school leaders' participatory management practices in schools.

Table 1 Mean Values and Standard Deviations for the Levels of School Leaders' Participatory Management Practices (N=537)

No	Participatory Management Practices	Mean	SD	Remark
1	Leadership Process	3.24	0.75	a moderate extent
2	Motivational Forces	3.21	0.74	a moderate extent
3	Communication Process	3.32	0.67	a great extent
4	Interaction-influence Process	3.36	0.67	a great extent
5	Decision-making Process	3.24	0.67	a moderate extent
6	Goal-setting Process	3.19	0.70	a moderate extent
7	Control Process	3.25	0.73	a moderate extent
Grand Mean		3.25	0.70	a moderate extent

Scoring Direction: 1.00-1.75=not at all

1.76-2.50= some extent

2.51-3.25=a moderate extent

3.26-4.00=a great extent

According to Table 1, school leaders and teachers perceived that the school leaders practiced to a moderate extent in their participatory management practices because the grand mean was 3.25.

Research Question (2): Analyzing the Variations of School Leaders' Participatory Management Practices in Terms of Their Attitudes Towards Participatory Management, Their Workload, School Climate and Organizational Trust

Table 2 Mean Values and Standard Deviations of School Leaders' Attitudes towards Participatory Management, School Leaders' Workload, School Climate and Organizational Trust

Factors	Mean	SD	Remark
School Leaders' Attitudes towards Participatory Management	3.06	0.64	High
School Leaders' Workload	2.90	0.78	Moderate
School Climate	3.21	0.58	High
Organizational Trust	3.23	0.51	High

Scoring Direction: 1.00-2.00=Low 2.01-3.00=Moderate 3.01-4.00=High

According to Table 2, school leaders perceived that they had *high* attitudes towards participatory management because the grand mean was 3.06 and their workload were *moderate* because the grand mean was 2.90. School leaders' and teachers' perceptions on school climate and organizational trust were *high* for participatory management because the grand mean was 3.21 and 3.23.

Table 3 Independent Samples t-Test Results Showing School Leaders' Participatory Management Practices Grouped by Their Attitudes towards Participatory Management Practice, Their Workload, School Climate and Organizational Trust

Variables	Factors	Group	Mean (SD)	t	df	p
Participatory Management	School Leaders' Attitudes towards Participatory Management	Group A	3.09 (0.41)	2.38	54	0.021*
		Group B	2.60 (0.16)			
	School Leaders' Workload	Group A	3.20 (0.45)	3.43	52.16	0.001**
		Group B	2.87 (0.27)			
	School Climate	Group A	3.20 (0.45)	11.26	534.80	0.000***
		Group B	2.87 (0.27)			
	Organizational Trust	Group A	3.51(0.41)	12.39	483.26	0.000***
		Group B	3.08(0.39)			

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 showed that school leaders' participatory management of Group A were statistically significant from those of Group B.

Research Question (4): Investigating the Level of School Improvement

Table 4 showed that the descriptive statistics of school improvement.

Table 4 Mean Value and Standard Deviations of the Levels of School Improvement as Perceived by School Leaders and Teachers (N=537)

Dimensions	Mean	SD	Remark
Learning and Teaching	3.36	0.61	High
Professional Development	3.26	0.52	High
Leadership and Management	3.26	0.52	High
Infrastructure and Resources	3.26	0.53	High
Financial Management	3.20	0.51	Moderate
Parent and Community Participation	3.17	0.52	Moderate
Overall	3.25	0.62	Moderate

Scoring Direction: 1.00-1.75=very low
2.51-3.25= moderate

1.76-2.50= low
3.26-4.00=high

Note: N_1 =number of school leaders

N_2 = number of teachers

According to Table 4, school leaders and teachers perceived that the level of school improvement was *moderate* because the mean value was 3.25.

Research Question (4): Investigating Potential Factors Affecting School Improvement

Before examining potential factors affecting school improvement, the relationship between school leaders' participatory management and school improvement was calculated by using Pearson-product moment correlation.

Table 5 The Relationship between School Leaders' Participatory Management Practices and School Improvement (N=537)

	Participatory Management Practices	School Improvement
Participatory Management Practices	1	.712**
School Improvement	.712**	1

** Correlation is significant at the 0.01 level (2-tailed).

Table 5 proved that the sample of this study (N=537), there was a significant, positive relationship between school leaders' participatory management (Mean=3.26, SD=0.70) and the school improvement (Mean=3.25, SD=0.61). There was a significant correlation but the strength of the correlation was strong ($r = 0.712$, $p < 0.01$). It may be concluded that there was a positive and significant relationship between school leaders' participatory management and school improvement.

In this study, seven variables were identified as predictors for school improvement: leadership process (LP), motivational forces (MF), communication process (CMP), interaction-influence process (IP), decision making process (DMP), goal-setting process (GP) and control process (CP). To investigate the best predictors for school improvement, simultaneous multiple regression was used. Mean values, standard deviations, and inter-correlations were described in Table 6.

Table 6 Means, Standard Deviations, and Inter-correlations for Potential Factors and School Improvement (N=537)

Variable	Mean	SD	SI	LP	MF	CMP	IP	DMP	GP	CP
SI	3.25	0.41	1.000	0.631***	0.629***	0.628***	0.541***	0.608***	0.615***	0.635***
Predictor Variables										
LP	3.24	0.75		1.000	0.751***	0.752***	0.617***	0.679***	0.667***	0.717***
MF	3.21	0.74			1.000	0.706***	0.665***	0.649***	0.670***	0.702***
CMP	3.32	0.67				1.000	0.680***	0.748***	0.701***	0.777***
IP	3.36	0.67					1.000	0.772***	0.714***	0.778***
DMP	3.24	0.67						1.000	0.847***	0.820***
GP	3.19	0.70							1.000	0.811***
CP	3.25	0.73								1.000

*** Correlation is significant at the 0.001 level (2-tailed).

According to Table 6, it was found that school improvement was positively and significantly correlated with leadership process ($r = 0.631$, $p < 0.001$), motivational forces ($r = 0.629$, $p < 0.001$), communication process ($r = 0.628$, $p < 0.001$), interaction-influence process ($r = 0.541$, $p < 0.001$), decision-making process ($r = 0.608$, $p < 0.001$), goal-setting process ($r = 0.615$, $p < 0.001$) and control process ($r = 0.635$, $p < 0.001$).

Table 7 Simultaneous Multiple Regression Analysis for School Improvement (N=537)

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	Std. Error	Beta		
(Constant)	1.559	.092		17.030	.000***
LP	.116	.036	.171	3.181	.002**
MP	.135	.036	.199	3.808	.000***
CMP	.090	.038	.135	2.358	.019*
IP	.004	.040	.005	.109	.913
DMP	.039	.047	.055	.830	.407
GSP	.083	.040	.132	2.090	.037*
CP	.066	.038	.112	1.724	.085

Note: $R=.712$, $R^2=.500$; $F(7,529) = 77.503$, *** $p<0.001$, ** $p<0.01$, * $p<0.05$

SI=School Improvement

MF=Motivational Forces

IP=Interaction-influence Process

GP= Goal-setting Process

The Regression Equation is

School Improvement=

$1.559+.116LP+.135MP+.090CMP+.004IP+.039DMP+.083GSP+.066CP$

LP=Leadership Process

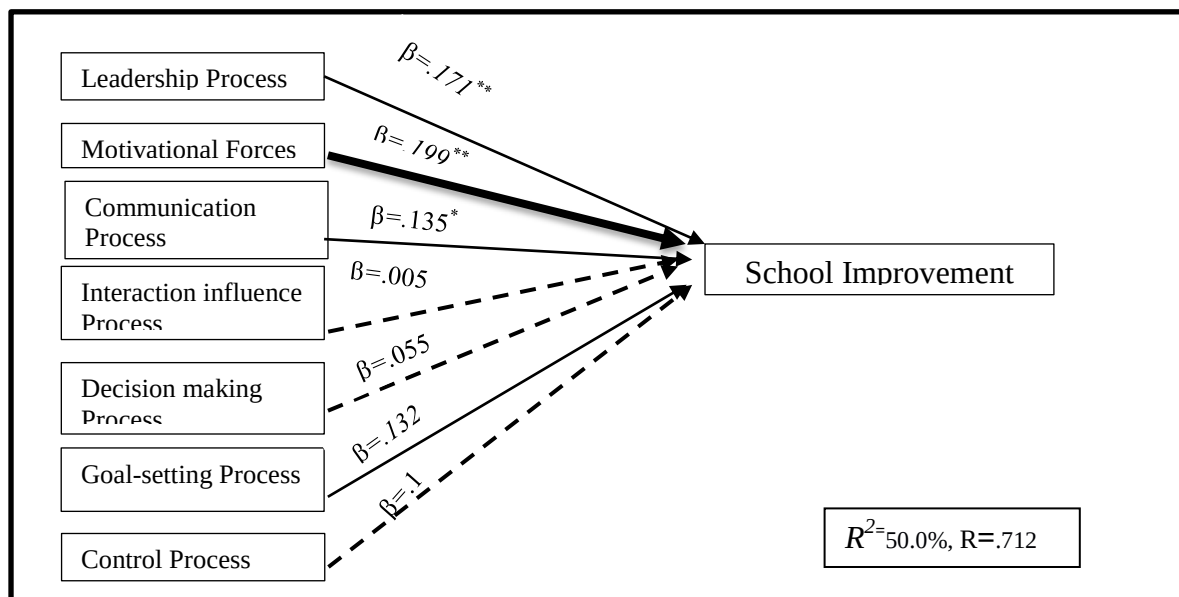
CMP=Communication Process

DMP= Decision Making Process

CP= Control Process

To evaluate the regression model and to determine how well the model fits the data, the researcher reported the adjusted coefficient of determination ($R^2=.500$). This indicated that 50% of the variance in school improvement was explained.

According to beta weights, motivational forces ($\beta=.199$, $p<0.001$) appeared to be the best predictor of school improvement. Leadership process ($\beta=.171$, $p<0.01$) was the second predictor of school improvement. Moreover, communication process ($\beta=.135$, $p<0.05$), goal-setting process ($\beta=.132$, $p<0.05$) appeared to be the third and fourth predictors of school improvement. Moreover, interaction-influence process, decision-making process and control process appeared to be important for school improvement.

**Figure 1 Potential Factors Affecting School Improvement**

—→ Predicting on School Improvement (statistically significant)

- - - → Predicting on School Improvement (not statistically significant but show relationship)

Research Question (5): Investigating Potential Factors Affecting School Leaders' Participatory Management Practices

To examine the potential factors affecting school leaders' participatory management, simultaneous multiple regression was calculated. Three factors were identified as predictors affecting participatory management practices of school leaders: "School Leaders' Attitudes towards Participatory Management (A), Workload (W), School Climate (SC) and Organizational Trust (OT). Mean, standard deviations and inter-correlations were shown in Table 8.

Table 8 Means, Standard Deviations, and Inter-correlations for School Leaders' Participatory Management Practices and Predictors Variables (N=56)

Variable	Mean	SD	PM	A	W	SC	OT
PM	3.25	0.70	1.000	.889***	-.547***	.671***	.607***
Predictor Variables							
A	3.06	0.64		1.000	-.594**	.728***	.111**
W	2.90	0.78			1.000	-.425**	-.021
SC	3.21	0.58				1.000	.823***
OT	3.23	0.51					1.000

*** Correlation is significant at the 0.001 level (2-tailed).

** Correlation is significant at 0.01 level (2-tailed).

PM= Participatory Management A=School Leaders' Attitude towards Participatory Management
W= School leaders' workload SC= School climate OT= Organizational trust

According to Table 8, it was found that school leaders' participatory management was positively and significantly related with school leaders' attitudes towards participatory management ($r=0.889$, $p<0.001$), workload ($r=0.547$, $p<0.001$), school climate ($r=0.671$, $p<0.001$) and organizational trust ($r=0.607$, $p<0.001$).

Table 9 Simultaneous Multiple Regression Analysis for Personal Factors and Contextual Factors Predicting School Leaders' Participatory Management Practices (N=56)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>
	B	Std. Error	Beta		
(Constant)	1.032	.230		7.495	.000***
School Leaders' Attitudes towards Participatory Management (A)	.396	.089	.522	4.436	.000***
School Leaders' Workload(W)	-.160	.067	-.226	-2.403	.020*
School Climate (SC)	.023	.007	.321	3.245	.002**
Organizational Trust (OT)	.111	.004	.331	3.338	.002**

Note: $R=.823$, $R^2=.651$; $F(4, 51) = 26.686$, *** $p<0.001$, ** $p<0.01$, * $p<0.05$

The Regression Equation is

School Leaders' Participatory Management = 1.032 + .396A - .160W + .023SC + .111OT

To evaluate the regression model and to determine how well the model fits the data, the researcher reported the adjusted coefficient of determination ($R^2=.651$). This indicated that 65.1% of the variance in school leaders' participatory management was explained According to

beta weights, school leaders' attitudes towards participatory management ($\beta=.396$, $p<0.001$) appeared to be the best predictor of school leaders' participatory management practices. School leaders' workload ($\beta=.160$, $p<0.05$) was the second predictor for school leaders' participatory management practices. Moreover, school climate was the third predictor for school leaders' participatory management practices ($\beta=.023$, $p<0.01$). In addition, organizational trust was the fourth predictor for school leaders' participatory management practices ($\beta=.111$, $p<0.01$).

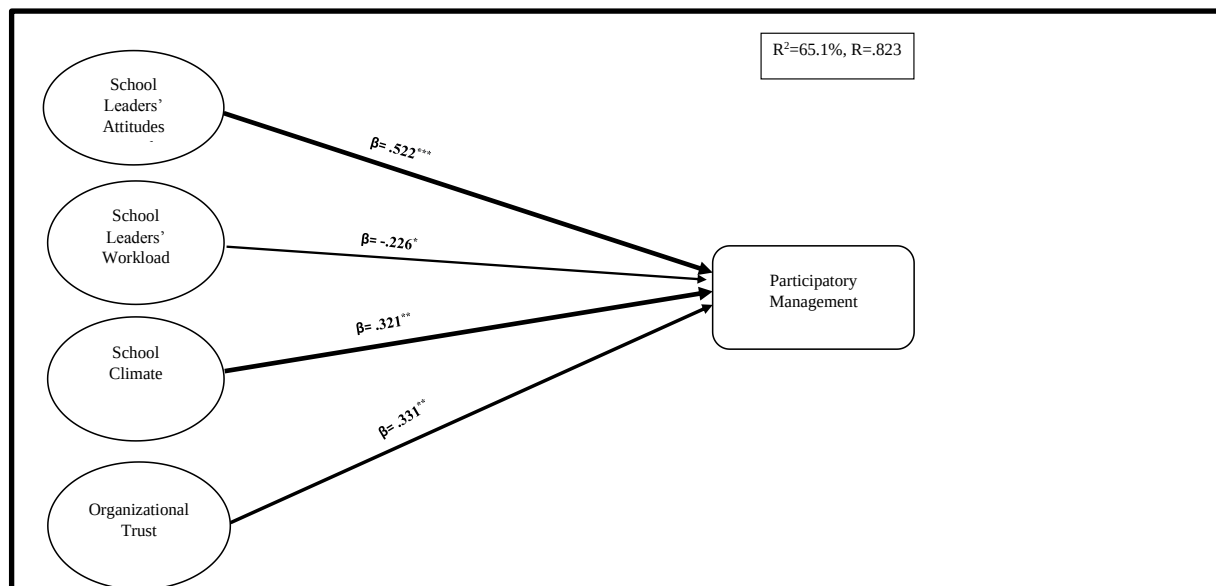


Figure 2 Potential Factors Affecting School Leaders' Participatory Management

- Predicting on School Leaders' Participatory Management (statistically significant)
 - - -→ Predicting on School Leaders' Participatory Management (not statistically significant but show relationship)

Based on the findings, a proposed model for school leaders' participatory management and school improvement for this study was developed and shown in Figure 3.

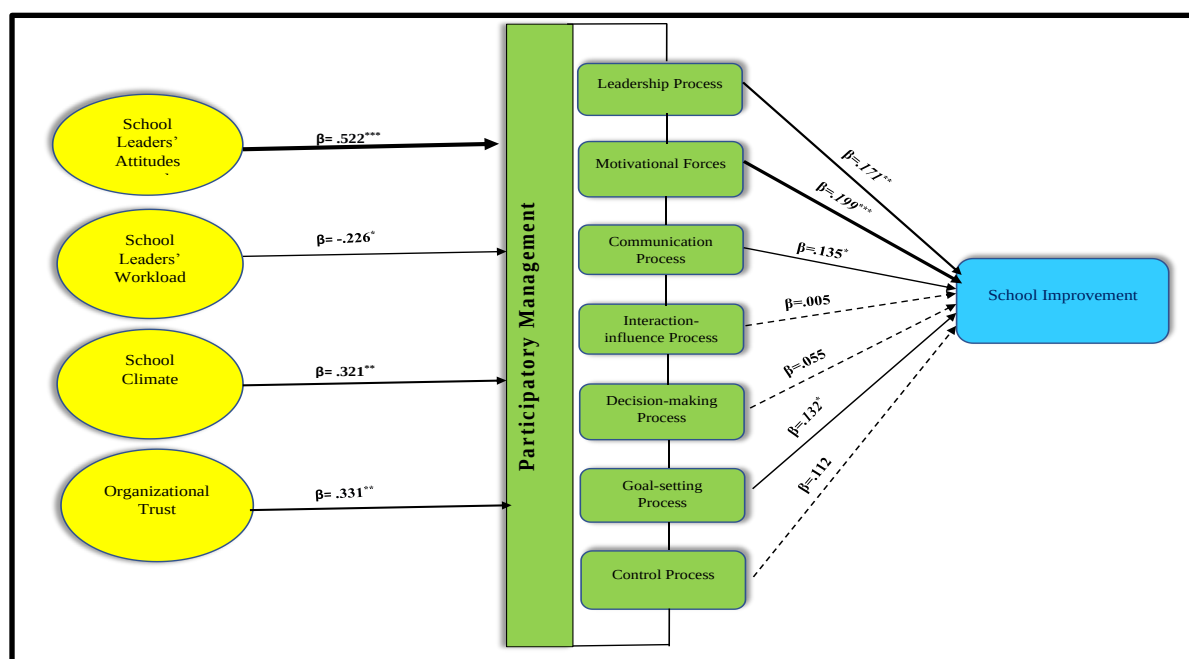


Figure 3 A Proposed Model for School Leaders' Participatory Management and School Improvement

Qualitative Findings (Interview, Observation and Document Analysis)

The results of the interview, observation and documentation could be summarized as follows:

Interview

And then *the kinds of school activities in which the school leaders, teachers and the members of school organizations participated* were budget and resource allocation, setting school policies and rules, school improvement planning, parents teachers association, discipline and behavioral management, school events and extra-curricular activities, maintaining school buildings, transportation and hiring teachers, and school activities and environment.

Moreover, *the school leaders helped teachers, parents and community members to participate more in school activities* by providing information about school, treating them with respect and trust, listening to their advice and opinions, treating parents as partners, communicating with the stakeholders regularly, inviting school events, making recognition and appreciation.

Furthermore, *the persons who took part in school improvement planning* were school leaders, teachers and school improvement plan committees. And *the things focused on in school improvement in your school* were the tasks concerned with organizing exams, managing school offices and using budgets, making green and clean schools, hiring workers, repairing toilets' roofs and broken doors, electric bills, and sports.

And then, *their opinions concerning the participation of parents and teachers in school management support school improvement*. All expressed yes. The engagement of stakeholders' diverse perspectives and ideas led to a sense of ownership among teachers and students, encouraging them to actively contribute to the school's betterment. It can foster good relationships and better learning outcomes. The stakeholders were aware of the actual conditions of the schools, contributed funds to the school, and found ways to improve the schools together.

Observation

All schools have organized school organizations. Group A, B and C schools made participatory decision-making. However, the one of the parents of the School Board of Trustees from Group D schools was silent and provided no answer to the school leaders. It was found that Group A, B and C schools had well-arranged classrooms, strong and safe school buildings, a good playground, clean and sanitised toilets, beautiful school gardens, enough water resources, and good maintenance of school environment. Group D schools were weak in the arrangement of classrooms, one dangerous school building, no playground, dirty toilets, poorly maintained school gardens, and school environment. Although all Group A schools, B, and C fully implemented their school improvement plan, Group D schools still left in implementing their school improvement.

Document Analysis

According to document analysis, all groups maintained records for school organizations, records of school meetings, records of student attendance, records of students' transition rate, records of MRC/CPR, records for discussing students' outcomes with parents, records for the support of instructional materials and resources, records for the assessment and maintenance of schools' buildings and infrastructures, records for school talk, records of the support from parents and the community, school assessment records, and records of collaborating with volunteers and community members. Although records for using library, ICT and media, records for discussion of the Board of Studies, records for checking lesson notes and plans, and records for implementing activities in the school calendar were found in Group A, Group B and Group C

schools, these were not found in Group D schools. Although Group A and C schools kept records for assessing students' exercise books and students' assessments, these were not found in Group B and Group D schools. Although Group A schools kept records for advanced training/certificates of teachers, records for inviting experts from various subject areas, and records of school families' groups, Group B, C and D schools did not keep these records. The records that were not found in all schools were records for observation of classrooms and records of prevention for natural disasters.

Results and Discussion

In this study, school leaders and teachers perceived their participatory management practices as moderate. Oskamp (1977, as cited in Landmesser, 1991) expressed that attitude can be shaped by events that occur in our surroundings. Further, Burhanuddin (2013) suggested that the employees who had a favorable attitude demonstrated a high level of performance at work. In this study, it was found that the school leaders who had a high level of attitudes towards participatory management practiced participatory management more than the school leaders with a low level of attitudes towards participatory management.

Increased administrative functions in schools reduce time for school principals to focus on certain management activities, such as participative management initiatives (Buthelezi, 2016). In this study, it was found that the school leaders who had a lot of workloads had less time in implementing their participatory management. Therefore, it could be concluded that heavy workload of school leaders affects their participatory management practices. Moreover, there was statistical significance among the group of school leaders' participatory management relating to school climate. It was found that the school leaders practiced more participatory management in the high level of organizational climate. According to open-ended responses, school environment that supports participatory management was one of the factors that support implementing participatory management. However, the study conducted by Reimann (1975) demonstrated that the structural factors of organization is not strongly related to perceived management effectiveness. In Burhanuddin (2013), leaders who were concerned with human values in the communication process were successful in building human relationships. The way leaders communicate with their subordinates can often be seen as a direct reflection of the organizational climate. Therefore, in this context, a supportive organizational climate influenced participatory management implementation. A supportive climate will enhance teamwork and communication by creating an atmosphere of cooperation and openness (Shadur et al., 1999). According to Schmid (1980, cited in Shagholi, 2011), organizational climate that is not conducive to participatory management was a barrier for participatory management.

Blasé and Blasé (2001, as cited in Mokoena, 2012) expressed that when there is trust, people are able to work together to identify and solve problems. Hargreaves (2001) argues that high levels of trust hasten the establishment of strong networks and collaborative relations among the members and stakeholders in a school. Tschannen-Moran (2001) has stated that people who have stronger trust in the organization, the decision makers tend to be more satisfied with their level of participation.

Managers' values concerning trust influence their willingness to allow subordinate participation in the decision-making process. Trust between management and employees is usually argued to be essential for effective participation (Wilsy, 1995). In this study, there was a *moderate level* of organizational trust among school leaders, teachers and parents. Moreover, there was a statistically significant difference among the groups of high level of organizational

trust, moderate level of organizational trust and low level of organizational trust. Therefore, it could be concluded that the higher the level of organizational trust, the more they implemented participatory management.

Concerning school improvement, the school leaders and teachers perceived that their school improvement was at *a moderate level*. Specifically, learning and teaching, professional development, leadership and management, infrastructures and resources showed a *high level* of improvement. Moreover, the students' achievement rates were higher in high-performing schools. However, parent and community participation showed a *moderate level* of improvement.

The interview result indicated that some school leaders should invite parents and community members into school environments for enjoyable and informal interactions that are welcoming, comfortable and culturally appropriate, treat them respect and trust, listen to their advice, make appreciation and recognition and invite them in school events.

The documentary analysis results indicated that most of the schools kept all records except records for observation of classrooms and records of prevention for natural disasters. According to the results of observation, most of the schools had school organizations, well-arranged classrooms, strong and safe school buildings, a good playground, clean and sanitised toilets, beautiful school gardens, enough water resources, good maintenance of school environment and made participatory decision-making.

In order to have effective school improvements, a school improvement plan is required (Harris, 2002). This is a road map that displays the changes that are needed in a school in order to improve the level of students' performance and clearly indicates how and when these changes will be made. Shuttleworth (2008) has explained that this plan helps school administrators, teachers, students, and parents determine their major focus. In this study, it was found that in schools with a high level of improvement, the school environment was well maintained, and all the school improvement plans were fully implemented.

Harris and Lambert (2013) posited that there are shared norms, shared values, agreed goals and common aspirations in improved schools. These shared norms, shared values, agreed goals and common aspirations reached through participatory management. Moreover, participatory management has a strong relationship with better school performance. Students perform best in schools with a "participatory" climate at all levels and where high but realistic expectations for students are held. Moreover, participatory management has been acknowledged as an essential ingredient in the improvement of school effectiveness and efficiency (Njoroge & Kathuri, 2017). According to the results of interview, all school leaders, teachers, and parents or community members from School Board of Trustees expressed that participatory management supports school improvement. The engagement of their diverse perspectives and ideas led to their contribution to the school's betterment.

Based on the findings, it was found that leadership process, motivational forces, communication process and goal-setting process appeared as predictors of school improvement. Communication process, interaction-influence process, decision-making process and control process were important for school improvement. Based on the results, leadership process, motivational forces, communication process, interaction-influence process, decision-making process, goal-setting process and control process impact school improvement.

Moreover, school leaders' attitude, workload, school climate and organizational trust affect their participatory management practices. The school leaders who have a high level of attitudes performed more participatory management than low level of attitudes towards participatory management. Moreover, although the school leaders had a heavy workload, they

performed significantly better in participatory management. A supportive organizational climate influences participatory management implementation (Burhanuddin, 2013). In this study, the school leaders in a supportive school climate performed better in their participatory management. Moreover, the schools with a high level of organizational trust significantly implemented their participatory management practices.

According to the findings, a proposed model for school leaders' participatory management and school improvement was developed. In this model, school leaders' attitude, workload, school climate and organizational trust were predictors of participatory management practices. Then, leadership process, motivational forces, communication process and goal-setting process appeared as predictors for school improvement. Interaction-influence process, decision-making process and control process were important for school improvement.

Not only school management but also all activities in school must be transparent because educational processes are essentially open systems and as such should be controlled only via white box or transparent box principles (Khin Zaw, 2001b). Therefore, the performance in schools should be controlled by white box principles. Moreover, if the school management became transparent, the work of the school would not only become more visible but also more closely intertwined and interconnected with family and community (Slater, 2004). With regards to Van Roekel (2008), parent, family, and community involvement in education correlates with higher academic performance and school improvement. Therefore, the role of participatory management could not be ignored in a school setting for improvement.

Suggestions

The followings were the suggestions for school leaders, teachers, and policymakers based on the findings of the research.

The policy makers

- should arrange a regular programme of leadership seminars, conferences and other development activities which focus specifically on aspects of management and leadership for effective utilization of an efficient school management system
- should offer training on equity, diversity, and inclusion to school leaders and teachers to create inclusive environments that cater to diverse student populations
- should facilitate opportunities for school leaders to collaborate with peers, both locally and nationally and internationally, to share best practices, strategies, and challenges
- should foster partnerships between schools and community organizations to offer resources and support services to families, such as health services, counseling, after-school programs, and other support systems

The school leaders

- should strengthen collaboration with teachers, pupils, parents and other members to achieve school goals
- should create an environment where stakeholders' opinions are valued and integrated into the decision-making process, acknowledge their efforts to participate continually in the decision-making process, establish open and transparent communication channels, provide them with the autonomy to make decisions related to their work, empower them to take ownership of their tasks, and implement a system that recognizes and rewards them for their contributions and achievements
- should create a supportive and friendly environment that provides confidence, loyal and a synergistic boost to increase organizational performance

- should provide opportunities for students to actively participate in decision-making processes, empowering them to have a say in their educational experiences
- should encourage the school members to initiate their influence on a substantial amount of cooperative teamwork.
- should invite School Improvement Committees and other stakeholders to participate in school activities in order to achieve school goals, enhance student support, and strengthen stronger relationships
- should conduct more discussions with the school leaders and teachers from other schools (school areas, school clusters)
- should cooperate with teachers and staff to maintain a playground, school compound and stadium in order to ensure a safe and conducive learning environment
- should support a collaborative culture among teachers in order to foster trust and relationships, enhance their professional development, and promote a well-rounded education
- should promote and foster the active engagement of parents and the local community in school events, administrative processes, and support initiatives
- should endeavor to utilize the strong and effective school leadership, with the assistance of other principals and administrators who can provide guidance and direction for school improvement efforts

The school leaders and teachers

- should attend professional development programs like seminars, workshops, and training courses to enhance their competencies
- should emphasize teachers' professional development areas to include in school improvement plan
- should cultivate an inclusive atmosphere that values and respects diverse backgrounds and perspectives, prioritizing the appreciation of diversity
- should create more opportunities for parents to participate in school programs
- should share information about school decisions, policies, and programs with parents in order to build trust and a sense of partnership

Needs for Further Research

This investigation mainly focused on school leaders' participatory management and school improvement.

- This study was limited to Basic Education High Schools in Yangon Region. Consequently, this procedure could be regarded as a constraint in the generalizability of its findings. Further study should be undertaken in other school levels, such as primary and middle schools.
- A qualitative research design should be used to investigate school leaders' participatory management and school improvement

Acknowledgements

We would to convey my profound appreciation to Rector and Pro-reactors of Yangon University of Education for permission to accomplish the dissertation successfully. We would like to offer our special acknowledgement to Professor, Referee and External Examiner for their administrative support and expert guidance during this study. Further, we are thankful to all school leaders, teachers and stakeholders from the selected schools for their active participation in this study.

References

- Argyris, C. (1955). Organizational leadership and participative management. *The Journal of Business*, 28(1), 1-7
- Atasoy, R. (2023). Leadership and workplace culture in the digital era: sustainability of the school leadership in the digital era under the shadow of crisis (Chapter 10). *School improvement*. IGI Global. DOI: 10.4018/978-1-6684-5864-8.ch010.
- Banai, M., & Katsounotos, P. (1993). Participative management in Cyprus. *International Studies of Management & Organization*, 23(3), 19-34. <https://doi.org/10.1080/00208825.1993.11656527>
- Burhanuddin (2013). *Participative management and its relationships with employee performance behavior. A study in the University Sector in Malang, Indonesia* (Doctoral Dissertation, University of Adelaide). School of Education. https://digital.librar.adelaide.edu.au/dspace/bitstream/2440/83505/9/01_front.pdf
- Buthelezi, A. B. (2016) *Participative management at secondary schools in the Uthungulu District*. Doctoral Dissertation. University of Zululand. <https://uzspace.unizulu.ac.za/server/api/core/bitstreams/002a10a8-9c64-4bed-a2f4-c589666f1b3c/content>
- Canaya, S. P. (2008). Participatory decision-making vis-a-vis teachers' morale and students' achievement in public secondary schools in Zamboanga City (Unpublished doctoral dissertation). College of Education, Western Mindanao State University. [Online]. Available at: <https://www.academia.edu/3745542/>
- Goodlad, J. I. (1984). *A place called school: Prospects for the future*. New York. McGraw-Hill.
- Hargreaves, D. H. (2001). A capital theory of school effectiveness and improvement British. *Educational Research Journal*, 27(4): 487-503.
- Harris, A. & Lambert, L. (2013). *Building leadership capacity for school improvement*. Philadelphia. Open University Press.
- Harris, A. (2002). *School Improvement: What's in It for Schools?* (1st edition). London: Routledge.
- Johnson, L., & Ledbetter, L. (2004). *The role of the principal in a shared decision-making school: a critical perspective*. Paper presented at the Annual Meeting of the American Education Research Association, Atlanta, GA, 12-16 April.
- Khin Zaw, Dr. (2001). *Theoretical pedagogy (I) (Ontology)*, PhD Programme Course Material, Yangon Institute of Education
- Landmesser, F.J. (1991). *The current attitudes of principals and teachers regarding mainstreaming in Virginia middle-level schools*. Dissertations, Theses, and Masters Projects. Paper 1539618746. <https://dx.doi.org/doi:10.25774/w4-gvje-t572>
- Lewin, K. (1951). *Field theory in social science: selected theoretical papers (Edited by Dorwin Cartwright)*. Harpers.
- Likert, R. (1961). *New patterns of management*. New York: McGraw Hill.
- Mokoena, S. (2012). Effective participative management: Does it affect trust levels of stakeholders in schools? *Journal of Social Science*, 30 (1), 45-53.
- Muruga, M. P. (2013). *Influence of headteachers' participatory management practices on pupils' performance at Kenya Certificate of Primary Education (KCPE) in Kirinyaga East District, Kenya* (Thesis, University of Nairobi). Retrieved from <http://erepository.uonbi.ac.ke/handle/11295/63490>
- Njoroge, N. & Kathuri, N. (2017). Influence of participatory management on school performance in public primary schools n Nakuru North Sub Country, Kenya. *International Journal of Recent Research in Social Sciences and Humanities (IJRSSH)*, 4(3), 33-43.
- Ogbo, A. I., Ugwu, C. C., Ugbam, C. O., & Chukwu, B. I. (2016). Participative management: Concept and application in consumer goods companies. *Risk Governance & Control: Financial Markets & Institutions*, 6(4), 223-226
- Quchi, W. (1981). Theory Z: How American Business can meet the Japanese. *Group & Organization Management*, 6(3), 283. <https://doi.org/10.1177/105960118100600316>
- Reimann, B. C. (1975). Organizational effectiveness and management's public values: A canonical analysis. *Academy of Management Journal*, 18(2), 224-241.
- Shadur, M. A., Kienzle, R., & Rodwell, J. J. (1999). The relationship between organizational climate and employee perceptions of involvement: The importance of support. *Group & Organization Management*, 24(4), 479-503. <https://doi.org/10.1177/1059601199244005>
- Shagholi, R., Zabihi, M.R., Atefi, M., & Moayedi, F. (2011). Female teachers and barriers of participatory management. *Procedia - Social and Behavioral Sciences*, 15, 241-245. <https://doi.org/10.1016/j.sbspro.2011.03.080>

- Shuttleworth, D. (2008). *School management in transition: Schooling on the edge*. New York: Routledge/Falmer.
- Stoll, L., & Fink, D. (1996). *Changing our schools* (1 Ed). Buckingham England ; Philadelphia: Open University Press.
- Tschannen-Moran, M. (2001). Collaboration and the need for trust. *Journal of Educational Administration*, 39(4): 308-331.
- Van Roekel, D. (2008). *Early childhood education and school readiness*. NEA Education Policy and Practice Department, Center for Great Public Schools. Washington, DC.
- Wilsy, M. D. (1995). Leadership and human motivation in the workplace, *Quality Progress*, 28: 11, pp. 85-88.

AN ANALYTICAL STUDY OF SCHOOL VIOLENCE MANAGEMENT STRATEGIES*

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Abstract

This study aims to investigate strategies for managing school violence, focusing on identifying commonly used violence management strategies and examining the relationship between these strategies and incidents of violence. Using a mixed-methods approach, surveys, interviews and documentary analysis were conducted with 1,430 high school students and 36 teachers for quantitative data, along with 12 teachers for qualitative insights, selected through multistage sampling. The reliability of the questionnaire was high (Cronbach's alpha > 0.90). Data were analyzed using exploratory and confirmatory factor analysis, descriptive statistics, and Pearson correlation. Six key strategies for managing school violence were identified: behavioral management strategy, safety-related strategy, curriculum-based strategy, early identification and intervention strategy, response strategy, and recovery strategy. Teachers predominantly employed response, safety-related, early identification, and behavioral management strategies. A negative correlation was found between school violence perpetration and the use of these strategies, suggesting that greater implementation is linked to reduced violence. This study highlights the importance of a holistic approach to violence management, engaging teachers, students, parents, and the community. It offers valuable insights for educators and policymakers seeking to improve the overall learning experience, create safer school environments and building peaceful society.

Keywords: School violence, School violence management strategies

Introduction

In today's world, the prevalence of violence among students within educational institutions has reached alarming levels, manifesting in varied and often unpredictable ways. Such incidents have profound implications on the well-being, development, and academic success of students. As a unique and transformative platform, education holds the potential to alter violent mindsets and promote non-violent behavior among young people (United Nations [UN], 2014). In Myanmar, the National Education Strategic Plan (NESP) highlights education as a critical force for supporting democratic values and fostering peace (Ministry of Education [MOE], 2016). Schools, as the foundational agencies of education, play an essential role in breaking cycles of violence by equipping students with communication skills, conflict resolution techniques, and values rooted in solidarity, tolerance, and respect. The International Commission on Education for the Twenty-first Century identified four fundamental pillars of learning: learning to know, learning to be, learning to do, and learning to live together (Delors, 1996). Among these, "learning to live together" is increasingly critical in today's context, where social harmony and conflict resolution skills are essential. Teachers, as leaders and role models for students, have a vital responsibility to guide young people toward constructive conflict management, empowering them to resist peer pressure, resolve interpersonal issues non-violently, and develop as responsible citizens who value human dignity and life (Sinclair, 2004). To fulfill this role effectively, teachers must be well-versed in various strategies for managing school violence, fostering an environment that encourages students to coexist peacefully and safely.

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Significance of the Study

School violence has severe short-term and long-term consequences for students, ranging from physical injuries and mental health issues to academic setbacks and long-term antisocial behavior. Such impacts harm not only student attendance and academic performance but also the broader social and economic stability of communities. Failure to address school violence can result in children facing these harmful consequences throughout their lives. In light of these risks, schools must prioritize creating mentally healthy, resilient children by fostering safe, supportive environments that emphasize constructive, peaceful conflict management. Effectively managing school violence requires a comprehensive approach by schools, educators, and policymakers that recognizes the need for a range of strategies. Skiba et al. (2000) underscore that no single solution can ensure school safety; rather, a combination of strategies is essential to cultivate a positive school climate. This study provides teachers and school leaders with a deeper understanding of diverse violence management strategies, while also contributing to the development of educational policies aimed at creating safer, more inclusive school environments. By promoting insights into practical approaches to violence management, this study aims to support the creation of safer learning spaces and encourage the adoption of policies that protect and nurture all students.

Research Objectives

- (1) To identify the school violence management strategies
- (2) To investigate the violence management strategies mostly used by the teachers
- (3) To investigate the relationship between the perpetration of school violence and the usage of school violence management strategies

Research Questions

- (1) What are the violence management strategies?
- (2) What are the violence management strategies mostly used by the teachers?
- (3) What is the relationship between the perpetration of school violence and the usage of school violence management strategies?

Conceptual Framework

This study based on the two model namely Response to Intervention (RTI) and School Wide Positive Behavior Support (SWPBS) model, both utilized three-tiered system with Tier 1 focusing on all students, Tier 2 targeting on at risk students and Tier 3 focusing at high risk of conduct disorder and on more intense level of intervention (one-on-one intervention) (Hilt-Panahon et al., 2011, Sprague & Horner, 2007). Osher et al. (1998) categorized the strategies for managing violence and aggression in schools into prevention strategies, intervention strategies and crisis response strategies.

Violent behaviors in the school are categorized into vandalic actions and interpersonal violence (Estevez et al., 2007). Vandalic actions include breaking desks or door, painting names, messages and graffities on the school walls. Interpersonal violence in the school may be students to students, students to staff members, staff members to students, staff members to staff members and parents to staff members (Cowie & Jennifer, 2007), and it may take the many specific forms including verbal violence; physical violence, sexual violence, emotional violence and psychological violence.

Definition of Key Term

School Violence

School violence can be defined as a phenomenon in which a member of the school community (teacher, student, other education workers, parent or visitor) is intimidated, bullied,

abused, threatened or assaulted; or their property is deliberately damaged by another member of that community or the public (Cowie & Jennifer, 2007).

Operational Definition

Violence Management Strategies

Violence management strategies are operationally defined as approaches used by the class teachers in managing violence among the students. Teachers' practices on violence management strategies are measured by the percentages calculated from the weighted frequencies. The greater the percentages, the higher the teachers' practices on violence management strategies.

Methodology

Research Method

This study used a mixed methods approach in which both quantitative and qualitative data are collected and analyzed within the single study. This study used the sequential explanatory mixed method approach where quantitative phase (numbers) followed by the qualitative phase (personal experience).

Sampling

The target population of this study was students and teachers from Yangon Region. For quantitative purpose, this study used multistage sampling to select the required participants. Total 1430 high school students and 36 class teachers were involved in this study. In the qualitative study, interviews also employed multistage sampling. Total 12 teachers were participated in the interview section.

Instrumentation

To collect the required quantitative data, a set of questionnaire was developed. The questionnaire consists of three parts; demographic data, school violence perpetration questionnaire and strategies for managing school violence questionnaire. The internal consistencies (Cronbach's alpha) were 0.91 for school violence perpetration questionnaire, and 0.96 for strategies for managing violence questionnaire respectively. In a qualitative study, semi-structure interview was conducted with teachers relating to the experience of school violence and strategies used for managing school violence.

Data Analysis

In this study, violence management strategies were identified by conducting the exploratory factor analysis and confirmatory factor analysis. Types of violence management strategies mostly used by the teachers were investigated with the descriptive statistics. The relationships between violence perpetration and various violence management strategies were investigated with Pearson Correlation analysis.

Findings

Exploring the School Violence Management Strategies

EFA and CFA were used to identify strategies for managing school violence. This study included 1430 participants and EFA was run with 620 participants and CFA was run with 810 participants, providing a ratio of over 10 cases per parameter in both EFA and CFA.

Exploratory Factor Analysis (EFA)

Exploratory factor analysis was used to discover dimensions of the scale and the number of items. Before running EFA, Kaiser-Meyer-Olkin (KMO) and Bartlett's test were utilized. EFA would be run when KMO coefficient was greater than 0.60 and the Bartlett's test was significant (Byukozturk, 2005, as cited Oguz, 2016). Kaiser-Meyer-Olkin Measure of Sampling Adequacy (.95) indicated that the sample size of the study was quite appropriate for the factor analysis. Bartlett's Test of Sphericity was also significant at 0.001 level ($p=0.000$). Factors that have eigenvalues greater than one were retained.

Table 1 School Violence Management Strategies Showing Eigenvalues of Rotation Sums of Squared Loadings

Rotation Sums of Squared Loadings		
Strategies	Eigenvalues	% of Variance
Factor 1	6.03	16.29%
Factor 2	3.85	10.40%
Factor 3	3.57	9.64%
Factor 4	3.32	8.97%
Factor 5	3.31	8.95%
Factor 6	2.51	6.79%

Eigenvalues of the six components were 6.03, 3.85, 3.57, 3.32, 3.31 and 2.51 respectively. These six factors explained 61.04 % of the total variance. Table 2 presents Factor Loadings and Communalities Based on Principal Component Analysis with Varimax Rotation for School Violence Management Strategies.

Table 2 Factor Loadings and Communalities Based on Principal Component Analysis with Varimax Rotation for School Violence Management Strategies (N=620)

Items	Components						Communalities
	1	2	3	4	5	6	
Setting the fair and clear rules prohibiting bullying and harassment.	.77						.76
Teaching systematically school behavior expectations to the students.	.77						.76
Recognizing and reinforcing the desirable behavior.	.79						.80
Actively supervising and monitoring the students' behavior.	.80						.81
Teaching and sharing the experiences of conflict resolution and violence prevention lesson.	.65						.76
Punishing the school violence according to the school rules and sanctions consistently.	.61						.66
Sharing the knowledge of early warning signs displayed by the students to parents and community.		.69					.76
Encouraging the parents and community to watch out the early warning signs displayed by the students.		.66					.76
Encouraging the parents and community to report the school if they occur any early warning signs.		.71					.73
Announcing the parents and community how to report and contact to school.		.51					.64
Assigning a pupil or pupils as a buddy who is actively listen to other peers' difficulties, problems and feeling.		.52					.63
Asking the students to find out a mutually acceptable solution of the peer problem by identifying and discussing the problems and causes of the problem.		.51					.64

Items	Components						Communalities
	1	2	3	4	5	6	
Asking the students to identify the routes to repairing damaged relations after violent incidents.		.50					.68
Checking the school environment with a group of teachers for safety.			.51				.62
Giving the phone number of teacher to contact if there are any problems on the way back to home.			.54				.63
Checking the toilets and other students gathering places to violate the school rules.			.55				.67
Announcing the behavior expectations and rules in the formal student gathering places.			.56				.76
Monitoring the students' behavior in formal student gathering places.			.76				.81
Training the anger management and practice mediation.				.71			.59
Developing individual behavioral plan for student who perpetrate the school violence.				.61			.69
Allowing the school council and other students leaders to decide solution about the incidents of school violence.				.68			.64
Asking the violent students to participate in community welfare programs.				.66			.66
Teaching about the violence and types of violence.					.65		.62
Teaching the safe behaviors.					.63		.64
Teaching the speaking skill, problem solving skills and share the knowledge about drugs and sexual education.					.51		.63
Teaching the child rights and responsibilities.					.50		.63
Using the restitution strategy.						.65	.65
Using in-school disciplinary alternatives.						.51	.53
Cooperating with the school management team to suspend and expulse students who perpetrate the school violence.						.74	.57

Note: Loading < 0.50 are suppressed.

Extraction method: Principal Component Analysis
Rotation method: Varimax with Kaiser Normalization

Table 2 displayed the items and factor loading for the rotated factors. According to Hair et al. (2014), the items with the factor loading values of 0.3 to 0.4 are minimally accepted and items with factor loadings below 0.3 should be eliminated. Buyukozturk (2005) argued that if the factor loading value of the item is 0.45 or higher, it is an indicator of a good result (as cited in Oguz, 2016). Thus, the rotated factor loadings less than 0.5 was omitted and items with the rotated factor loading greater than 0.5 were retained.

Factor one included six items with factor loadings ranging from 0.61 to 0.80, **factor two** involved seven items with factor loadings ranging from 0.50 to 0.71, **factor three** consisted of five items with factor loading ranging from 0.51 to 0.76, **factor four** included four items with

factor loading ranging from 0.61 to 0.71, **factor five** involved four items with factor loading ranging from 0.50 to 0.65, and **factor six** included three items with factor loading ranging from 0.51 to 0.74.

Table 3 stated the names of the violence management strategies proposed by the researcher in order to accommodate the extracted factors with descriptive statistics.

Table 3 Descriptive Statistics of the School Violence Management Strategies (N=620)

No.	Strategies	No. of Items	Mean	SD
1.	Behavioral Management Strategies	6	2.71	0.87
2.	Early Identification and Intervention Strategies	7	2.48	0.81
3.	Safety Related Strategies	5	2.76	0.79
4.	Recovery Strategies	4	2.06	0.76
5.	Curriculum Related strategies	4	2.26	0.79
6.	Response Strategies	3	2.75	0.71

The names of the strategies were validated by the well experienced teacher educators and expert retired educators from the Department of Educational Theory and Management, Yangon University of Education. After discussing violence management strategies with them, the names of factors were labeled with the meaning of items and their advice. Validated factors for violence management strategies were behavioral management strategies, early identification and intervention strategies, safety related strategies, recovery strategies, curriculum-based strategies and response strategies.

Confirmatory Factor Analysis (CFA)

After performing the EFA, CFA was conducted to test how well the obtained factor model fit. CFA is a technique that seeks to confirm if the number of factors (or constructs) and the loadings of observed (indicator) variables on them conform to what is expected on the basis of theory” (Costa & Sarmento, 2019). A CFA was performed using maximum-likelihood estimation to test the fit of the obtained factor model to the data. There are various indicators of the goodness of fit for a specific model. Model fit indices such as Normed Fit Index (NFI) of Bentler and Bonnett, Tucker-Lewis Index (TLI), Bentler’s Compared Fit Index (CFI) and the root mean square error (RMSEA) of misfit measure, were used in this study. The model fit indices of the violence management strategies were shown in Table 4.

Table 4 Model Fit Indices of the Model of Violence Management Strategies

Fit Indexes	Ideal Standards	Observed Values	Remark
RMSEA	< 0.1	0.07	Good fit
TLI	> 0.9	0.87	Acceptable
CFI	> 0.9	0.89	Acceptable
NFI	>0.9	0.87	Acceptable

According to Table 4, it was found that TLI, CFI and NFI were nearly 0.9 and RMSEA was within the acceptable limit of 0.08 (Hu & Bentler, 1999, as cited in Xia & Yang, 2018). According to criteria for a good model fit recommended by Wijanto (2008), RMSEA value of < .08 was a good fit and all TLI, CFI and NFI values were a marginal fit (acceptable). The results of confirmatory factor analysis were presented in figure 1.

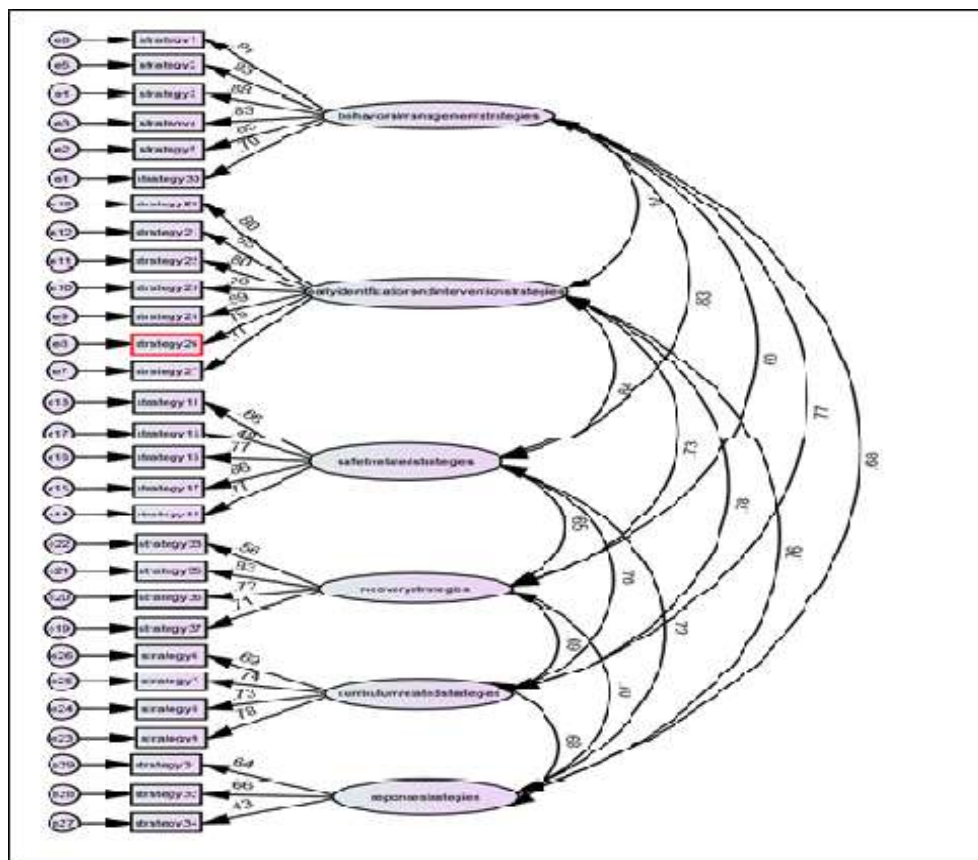


Figure 1 Confirmed Model of School Violence Management Strategies

Investigating the Violence Management Strategies Mostly used by Teachers

After identifying the violence management strategies by factor analysis, violence management strategies mostly use by the teachers were explored based on the students' responses and teachers' responses.

Investigating the Violence Management Strategies Mostly used by Teachers according to Students' Responses

The weighted frequency and percentage of the usage of each violence management strategy was calculated. The following Table 5 showed the weighted frequencies and percentages of violence management strategies.

Table 5 Weighted Frequencies and Percentages of School Violence Management Strategies used by Teachers According to Students' Responses (N=1430)

No.	Violence Management Strategies	Weighted Frequencies	Percentages
1.	Response Strategies	11091	95%
2.	Safety-related Strategies	18107	94%
3.	Early Identification and Early Intervention Strategies	21854	91%
4.	Curriculum-related Strategies	11142	85%
5.	Behavioral Management Strategies	7331	80%
6.	Recovery Strategies	9714	78%

According to Table 5, it was found that teachers mostly used response strategies, safety-related strategies, early Identification and Early Intervention with 95%, 94% and 91 % respectively. It can be seen clearly in Figure 2.

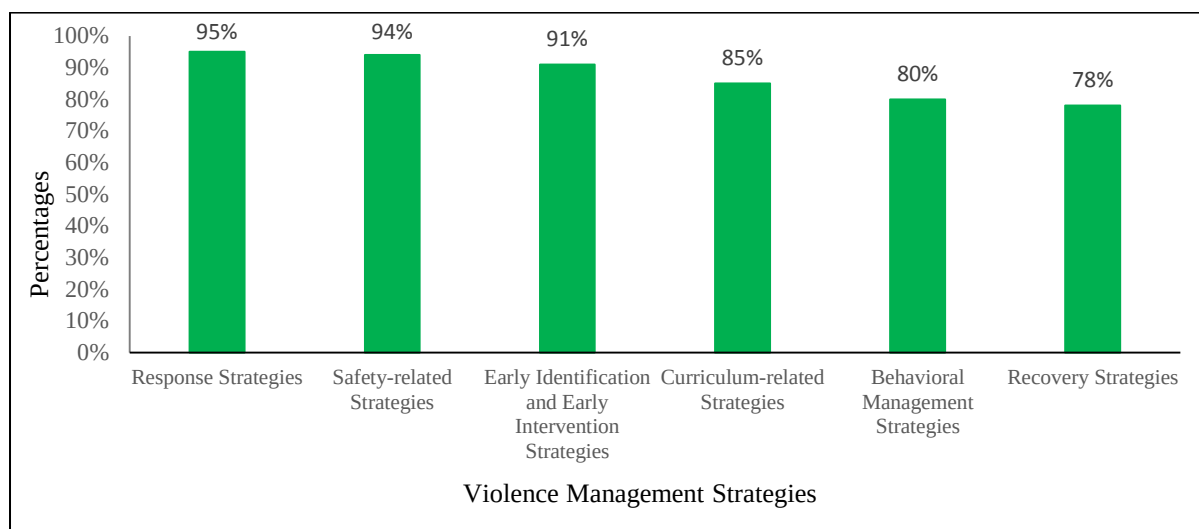


Figure 2 Percentages of School Violence Management Strategies used by Teachers According to Students' Response

Investigating the Violence Management Strategies Mostly used by Teachers according to Their Responses

The weighted frequency and percentage of the usage of each violence management strategy was calculated. The following Table 6 showed the weighted frequencies and percentages of violence management strategies.

Table 6 Weighted Frequencies and Percentages of School Violence Management Strategies used by Teachers According to Their Responses (N=36)

No.	Violence Management Strategies	Weighted Frequencies	Percentages
1.	Early Identification and Early Intervention Strategies	773	99%
2.	Safety-related Strategies	621	99%
3.	Behavioral Management Strategies	656	98%
4.	Curriculum-related Strategies	405	98%
5.	Response Strategies	344	97%
6.	Recovery Strategies	341	92%

According to Table 6, class teachers responded that they mostly used early identification and intervention strategies, safety-related strategies, behavioral management strategies with 99%, 99% and 98 % respectively. It could be seen clearly in Figure 3.

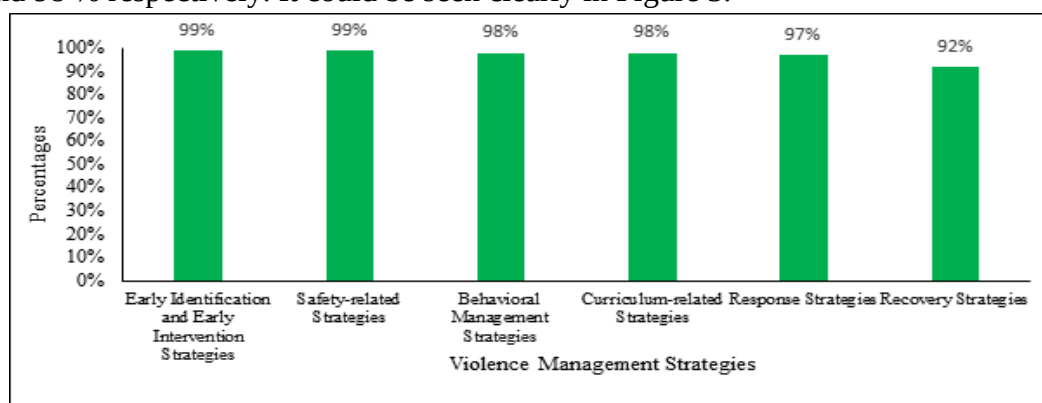


Figure 3 Percentage of School Violence Management Strategies used by Teachers According to Their Responses

Investigating the Relationship between School Violence and Violence Management Strategies according to Students' Response

In order to explore how different school violence management strategies effect the school violence, the relationship between school violence management strategies and school violence were explored with Pearson Product-Moment Correlation.

Table 7 Correlation Matrix between School Violence and Violence Management Strategies (N=1430)

	Violence perpetration	Behavioral management strategies	Early identification and intervention	Safety related strategies	Curriculu m related strategies	Response strategies	Recovery strategies
Violence perpetration	1	-.606**	-.536**	-.491**	-.345**	-.216**	-.246**
Behavioral management strategies		1	.732**	.757**	.696**	.512**	.529**
Early identification and intervention			1	.737**	.681**	.550**	.611**
Safety- related strategies				1	.634**	.497**	.494**
Curriculum- related strategies					1	.475**	.546**
Response strategies						1	.429**
Recovery strategies							1

** . Correlation is significant at the 0.01 level

According to the Table 7, it was found that there was significant negative correlation between school violence perpetration and violence management strategies. It was found that there were significant negative correlations between school violence perpetration and behavioral management strategies ($r = -0.606$, $p = 0.000$), early identification and intervention strategies ($r = -0.536$, $p = 0.000$), safety-related strategies ($r = -0.491$, $p = 0.000$), curriculum-related strategies ($r = -0.345$, $p = 0.000$), response strategies ($r = -0.216$, $p = 0.000$), and recovery strategies ($r = -0.246$, $p = 0.000$). It can be concluded that the more the teachers used violence management strategies, the lower the perpetration of violence by the students. The effect size ranged from small than typical to larger than typical in social science.

Responses for the open-ended questions

In teacher questionnaire, 36 class teachers from the selected Basic Education High Schools were asked the three open-ended questions. First question concerned with types of school violence experienced by teachers, second question concerned how they manage school violence in their schools. Their responses to these open-ended questions were presented as the qualitative findings.

1. What types of school violence are occurred in your schools?

Teachers' responses to the types of school violence experienced in their schools were;

- Physical Violence (n=26)
- Verbal Violence (n=26)
- Psychological Violence (n=6)
- No experience of school violence (n=6)

2. How do you manage school violence in your school?

Teachers' response on how they manage school violence were:

- Verbally warning students by class teachers (n=7)
- Informing to school disciplinary board, recording the incidence in the report book and ask the students to sign on covenant letter (n=7)
- Sending disciplinary letter to Parents and ask for consultation about their children's violent behavior (n=9)
- Suspending and dismissing in accordance with the decision of school disciplinary board (n=6)
- Using in-school disciplinary activities such as cleaning, glass cutting (n= 2)
- Participating in community welfare activities (n=1)
- Asking to participate in music, physical exercise and other activities in school (n=1)
- Counselling the victimized students (n=2)
- Counselling the problem child to reduce their violent behavior (n=2)

Results of Interview

Based on the quantitative findings, schools were classified into two groups; high rate of school violence and low rate of school violence. Group I included six teachers from township with the highest rate of school violence perpetration. Group II included six teachers from township with the lowest rate of school violence perpetration were selected for interview. Semi-structure interview format was used.

Teachers' Responses

Class teachers and teachers who are members of school disciplinary board were selected for interview. Teacher participants were asked a series of opening about the strategies that they used for managing school violence.

When interviewing about **the strategies used by the teachers for managing school violence**, teachers from both groups stated the various prevention strategies, intervention strategies and response strategies.

Prevention Strategies: Teachers set general rules, fostered positive relationships, and modified physical environments to reduce incidents. Group II schools, with lower violence rates, implemented more structured safety practices, such as frequent monitoring and requiring signed agreements on school rules.

Intervention Strategies: Teachers monitored early warning signs and collaborated with parents and communities. In Group II, students proactively informed teachers of potential issues, allowing for early intervention. Pairing low-engagement students with high achievers was noted as an effective approach in Group II.

Response Strategies: Group I teachers used a step-based discipline system, including suspension, while Group II preferred non-punitive responses like counseling and school duties. Teachers from both groups applied in-school disciplinary tasks, though Group I faced occasional resistance.

Results of Documentary Analysis

According to the documentary analysis, types of violence mostly perpetrated by the students were;

- Verbal violence and mild physical violence such as kicking and beating
- Serious physical violence such as such punching, using dangerous objects to fight and bleeding incidence
- Mild sexual violence such as irrelevant touching to the girl and sending sexual text message
- psychological violence such as threatening by using offensive words or showing fist
- Vandalism, Financial Violence

The violence management strategies mostly used by teachers were;

- Suspending
- Informing to parents and ask to sing on school disciplinary record book
- Being Warned by the teachers, send to principal office

Conclusion

The study highlights the effectiveness of a comprehensive violence management strategies, integrating prevention, intervention, and response strategies to create a safer school environment. Educational leadership plays a pivotal role in fostering a culture of safety and respect, guiding policies and practices that promote consistent implementation across all levels of school operations. Effective leadership also ensures alignment between teacher-student perceptions of violence management, fostering collaboration among stakeholders to enhance school safety and support a positive learning environment. By instituting clear policies and leading, school leaders can inspire a commitment to safe and supportive environments across the school community.

Suggestions

The findings from this study provide valuable insights into strategies for school violence management. Based on these findings, the following suggestions are proposed for Basic Education Schools, educational institutions, and policymakers.

- **Strengthening Prevention and Intervention Policies:** Administrators and teachers should establish and enforce clear, evidence-based policies that prioritize prevention and intervention. Policies should be designed to foster a safe, inclusive environment, with guidelines on managing and addressing violent behavior. Educational leaders should collaborate with teachers to establish rules, promote emotional intelligence, and teach conflict resolution skills, aiming to prevent violence before it occurs.
- **Empowering Teachers and Student Leaders through Training:** Intervention strategies should include structured, policy-backed training programs for both teachers and student leaders. Leaders should implement policies that support training in recognizing warning signs of violence, mentoring, and counseling skills to assist at-risk students. Furthermore, student leaders should receive training in negotiation, communication, and problem-solving strategies to mediate conflicts among peers.
- **Reducing Dependence on Punitive Measures through Policy Innovation:** Findings suggest a need to minimize reliance on punitive measures like suspension and expulsion. Educational leaders should consider policy changes that emphasize alternative, supportive disciplinary strategies, such as restorative justice practices and in-school counseling. Establishing policies that prioritize recovery-focused approaches can help address underlying behavioral issues and support students' social and emotional development.

- **Adopting a Holistic, Community-Centric Approach:** Schools should adopt a holistic policy framework for managing violence, involving educators, students, parents, and community members. Policies should reflect a multi-layered approach to violence management, integrating prevention, intervention, and response strategies to build a safe, collaborative school culture. School leaders should advocate for policies that promote partnerships with families and community organizations to foster a broader support network for students.
- **Encouraging Continuous Policy Research and Development:** Ongoing research and collaboration among educational leaders, researchers, and policymakers are essential for continuously improving school violence management strategies. Policymakers should establish frameworks that facilitate research-driven decision-making, encouraging schools to refine their approaches based on current findings and best practices. By fostering a culture of continuous improvement, schools can stay responsive to emerging needs and contribute to the development of safer learning environments.

These suggestions aim to guide educational leaders, policymakers, and Basic Education Schools in establishing policies and practices that promote a safe, nurturing learning environment. By implementing these strategies and supporting a proactive leadership role, schools can play a vital part in reducing violence, enhancing well-being, and ensuring students have a safe space to learn and grow.

Acknowledgements

We would like to offer our respectful gratitude to rector and pro-reactors of Yangon University of Education for their permission to carry out this research. We would like to offer our special acknowledgement to Professor for her administrative support and expert guidance during this study. Further, we are thankful to all the principals, teachers and students from the selected schools for their active participation in this study.

References

- Costa, V., & Sarmento, R. (2019). *Confirmatory Factor Analysis: A case study*. Cornell
- Cowie, H., & Jennifer, D. (2007). *Managing violence in schools: Whole school-approach to best practice*. SAGE Publications, London. <https://doi.org/10.4135/9781446214558>
- Delors, J. (1996). *Learning-the treasure within: Report to UNESCO of the International Commission on Education for the Twenty-first Century*. UNESCO, Paris.
- Estevez, E., Murgui, S., Musitu, G. & Moreno, D (2007). School Violence in Adolescence: An analysis of mediators of family and classroom environment effects by gender. *Journal of Adolescence*, Vol.35.
- Hilt-Panahon, A., Shapiro, E. S., Clemens, N. H., & Gischar, K. L. (2011). *The structure and content of the RTI model*. The Guilford Press.
- Ministry of Education (MOE). (2016). *National Education Strategic Plan (2016-2021)*. http://resource.mmoe.myanmarexam.org/docs/nesp/NESP-SUMMARY_English.pdf
- Oguz, A. (2016). Development of oral expression self-efficacy belief scale for pre-service teachers. *Journal of Educational Science Research*, 6(1). <https://www.researchgate.net/publication/301493995>
- Osher, D., Dwyer, K., & Warger, C. (1998). *Early warning, timely response: A guide to safe schools*. U.S. Department of Education, Washington DC.
- Sinclair, M. (2004). *Learning to live together: Building skills, values and attitudes for the twenty-first century*. United Nations Educational, Scientific and Cultural Organization (UNESCO).
- Skiba, R., Boone, K., Fontanini, A., Wu, T., & Strassell, A. (2000). *Preventing school violence: A practical guide to comprehensive planning*. Indiana Education Policy Center.
- Sprague, J. and R. Horner (2007). *School wide positive behavioral support. Handbook of school violence and school safety*. Erlbaum Associates, Inc.
- United Nations (UN). (2014). *Tackling violence in schools: A global perspective bridging the gap between standards and practice*. https://sdgs.un.org/sites/default/files/publications/2611violence_in_schools.pdf
- Xia, Y., & Yang, Y. (2018). RMSEA, CFI, and TLI in structural equation modeling with ordered categorical data: The story they tell depends on the estimation methods. *Behavioral Research Methods*, 15,409-428.

ENTREPRENEURSHIP EDUCATION: A STUDY OF TEACHER EDUCATORS' ATTITUDE

Thet Thet Khine¹, Su Chan Myae² & Khin Mar Ni³

Abstract

The primary objective of this study was to investigate teacher educators' attitudes toward entrepreneurship education. The study employed a mixed-methods approach, combining both quantitative and qualitative research methods. A total of 336 teacher educators from ten education degree colleges were selected through simple random sampling. Data were collected using questionnaires, open-ended questions and interviews. For the qualitative aspect, 16 teacher educators were purposefully chosen as participants. The reliability of the attitude-related items in the survey was confirmed with a coefficient of 0.80. Quantitative data analysis included descriptive statistics, independent samples t-test, one-way ANOVA and multiple comparisons. The qualitative data were analyzed using thematic analysis, enabling the identification of recurring themes. The findings revealed that teacher educators generally exhibited a positive attitude toward entrepreneurship education. Personal factors such as age, academic qualifications, years of service, and experience with entrepreneurship education significantly influenced their attitudes. However, challenges such as lack of resources, financial support, and infrastructure were noted as potential barriers to the effective implementation of entrepreneurship education. Additionally, concerns were raised about integrating entrepreneurship education into the existing curriculum. This study highlights the need for institutional support and strategic interventions to foster positive attitudes among teacher educators, which is essential for the successful integration of entrepreneurship education.

Keywords: Attitude, Entrepreneurship Education

Introduction

In recent years, countries around the globe, including Myanmar, have been grappling with significant socioeconomic challenges, particularly unemployment. As governments strive to create pathways for employment and economic self-sufficiency, the role of entrepreneurship and entrepreneurship education has become increasingly vital. Globally recognized as a key driver of economic growth and innovation, entrepreneurship is seen not only as a solution to unemployment but as a means to foster a self-sustaining economy. As a result, many educational systems are integrating entrepreneurial dynamic skills into their curricula, preparing students to meet the demands of modern employers who prioritize initiative, innovation, and a forward-thinking mindset.

For Myanmar, aligning the educational system with global trends in entrepreneurship education is essential for building a resilient and adaptable economy. International organizations such as the European Commission (2010) and UNESCO (2004) have emphasized the importance of entrepreneurship education in addressing global economic challenges. To meet these demands, Myanmar's education system must undergo significant reforms to equip students with the entrepreneurial mindset needed for innovation, job creation, and sustainable development. The emphasis on entrepreneurship education aligns with the country's need for economic

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diversification, particularly in the wake of globalization and rapid technological advancements. Teacher educators are at the forefront of this transformation, tasked with fostering an entrepreneurial mindset among future teachers. They play a critical role in shaping how entrepreneurship is taught, understood, and applied in the classroom.

Significance of the Study

This study is pivotal for shaping the future of teacher education in Myanmar by investigating teacher educators' attitudes toward entrepreneurship education. The findings will provide crucial insights for policy development, curriculum enhancement, and teacher training programs tailored to Myanmar's unique educational and economic needs. As Myanmar continues to face rising unemployment and seeks pathways for economic growth, preparing teacher educators to effectively teach entrepreneurship is essential for fostering entrepreneurial skills in future generations. This aligns with the nation's goal of economic diversification and the promotion of small and medium-sized enterprises (SMEs) as noted by Nu Nu Lwin (2019). By addressing the talent and skills gap highlighted in the Myanmar Entrepreneurial Ecosystem Snapshot Report (2019), this study will support efforts to close the gap in entrepreneurial capacity. It will help develop a more robust entrepreneurship education curriculum that reflects the specific challenges faced by teacher educators in Myanmar, ultimately contributing to the nation's long-term economic development. Moreover, the findings can offer valuable insights for other nations facing similar challenges, emphasizing the global importance of entrepreneurship education.

Aim of the Study

The main purpose of this study was to investigate teacher educators' attitudes towards entrepreneurship education and to discuss the impact of personal factors on these attitudes.

The specific objectives of this study were described as follows.

- (1) To examine teacher educators' attitude towards entrepreneurship education in relation to their personal factors.
- (2) To identify the factors influencing teacher educators' attitude towards entrepreneurship education.

Conceptual Framework

This study builds upon theoretical insights from Watson (2013), Lackéus (2015), Ioannou et al. (2017), and Bacigalupo et al. (2016) to examine teacher educators' attitudes towards entrepreneurship education. The framework encompasses three key domains: Ideas and Opportunities, Resources, and Into Action.

Ideas and Opportunities:

- Spotting Opportunities: Encourages learners to identify market opportunities and challenges.
- Creativity: Fosters innovation through creative thinking and resourcefulness.
- Vision: Teaches learners to imagine and work towards a future vision by translating ideas into actions.
- Valuing Ideas: Students learn to assess the value of ideas socially, culturally, and economically.
- Ethical and Sustainable Thinking: Emphasizes the impact of entrepreneurial action on society and the environment.

Resources:

- Self-awareness and Self-efficacy: Cultivates belief in one's abilities and reflection on strengths and weaknesses.
- Motivation and Perseverance: Focuses on resilience and persistence in achieving goals.
- Mobilizing Resources: Teaches the efficient use of resources, including financial literacy.
- Financial Literacy: Equips students to make informed financial decisions that sustain value-creating activities.
- Mobilizing Others: Promotes collaboration and leadership to achieve entrepreneurial goals.

Into Action:

- Taking Initiative: Encourages proactive problem-solving and goal-setting.
- Planning and Management: Develops strategic planning and adaptability to unforeseen changes.
- Coping with Uncertainty: Emphasizes decision-making in ambiguous situations with risk management.
- Working with Others: Promotes teamwork, networking, and conflict resolution in entrepreneurial endeavors.
- Learning through Experience: Encourages reflective learning from both successes and failures.

The Entrepreneurial Intention Model (EIM) and Structural Model of Entrepreneurial Intention (SMEI) (Luthje & Franke, 2003) suggested that entrepreneurial intention is shaped by personal and contextual factors. This study incorporates these models, personal factors influencing teacher educators' attitudes toward entrepreneurship education. Personal factors include demographic attributes such as gender, age, qualifications, and experience with entrepreneurship education influence entrepreneurial attitudes.

Definitions of Key Terms**Attitude**

Attitude is a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object (Fishbein & Ajzen, 1993).

Entrepreneurship Education

Entrepreneurship education is about learners developing the skills and mind-set to be able to turn creative ideas into entrepreneurial action (European Commission, 2016).

Limitations of the Study

This study focuses exclusively on teacher educators' attitudes toward entrepreneurship education in Lower Myanmar, which may limit the generalizability of the findings beyond this region. The assessment of attitudes encompasses three dimensions: ideas and opportunities, resources, and into action. Additionally, entrepreneurship education is a dynamic field, and teacher educators' attitudes and understanding may change over time due to evolving pedagogical approaches and curriculum changes. The study's findings may only provide a snapshot of a particular period.

Methodology

Research Method

In this study, a mixed-method research design, both quantitative and qualitative method, was used.

Sampling

This study included a total population of 483 teacher educators from all Education Degree Colleges in Lower Myanmar. For the quantitative purpose, participants were selected using a simple random sampling method, comprising 336 teacher educators. In the qualitative study, 16 teacher educators were purposefully selected as participants.

Instrumentation

To collect quantitative data, a questionnaire was designed with two sections: personal factors and teacher educators' attitudes toward entrepreneurship education. The reliability coefficient was 0.80 for the attitude items. Additionally, semi-structured interviews were conducted with selected teacher educators to gain qualitative insights.

Data Analysis

In the quantitative phase, data from the questionnaires were analyzed using SPSS version 26. Teacher educators' attitudes towards entrepreneurship education were assessed based on mean values, categorized from "strongly negative" to "strongly positive". Independent samples t-tests, one-way ANOVA, and post-hoc multiple comparison tests were conducted to examine variations in attitudes based on personal factors. The qualitative data were organized, coded, and analyzed to identify patterns and themes, which were compared with the quantitative results and relevant documents.

Findings

Investigating Teacher Educators' Attitude towards Entrepreneurship Education

Table 1 showed the mean values and standard deviations of teacher educators' attitude towards entrepreneurship education.

Table 1 Mean Values and Standard Deviations of Teacher Educators' Attitude Towards Entrepreneurship Education (N=336)

No.	Attitude towards Entrepreneurship Education	Mean	SD	Remark
1	Ideas and Opportunities	3.16	.29	Positive
2	Resources	3.14	.29	Positive
3	Into Action	3.16	.31	Positive
	Overall	3.16	.29	Positive

Scoring Direction:

1.00-1.75=Strongly Negative 1.76-2.50=Negative 2.51-3.25=Positive 3.26-4.00=Strongly Positive

According to Table 1, the overall attitude towards entrepreneurship education, indicated by the grand mean value, is 3.16 reflecting a positive orientation among teacher educators.

Variations of Teacher Educators' Attitude towards Entrepreneurship Education According to Their Personal Factors

To explore potential variations in teacher educators' attitudes towards entrepreneurship education, this study examines the role of personal factors, such as gender, age, qualification,

position, years of service, subject taught, and entrepreneurial experiences.

Table 2 Independent Samples t-Test Results of Teacher Educators' Attitudes Toward Entrepreneurship Education by Gender (N=336)

Domain	Gender	N	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Ideas and Opportunities	Male	18	3.12	.32	-.30	334	n.s
	Female	318	3.14	.29			
Resources	Male	18	3.11	.43	-.43	334	.032*
	Female	318	3.14	.29			
Into Action	Male	18	3.00	.37	-2.19	334	n.s
	Female	318	3.17	.31			
Overall	Male	18	3.08	.35	-1.07	334	n.s
	Female	318	3.15	.27			

Note: n.s= no significance, * $p < .05$

Table 2 showed a significant gender difference in the Resources domain among teacher educators, but no differences in other domains.

Table 3 One-way ANOVA Results on Teacher Educators' Attitudes towards Entrepreneurship Education by Age (N=336)

Domain	Age group	N	Mean	SD	<i>F</i>	<i>p</i>
Ideas and Opportunities	21-30	74	3.14	.28	1.10	n.s
	31-40	110	3.15	.30		
	41-50	60	3.18	.34		
	>50	92	3.10	.23		
Resources	21-30	74	3.12	.30	4.68	.003**
	31-40	110	3.14	.32		
	41-50	60	3.25	.36		
	>50	92	3.07	.20		
Into Action	21-30	74	3.16	.30	5.74	.001**
	31-40	110	3.21	.34		
	41-50	60	3.24	.37		
	>50	92	3.05	.22		
Overall	21-30	74	3.14	.26	4.05	.007**
	31-40	110	3.17	.29		
	41-50	60	3.22	.34		
	>50	92	3.07	.19		

Note: n.s= no significance, ** $p < .01$

As shown in Table 3, results indicated significant differences among age groups in the Resources ($F(3,332) = 4.68, p < .01$) and Into Action ($F(3,332) = 5.74, p < .01$) domains, while no significant differences were found in the Ideas and Opportunities domain. Therefore, to obtain more detailed information, Tukey HSD post hoc comparison was performed as shown in Table 4.

Table 4 Multiple Comparisons for Teacher Educators' Attitude towards Entrepreneurship Education by Their Age (N=336)

Domain	(I) Age	(J) Age	Mean Difference (I-J)	<i>p</i>
Ideas and Opportunities	41-50 years	Above 50 years	.19	.001**
Resources	31-40 years	Above 50 years	.16	.003**
	41-50 years	Above 50 years	.19	.002**
Overall	41-50 years	Above 50 years	.15	.005**

Note: ** $p < .01$

The results in Table 4 indicated significant differences in attitudes towards entrepreneurship education among teacher educators by age, particularly between those aged 41-50 and those over 50.

Table 5 One-way ANOVA Results on Teacher Educators' Attitudes towards Entrepreneurship Education by Academic Qualification (N=336)

Domain	Qualification	<i>N</i>	Mean	SD	<i>F</i>	<i>p</i>
Ideas and Opportunities	Bachelor Degree	169	3.10	.27	3.75	.02*
	Master Degree	138	3.17	.29		
	PhD Degree	29	3.23	.32		
Resources	Bachelor Degree	169	3.10	.28	3.10	n.s
	Master Degree	138	3.17	.31		
	PhD Degree	29	3.20	.31		
Into Action	Bachelor Degree	169	3.11	.29	6.04	.003**
	Master Degree	138	3.20	.33		
	PhD Degree	29	3.30	.31		
Overall	Bachelor Degree	169	3.10	.25	4.92	.008**
	Master Degree	138	3.18	.29		
	PhD Degree	29	3.24	.30		

Note: n.s= no significance, ** $p < .01$, * $p < .05$

According to Table 5, the overall score also showed significant differences between academic qualifications ($F(2,333)=4.92$, $p < .01$). Therefore, to gain more detailed insights, a Tukey HSD post hoc comparison was conducted, as shown in Table 6.

Table 6 Multiple Comparisons for Teacher Educators' Attitude towards Entrepreneurship Education by Their Academic Qualification (N=336)

Domain	(I)Qualification	(J)Qualification	Mean Difference(I-J)	<i>p</i>
Into Action	Bachelor Degree	Master Degree	-.087	.04*
		PhD Degree	-.193	.007**
Overall	Bachelor Degree	Master Degree	-.07	.03*
		PhD Degree	-.14	.03*

Note: ** $p < .01$, * $p < .05$

As presented in Table 6, for the domain "Into Action," teacher educators with Master degrees had significantly higher attitudes towards entrepreneurship education than those with Bachelor degrees ($p < .05$, $d=0.28$), and teacher educators with PhD degrees had significantly higher attitudes than those with Bachelor degrees ($p < .01$, $d=0.62$). Overall, teacher educators with Master degrees and PhD degrees had significantly higher attitudes than those with Bachelor degrees ($p < .05$, $d=0.28$; $p < .05$, $d=0.47$) respectively.

Table 7 One-way ANOVA Results on Teacher Educators' Attitudes towards Entrepreneurship Education by Their Position (N=336)

Domain	Position	N	Mean	SD	F	p
Ideas and Opportunities	Tutor	76	3.13	.28	2.44	n.s
	Assistant Lecturer	47	3.24	.32		
	Lecturer	71	3.15	.31		
	Associate Professor	87	3.13	.29		
	Professor	55	3.06	.19		
Resources	Tutor	76	3.15	.32	1.12	n.s
	Assistant Lecturer	47	3.21	.35		
	Lecturer	71	3.13	.34		
	Associate Professor	87	3.11	.27		
	Professor	55	3.11	.19		
Into Action	Tutor	76	3.14	.28	1.63	n.s
	Assistant Lecturer	47	3.24	.36		
	Lecturer	71	3.20	.37		
	Associate Professor	87	3.15	.32		
	Professor	55	3.10	.20		
Grand Mean	Tutor	76	3.14	.26	1.72	n.s
	Assistant Lecturer	47	3.23	.32		
	Lecturer	71	3.16	.31		
	Associate Professor	87	3.13	.27		
	Professor	55	3.09	.17		

Note: n.s= no significance

The findings in Table 7 revealed that there were no significant differences in teacher educators' attitudes towards entrepreneurship education across different positions in any of the three domains.

Table 7 One-way ANOVA Results on Teacher Educators' Attitudes towards Entrepreneurship Education by Years of Service (N=336)

Domain	Years of Service	N	Mean	SD	F	p
Ideas and Opportunities	Below 10 years	127	3.15	.31	3.391	.03*
	11-20 years	113	3.18	.31		
	Above 20 years	96	3.08	.21		

Domain	Years of Service	N	Mean	SD	F	p
Resources	Below 10 years	127	3.14	.32	2.584	n.s
	11-20 years	113	3.18	.34		
	Above 20 years	96	3.08	.22		
Into Action	Below 10 years	127	3.20	.32	5.972	.003**
	11-20 years	113	3.20	.36		
	Above 20 years	96	3.07	.23		
Overall	Below 10 years	127	3.16	.29	4.411	.01*
	11-20 years	113	3.19	.31		
	Above 20 years	96	3.08	.20		

Note: n.s= no significance, * $p < .05$, ** $p < .01$

As indicated by Table 7, there were significant differences for the Ideas and Opportunities domain, ($F(2,333) = 3.391$, $p < .05$), for the Into Action domain, ($F(2,333) = 5.972$, $p < .01$). For the overall attitude, ($F(2,333) = 4.411$, $p < .05$), indicating a significant difference in mean scores across the groups.

Table 8 Multiple Comparisons for Teacher Educators' Attitude towards Entrepreneurship Education by Years of Service (N=336)

Domain	(I) Years of Service	(J) Years of Service	Mean Difference (I-J)	p
Ideas and Opportunities	11-20 years	Above 20 years	.10	.03*
Into Action	Below 10 years	Above 20 years	.13	.007**
Overall	Below 10 years	Above 20 years	.13	.007**
	11-20 years	Above 20 years	.11	.01*

Note: ** $p < .01$, * $p < .05$

According to Table 8, significant distinctions were found between teacher educators with over 20 years of experience and those with less than 10 years, as well as those with 11-20 years of experience.

Table 9 One-way ANOVA Results on Teacher Educators' Attitudes towards Entrepreneurship Education by Subjects They Taught (N=336)

Domain	Subject Taught	N	Mean	SD	F	p
Ideas and Opportunities	Educational Studies	70	3.19	.23	2.568	.03*
	Methodologies	43	3.13	.26		
	Academic (Science)	86	3.11	.21		
	Academic (Art)	101	3.09	.36		
	Co-Curriculum & ICT	36	3.24	.32		
Resources	Educational Studies	70	3.17	.25	1.272	n.s
	Methodologies	43	3.07	.28		
	Academic (Science)	86	3.13	.22		

Domain	Subject Taught	N	Mean	SD	F	p
	Academic (Art)	101	3.13	.35		
	Co-Curriculum & ICT	36	3.21	.41		
Into Action	Educational Studies	70	3.22	.29	.923	n.s
	Methodologies	43	3.16	.34		
	Academic (Science)	86	3.15	.26		
	Academic (Art)	101	3.13	.34		
	Co-Curriculum & ICT	36	3.19	.37		
Overall	Educational Studies	70	3.19	.21	1.487	n.s
	Methodologies	43	3.11	.27		
	Academic (Science)	86	3.13	.20		
	Academic (Art)	101	3.11	.34		
	Co-curriculum & ICT	36	3.21	.34		

Note: n.s= no significance, * $p < .05$

As shown in Table 9, the overall ANOVA test result also did not show any significant difference in the mean values across subject groups.

Table 10 Independent Samples t-Test Results of Teacher Educators' Attitudes Toward Entrepreneurship Education by Their Experiences with Entrepreneurship Education (N=336)

Domain	Group	N	Mean	SD	t	df	p
Ideas and Opportunities	More experience	48	3.27	.36	3.27	333	.001**
	Less experience	288	3.12	.27			
Resources	More experience	48	3.28	.41	3.55	333	.000***
	Less experience	288	3.11	.27			
Into Action	More experience	48	3.32	.38	3.78	333	.003**
	Less experience	288	3.14	.30			
Overall	More experience	48	3.29	.37	2.98	333	.004**
	Less experience	288	3.12	.25			

Note: *** $p < .001$, ** $p < .01$

In Table 10, participants were divided into two groups: one group consisting of individuals who have engaged in two or more entrepreneurship education activities, and the other group comprising those with experience in only one or no entrepreneurship education activities. The group with more experience in entrepreneurship education had a higher mean value (Mean = 3.29, SD = 0.37) compared to the group with less experience (Mean = 3.12, SD = 0.25). This difference was statistically significant ($t = 2.98$, $p < .01$), indicating that those with more experience in entrepreneurship education exhibit more positive attitudes towards it.

Qualitative Findings

Open-ended Responses

Open-ended questions were presented to teacher educators to elicit detailed insights into their attitudes towards entrepreneurship education. Specifically, two open-ended questions

sought their opinions on the rationale for introducing entrepreneurship education programs in education degree colleges and the potential challenges that might emerge during the implementation process.

(1) What are the reasons for considering the implementation of entrepreneurship education in education degree colleges?

With regard to question no. (1), 183 (54.5%) of the 336 participants responded that:

- Entrepreneurship education is a global initiative that can enhance educational quality to international standards (n=12, 6.6%).
- It equips students with 21st-century skills, expanding their employment opportunities (n=108, 59%).
- Graduates can contribute to entrepreneurship development in various industries (n=66, 36.1%).
- Globalized education demands adaptation to a business-oriented approach (n=21, 11.5%).
- It can support student teachers in pursuing advanced studies (n=12, 6.6%).
- Entrepreneurship education prepares future teachers with entrepreneurial mindsets and skills (n=38, 20.8%).

(2) What are the foreseen challenges and obstacles that are likely to arise during the implementation of entrepreneurship education in education degree colleges?

With regard to question no. (2), 264 (78.6%) of 336 participants responded that:

- Limited resources (time, space, finances) hinder implementation (n=198, 75.4%).
- Resistance to change among some educators (n=6, 2.3%).
- Need for educators with expertise in entrepreneurship (n=125, 47.3%).
- High student-teacher ratios and insufficient teacher numbers (n=102, 37.6%).
- Administrative support is essential for successful implementation (n=199, 75.4%).
- A well-structured and planned approach is necessary (n=19, 7.2%).
- Active engagement from educators and students is key (n=24, 9.1%).
- Curriculum modification is challenging but possible (n=18, 6.8%).
- Increased workloads for educators may arise (n=29, 10.9%).
- The school environment must support entrepreneurship activities (n=12, 4.5%).

Results of Interview

In order to conduct the interviews, eight participants with the highest mean scores attitude towards entrepreneurship education were selected for Group A, while eight participants with the lowest mean scores were chosen for Group B.

To assess teacher educators' attitudes towards entrepreneurship education, an interview form was developed with five key components: (a) perceived benefits, (b) challenges and limitations, (c) integration into the current curriculum, (d) role of principals and authorities, and (e) professional development needs.

(a) Perceived Benefits: Both groups agreed that entrepreneurship education enhances student teachers' skills, contributing to the improvement of education quality. Group A emphasized its ability to foster creativity and problem-solving, while Group B also noted its potential to benefit both students and educators.

(b) Challenges and Limitations: Group A (100%) and 37.5% of Group B noted challenges such as resource shortages and the need for teacher training. They suggested solutions like specialized workshops and budget allocation. Group B, however, raised concerns about integrating entrepreneurship education into an already updated curriculum and stressed the need for careful planning.

(c) Curriculum Integration: Group A suggested integrating entrepreneurship education through cross-subject projects without disrupting the curriculum, while Group B expressed concerns about adding new content to an already demanding curriculum.

(d) Role of Principals and Authorities: Both groups highlighted the importance of support from principals and higher authorities. They emphasized that leadership is crucial for successful implementation, as it provides direction and resources for entrepreneurship education.

(e) Professional Development Needs: Both groups recognized the need for teacher training. Group A supported specialized workshops to improve teaching of entrepreneurial concepts, while Group B suggested shorter, more flexible training sessions to fit their busy schedules. Some participants preferred face-to-face workshops, while others favored a mix of online and in-person training.

Discussion

The success of entrepreneurship education largely depends on teachers' positive attitudes and willingness (Lackéus, 2015). This study examined teacher educators' attitudes toward entrepreneurship education across three domains: "Ideas and Opportunities," "Resources," and "Into Action." Overall, the findings revealed that educators hold positive attitudes towards entrepreneurship education, with many recognizing its value in academic and professional development.

To gain insight into the personal factors that influence teacher educators' attitudes towards entrepreneurship education is essential for developing effective strategies to promote this form of education (Al-Otaibe & Al-Ghobaiwi, 2021). The study examined various personal factors and their impact on teacher educators' attitude towards entrepreneurship education.

The study found no significant gender differences in overall attitudes towards entrepreneurship education among teacher educators. This finding is in line with previous research that also failed to identify gender as a significant predictor of attitudes in the context of entrepreneurship education (Bosma et al., 2012). It suggests that both male and female teacher educators hold similar views regarding the value of entrepreneurship education.

Significant age-related differences were observed in attitudes towards entrepreneurship education. Teacher educators in the middle-aged category exhibited more favorable attitudes than their older counterparts. This finding is consistent with the idea that experience and exposure to evolving educational paradigms may contribute to more favorable attitudes towards entrepreneurship education (Kuratko, 2005). Older educators may have been less exposed to entrepreneurship education during their own training and may therefore be less familiar with its potential benefits.

Teacher educators with higher academic qualifications, specifically Master's and PhD degrees, exhibited more positive attitudes across all domains of entrepreneurship education compared to those with Bachelor's degrees. This observation aligns with prior research

suggesting that higher academic qualifications may enhance educators' appreciation of innovative teaching methods (Fayolle & Gailly, 2015). Advanced degrees often involve exposure to contemporary educational practices, which can contribute to the cultivation of more positive attitudes in educators.

In terms of the positions held by teacher educators, the differences were not statistically significant, indicating that the position did not significantly influence attitudes. This finding is in line with research that emphasizes the multidisciplinary nature of entrepreneurship education, where educators from various positions can play crucial roles (O'Connor, 2014). It suggests that the promotion of entrepreneurship education is not confined to specific roles within educational institutions.

Teacher educators with over 20 years of service demonstrated less positive attitudes towards entrepreneurship education compared to those with fewer years of service. Those with 11-20 years of service also exhibited more positive attitudes. These results emphasize the need for continuous professional development to update and refresh the skills and attitudes of educators who have been in the field for an extended period (Pittaway & Cope, 2007).

Although variations in attitude mean scores were observed across subject groups, the differences were not statistically significant. This suggests that while specific subject groups may have varying baseline attitudes, these differences do not reach statistical significance. Entrepreneurship education's multidisciplinary nature makes it adaptable to various subjects and domains (Kuratko, 2005).

Teacher educators with more experiences with entrepreneurship education exhibited significantly more positive attitudes towards entrepreneurship education. This finding highlights the importance of practical experiences in shaping attitudes and fostering a deeper appreciation for entrepreneurship education. Practical experience can provide insights into the value of entrepreneurship education in preparing students for the dynamic business environment (Fayolle & Gailly, 2015).

It can be concluded that the study's findings suggest that personal factors such as age, academic qualification, years of service, and experiences with entrepreneurship education significantly influence teacher educators' attitudes towards entrepreneurship education. This result aligns with Ahmad (2019) research, which similarly concluded that the socio-personal characteristics of respondents are pivotal in boosting individual entrepreneurial attitudes. While there were variations in attitudes across different subject areas, these differences were not statistically significant, further demonstrating the adaptability of entrepreneurship education across disciplines. Qualitative findings identified key challenges, such as limited resources and concerns over integrating entrepreneurship into existing curricula, which may hinder educators' enthusiasm for this approach.

Suggestions

1. Tailor training programs to different age groups, with workshops that help older educators bridge the gap between traditional methods and entrepreneurship education.
2. Offer more hands-on opportunities like workshops and seminars to give educators practical experience with entrepreneurship education.

3. Implement continuous professional development programs to keep all educators, including those with many years of service, updated and engaged with entrepreneurship education.
4. Promote cross-disciplinary projects to emphasize the adaptability of entrepreneurship education in various subjects.
5. Encourage institutional leaders to actively support entrepreneurship education through clear directives, resource allocation, and setting strategic priorities.
6. Organize interdisciplinary workshops to foster collaboration and idea-sharing among teacher educators, promoting entrepreneurial thinking.
7. Establish professional learning communities where educators can share resources, experiences, and teaching strategies related to entrepreneurship education.

Conclusion

In conclusion, this study highlights the generally positive attitude of teacher educators towards the implementation of entrepreneurship education in education degree colleges. Factors such as academic qualifications, years of service, and prior experience with entrepreneurship education significantly influence these attitudes. While the findings demonstrate a readiness among educators to embrace entrepreneurial concepts, challenges such as limited resources, lack of infrastructure, and integration within the existing curriculum remain key concerns. Addressing these obstacles through ongoing professional development, resource allocation, and leadership support will be crucial for the successful implementation of entrepreneurship education. Overall, the study underscores the importance of fostering a supportive environment to equip future teachers with entrepreneurial skills that align with the demands of 21st-century education.

Acknowledgements

We wish to express our sincere gratitude to Dr. Kay Thwe Hlaing, Rector of Yangon University of Education, and Dr. May Myat Thu, Dr. Khin Khin Oo, and Dr. Nyo Nyo Lwin, Pro-rectors of Yangon University of Education for granting us the permission to conduct this research. Additionally, we are grateful to all the principals and teacher educators from the selected education degree colleges for their active participation in this study.

References

- Al-Otaibe, N. A., & Al-Ghobaiwi, T. A. (2021). Secondary school islamic entrepreneurship education teachers' attitudes towards entrepreneurial reflective teaching in the light of demographic variables. *Journal of Entrepreneurship Education*, 24(6), 1-20.
- Aspen Network of Development Entrepreneurs. (2019). *Myanmar Entrepreneurial Ecosystem Snapshot Report*. https://ecosystems.andeglobal.org/assets/document/ASP-ANDESnapShotReport_Myanmar.pdf
- Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). *EntreComp: The entrepreneurship competence framework*. Luxembourg: Publication Office of the European Union, 10, 593884.
- Bosma, N., Hessels, J., Schutjens, V., Van Praag, M., & Verheul, I. (2012). Entrepreneurship and role models. *Journal of economic psychology*, 33(2), 410-424.
- European Commission (2016). *Entrepreneurship education at school in Europe*. Eurydice Report. Luxembourg: Publications Office of the European Union. https://publications.europa.eu/resource/cellar/74a7d356-dc53-11e5-8fea-01aa75ed71a1.0001.02/DOC_1
- European Commission. (2010). *Employment and entrepreneurship*. https://ec.europa.eu/youth/policy/youth-strategy/employment-entrepreneurship_en
- Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: Hysteresis and persistence. *Journal of small business management*, 53(1), 75-93.

- Fishbein, M., & Ajzen, I. (1993). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Ioannou, M., Bratitsis, T., & Tsolopiani, I. (2017). KidVenture Project - Framework for the Key Entrepreneurship Competences. https://www.researchgate.net/publication/321950927_KidVenture_-_FRAMEWORK_FOR_THE_KEY_ENTREPRENEURSHIP_COMPETENCES/citation/download
- Kuratko, D. F. (2005). The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. *Entrepreneurship Theory & Practice*. <http://dx.doi.org/10.1111/j.1540-6520.2005.00099.x>
- Lackéus, M. (2015). *Entrepreneurship in Education, What When Why How*. Entrepreneurship 360 background paper, OECD, European Commission and LEED. https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf
- Luthje, C., & Franke, N. (2003). The 'making' of an entrepreneur: Testing a model of entrepreneurial intent among engineering students at MIT. *R&D Management*, 33(2), 135-147.
- Nu Nu Lwin. (2019). Entrepreneurial Education in Myanmar with The Reference to Korean Experience. *The Myanmar Journal*, 6(1). https://www.academia.edu/84073745/Entrepreneurial_Education_in_Myanmar_with_the_Reference_to_Korean_Experience
- Pittaway, L., & Cope, J. (2007). Entrepreneurship education: A systematic review of the evidence. *International Small Business Journal*, 25(3), 479-510.
- United Nations Educational, Scientific and Cultural Organization. (2004). Higher education in Europe, http://www.unesdoc.unesco.org/images/001621/16_2192e.pdf
- Watson, T. J. (2013). Entrepreneurship in action: bringing together the individual, organizational and institutional dimensions of entrepreneurial action. *Entrepreneurship & Regional Development*, 25(5-6), 404-422.

AN INVESTIGATION INTO NEW SCIENCE CURRICULUM IMPLEMENTATION AT PRIMARY LEVEL

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Abstract

This study investigated new science curriculum implementation at primary level. The specific objectives were: to investigate the extent of teachers' practices in new science curriculum implementation in terms of planning, teaching, managing classrooms and assessing. Explanatory mixed method was used, quantitative study first and qualitative study follows to explain quantitative findings deeply. In pilot study, instrument validity and reliability were conducted with the samples of 380 primary teachers from Nga Pu Taw Township and Kyaik Ma Yaw Township. In the main study, the samples of 530 teachers were selected from Yangon Region by using multi-stage cluster sampling method. Questionnaire validated in pilot study, was used in the main study. Quantitative data was analyzed by descriptive and inferential statistics and qualitative data was analyzed by thematic analysis. Although quantitative findings indicated that teachers practiced to a moderate extent in curriculum implementation, observation results indicated that there were many requirements for successful implementation. There were statistically significant differences according to gender, age, position, service, qualification, course (related to science). The interview results and open-ended responses highlighted that resources (staff, time, space, teaching aids, teacher's quality and refresher courses) should be adequately and efficiently supported for effective curriculum implementation.

Keyword: Science Curriculum Implementation

Introduction

Education is vital for individual and societal development, and in today's global economy, nations thrive by investing in education. Myanmar's National Education Strategic Plan (2016-2021) initiated reforms, including a new primary science curriculum designed to foster 21st century skills, critical thinking, and scientific literacy. This curriculum, rooted in inquiry-based learning, equips students with essential scientific process skills through hands-on activities. Effective implementation of this curriculum is key to promoting equity, preparing students for a rapidly evolving world, and fostering responsible citizenship. Teachers play a crucial role in ensuring the success of this curriculum, as their involvement is essential for translating educational reforms into meaningful classroom practice.

The importance of curriculum reform and implementation cannot be overstated. A well-designed and effectively implemented curriculum is critical for ensuring that all students, regardless of their backgrounds, have equal access to quality education and learning opportunities. In Myanmar, the implementation of the new primary science curriculum is expected to play a vital role in achieving these goals, particularly as science education serves as a foundation for nurturing scientific literacy, problem-solving skills, and responsible citizenship. Teachers are central to the success of this curriculum implementation, as they are responsible for translating planned curriculum into practical classroom activities. Their role is vital in fostering students' scientific inquiry and critical thinking skills, which are necessary for preparing students to thrive in an ever-changing society. The importance of teacher involvement in the curriculum

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process has been highlighted by scholars such as Dr. Khin Zaw (2001b) and Gupta (2023), who emphasize that the effectiveness of any education system is heavily reliant on its teachers.

Research Objectives

The general objective of this study was to investigate new science curriculum implementation at primary level. The specific objectives were

- To examine the planning practices of primary school teachers and the difficulties they face when designing science lessons based on the new science curriculum.
- To explore the teaching practices employed by primary school teachers and the instructional difficulties encountered during the implementation of the new science curriculum.
- To investigate classroom management practices used by teachers and the difficulties they experience in managing student behavior and learning environments under the new science curriculum.
- To analyze the assessment practices adopted by teachers and the difficulties they encounter in evaluating student learning outcomes according to the new science curriculum guidelines.
- to describe suggestions for improving curriculum implementation through teachers' perceptions

Theoretical Framework of the Study

The theoretical framework of this research is grounded in several educational theories that support effective curriculum implementation, particularly in the context of primary science education. Democratic educational philosophy (Hopkins, 2014; MacMath, 2008) underscores the importance of fostering an inclusive and participatory learning environment where students engage actively in their own learning. Constructivism (Schunk, 2012) emphasizes that students construct their own knowledge through hands-on experiences and reflection, which aligns with inquiry-based science education. Additionally, cognitive theories (Fetsco & McClure, 2005; Schunk, 2012) highlight the role of mental processes in learning, where students need scaffolding and guidance to develop critical thinking and scientific understanding. The multimodal model (Khin Zaw, 2001a) also plays a critical role, recognizing the importance of various teaching and learning strategies that accommodate different modes of human cognition, including analysis, synthesis, and exploration.

In applying these theories, primary science teachers must engage in practices that enhance curriculum implementation. This involves careful **planning** that aligns with curriculum objectives and adapts to the diverse needs of students (Alake-Tuenter et al., 2012). **Teaching** strategies should facilitate active student participation, promote the development of science process skills, and foster cognitive growth through scaffolding (Schunk, 2012). **Classroom management** is equally important, as a supportive and well-structured environment enables effective learning (Belgeonne et al., 2003). Finally, **assessing and monitoring** students' progress through reflective practices and alternative assessments ensure that students' understanding is continuously evaluated and that teaching methods are adjusted accordingly (Mamlok-Naaman, 2017). This comprehensive theoretical framework supports the primary science curriculum's

goals of equipping students with the skills and knowledge they need to live in a modern, science-driven world.

Definitions of Key Terms

Curriculum Implementation

Curriculum implementation refers to “how the planned or officially designed course of study is translated by the teacher into syllabuses, schemes of work and lessons to be delivered to students” (Bediako, 2019, p.1).

Operational Definition

Curriculum Implementation

In this study, curriculum implementation assumes the practices of primary teachers in terms of their lesson planning, teaching, managing the classroom, and assessing and monitoring students’ learning. Levels of curriculum implementation practices were measured by the mean values of the teachers who taught primary science. The greater the mean values, the more the teachers practise in curriculum implementation.

Methodology

In order to connect the quantitative results to the qualitative data in order to explain the quantitative results in more depth (Creswell & Creswell, 2018; Creswell & Plano Clark, 2018), an explanatory sequential mixed-methods design was used to investigate the research problem for this study.

There were 10344 primary teachers in four districts of Yangon Region. The quantitative sample of 553 teachers (who were teaching primary science) from 114 schools were selected using the multistage cluster sampling method. For a qualitative study, participants were selected using the purposive sampling method. Eight teachers from basic education schools were selected for observation and interviews based on the quantitative results.

In the pilot study, questionnaire for science curriculum implementation was constructed by using exploratory factor analysis (EFA) because one of the uses of EFA was “to construct a questionnaire to measure an underlying variable” (Field, 2017, p.991). The questionnaire was construct with appropriate variables and items to be included in the multivariate analyses in the pilot study. Curriculum implementation practices were explored with data summarization without interpretation. The reliability coefficient for planning, teaching, managing classrooms and assessing and monitoring were 0.9, 0.94, 0.89, 0.94 respectively. The content validity indices for planning, teaching, managing classrooms and assessing and monitoring were 0.98, 0.98, 0.90 and 0.93 respectively. This validated questionnaire was used in the study. Interview questions and observation checklist were developed based on literature review, theoretical framework and the quantitative results.

In pilot study, factor analysis was used to construct the variables into appropriate components related to primary science curriculum implementation practices. Descriptive and inferential statistics were used to investigate the extent of teachers’ practices in new science curriculum implementation at primary level and their variations. Qualitative data was analyzed by thematic analysis, both inductive and deductive coding. Interview records were analyzed by inductive coding and observation records were analyzed by deductive coding.

Findings

Quantitative Findings

Investigating the Extent of Teachers' Practices in New Science Curriculum Implementation at Primary Level

Teachers' practices in the new science curriculum implementation at primary level were investigated in terms of planning, teaching, managing classrooms and assessing and monitoring. Table 1 showed mean values and standard deviations of teachers' practices in the new science curriculum implementation at primary level (teachers' curriculum implementation practices).

Table 1 Mean Values and Standard Deviations of Teachers' Curriculum Implementation Practices (N=553)

Curriculum Implementation Practices	Mean	SD	Remark
Planning	4.08	0.51	practice to a moderate extent
Teaching	4.15	0.57	practice to a moderate extent
Managing Classrooms	4.24	0.53	practice to a great extent
Assessing and Monitoring	4.33	0.55	practice to a great extent
Grand Mean	4.20	0.49	practice to a moderate extent

Scoring Direction:

1.00-1.80= do not practice at all 2.61-3.40=practice to some extent 4.21-5.00=practice to a great extent
 1.81-2.60= practice to a small extent 3.41-4.20= practice to a moderate extent

Generally, teachers practiced to a moderate extent in overall curriculum implementation as its mean value was 4.20. Teachers practiced to a moderate extent in planning and teaching as their mean values were 4.08 and 4.15 respectively. Furthermore, they practiced to a great extent in managing classrooms and assessing and monitoring, because their respective mean values were 4.24 and 4.33.

Qualitative Findings

Results of Classroom Observation

The researcher conducted classroom observation based on the theoretical framework and five stages of the inquiry-based method: stage 1 (Answering questions), stage 2 (Exploration), stage 3 (Reading), stage 4 (Elaboration) and stage 5 (Summary and Evaluation), that were prescribed in Primary Science Curriculum. The observation checklist included five parts. Table 2 presented brief information of classroom observation.

Table 2 Brief Information of Classroom Observation

Teacher		Grade	Topic	Time allowed	Actual Teaching Time	Days	Class Size	Remark	
								Time	Contents
Lower Primary	Teacher 1	2	Heat and Light from the Sun	6*40 min	• 2*40 min • 2*40 min • 50 min	3	60	✓	✓
	Teacher 2	2	Heat and Light from the Sun	6*40 min	• 46 min	1	120	✗	✓
	Teacher 3	3	Sink and Float	4*40 min	• 2*40 min • 43 min	2	32	✓	✓
	Teacher 4	3	Using Magnet and Compact(Searching Cardinal Points)	5*40 min	• 42 min	1	33	✗	✗

Teacher		Grade	Topic	Time allowed	Actual Teaching Time	Days	Class Size	Remark	
								Time	Contents
Upper Primary	Teacher 5	5	Force and Work Done	5*40 min	• 3*40 min + 60 min	1	14	✓	✓
	Teacher 6	5	Kinetic Energy and Potential Energy	5*40 min	• 48 min • 47 min • 45 min • 44 min	4	27-30	✓	✓
	Teacher 7	4	Phases of water	5*40 min	• 76 min	1	5	×	×
	Teacher 8	5	Force and Work Done	5*40 min	• 35 min	1	60	×	✓

Note: ✓ = matched with allocated time and monthly table of contents

× = did not match with allocated time and monthly table of contents

According to the theoretical framework, primary science curriculum implementation was studied based on four areas: planning, teaching, managing the classroom, and assessing and monitoring. The codes of observation were presented in Table 3.

Table 3 Codes of Classroom Observation

Code	Sub-Code	Definitions
Planning		Planning involves preparing physical environment (including teaching aids, seating arrangement, etc.) and lessons according to the guidelines of teacher's guide.
Teaching	• Answering questions • Exploration • Reading • Elaboration	• Answering questions means arousing students' interests and curiosity by asking questions • Exploring means that students were given hand-on activities to develop their scientific understanding and science process skills. • Reading included further reading sections that extend students' understanding and knowledge. • Elaboration means students were asked much questions to elaborate their understanding and extended learning.
Managing the Classroom		Time management, physical situation (resources) and students' involvement and security were managed.
Assessing and Monitoring	• Summary and Evaluation • Monitoring	• Assess students' knowledge, understanding and application by asking questions (not only doing exercises involved in the student's book but also rubric items developed by teachers).

Code	Sub-Code	Definitions
		Students' involvement in activities and students' learning were monitor during teaching periods and provide constructive feedback.

The results of lower primary teachers were discussed first according to these areas.

Relating to **planning**, although teachers 1 and 3 prepared lessons according to the allocated time and prepared the required teaching aids for all activities, teachers 2 and 4 did not prepare according to the allocated time. Teacher 1 and 3 prepared lessons in an orderly manner to arouse students' interest by preparing teaching aids (available resources) adequately and attractively. Teacher 2 prepared teaching aids for the activities, but they were not sufficient for all students. Although teacher 4 did not prepare teaching aids (guided by the teacher's guide), she used the telephone as a teaching aid. Teacher 1 prepared a seating arrangement that was appropriate for lessons, activities, and group work, but the size of the class was too small for 60 students, and one student did not get a seat (only on one day). Teacher 2 class size was so big (120 students) that it was not convenient for group work. Teacher 3 prepared seating arrangements that were appropriate for lessons, activities, and group work. Teacher 4 prepared seating only for the lecture and did not prepare the class for group work (although the size and seats were easy to move). Teachers 1, 2 and 3 prepared lessons related to real life and the students' prior knowledge. All teachers did not prepare further assessment types of questions (item types and rubric types) for this lesson.

Related to **teaching**, teachers 1 and 3 asked questions and stimulated students' curiosity and interests in stage 1 (Answering questions). Teacher 3 even showed real objects that could stimulate students' interest. Teachers 2 and 4 also asked questions to stimulate the students' interest, but they gave the answers to the activities before doing activities.

In stage 2 (Exploration), teachers 1 and 3 did all hand-on activities with adequate teaching aids and guidelines from the teacher's guide and allowed all students to be involved in all activities. Teacher 1 adjusted the lesson based on the condition of the activity (water and sand were not warm in 10 minutes). Teachers 1 and 3 gave students opportunities to construct scientific understanding based on their hands-on activities. Teacher 2 did three hands-on activities but limited the number of students involved in the activities. For one activity, hands-on experience was not conducted. Teacher 4 did only one hand-on activity for all four activities by using compact apparatus on the telephone (not bar magnets and compacts). Teachers 2 and 4 explained and gave answers during the introduction (Answering questions). Teachers 1 and 3 did activities that matched each of the learning objectives of the lesson.

Teachers 1 and 3 created the learning experiences that encouraged not only students' communication skills, problem-solving skills, and science process skills but also their independent skills. Although teacher 2 taught science process skills through activities, not all students had the same opportunities to observe and compare. Teacher 4 gave students the opportunity to observe cardinal points by using the phone; students did not have the opportunity to observe, measure, or compare bar magnets and compacts. Furthermore, teacher 3 taught communication skills among students, but teacher 4 did not do activities to develop students'

communication skills among students. Although teachers 1, 3 and 4 made group work, they could not encourage groups of students to discuss within groups effectively.

In stage 3 (Reading), teachers 1, 2 and 3 asked and explained questions related to real life. But they did not encourage students to explain their real-life experiences. Teacher 4 skipped this part for teaching.

In stage 4 (Elaboration), although the teacher guide intended to express students' understanding of all activities related to the lesson by communicating and presenting their understanding in their own words, teachers 1, 2 and 3 let students read and only asked answers for the lesson. Teacher 4 skipped this stage.

Concerning **managing classrooms**, although teacher 1 gave the required teaching aids attractively, students were very crowded, and students harmed each other (sand entered the eye of one student because of another student). Teacher 3 gave adequate teaching aids, and the classroom was quiet (no external noise) and wide. Teacher 2 could not provide adequate teaching aids, and the classroom was too small for 120 students. Although teacher 4 had a wide classroom with moveable desks and chairs, she did not manage to do effective group work.

Teacher 1 and 3 managed time effectively (giving adequate time and adjusting the timeline), especially for all activities. Teacher 2 and 4 did not manage time for the students learning (not teach according to the allocated time and given instructions). Teacher 1 and 3 made pair work, group work, and class work as directed by the teacher's guide and observed them. But, teacher 2 did not make group work, and teacher 4 made group work, but it did not achieve learning objectives. Teachers 1, 2 and 3 encouraged students' integrity and to respect other students. While teachers 1 and 3 considered all students to take part in learning opportunities, teachers 2 and 4 were weak in considering individual student's learning.

In **assessing and monitoring**, teachers 1 and 3 answered all questions in the exercise of the lesson that assessed students' remembering, understanding, and application. Teacher 1 encouraged students' creativity in doing exercise. Teacher 2 gave homework for one question in the exercise (the teacher's guide requested not to give homework) that encourages student's application and creativity. Teacher 4 did not assess the student's application. During activities and exercises, all teachers heard student's variety and incorrect or wrong answers; teacher 1 considered all answers and gave constructive feedback; then teacher 1 redirected, prompted, and probed the questions to get correct answers. Teachers 2, 3 and 4 accepted correct answers and neglected wrong or incomplete answers. Teacher 1 and 3 observed, checked students answers to the activities and exercises, and gave accurate and timely feedback to students during the activities and exercises.

Teachers 1 and 3 prepared better for the lesson than teachers 2 and 4. Although teachers 1 and 3 created learning opportunities for student's interest, engagement, scientific understanding, science process skills, and other 21st century skills through activities, teachers 2 and 4 were weak in creating these learning opportunities. All four teachers were weak in stages 3, and 4 of the inquiry-based method; they did not follow the instructions in the teacher's guide. Teachers 1 and 4 managed classrooms not only in time management and seating arrangements but also in students' engagement. Teachers 2 and 4 were still needed to manage classrooms well. All

teachers needed to develop and use rubric items or verbal questions that could assess student's understanding and application.

The results for upper primary teachers were as follows.

Relating to **planning**, although teachers 5 and 6 prepared lessons according to the allocated time and required teaching aids for all activities, teachers 7 and 8 did not prepare according to the allocated time. Teacher 5 and 6 prepared lessons in an orderly manner to arouse students' interest by preparing teaching aids (available resources) adequately and attractively. Teacher 7 prepared teaching aids for an activity. Teacher 8 prepared teaching aids for an activity, but just for demonstration. Teacher 5 prepared seating arrangements that were appropriate for lessons, activities, and group work. Teacher 6's classroom was small; students were crowded, and the teacher could not rotate and observe because the lane between rows and columns was narrow. Teachers 7 and 8 prepared seating arrangements that were appropriate for the lecture. Teacher 6 prepared lessons related to real life and the students' prior knowledge. All teachers did not prepare further assessment questions (item types and rubric types) for this lesson.

Related to **teaching**, all teachers asked questions and stimulated students' curiosity and interests in stage 1 (Answering questions). Teacher 8 asked questions to stimulate the students' interest, but she explained and gave the answers to the activities before doing them.

In stage 2 (Exploration), teachers 5 and 6 did all hand-on activities with adequate teaching aids and guidelines from the teacher's guide and allowed all students to be involved in all activities. Even though teacher 5 prepared and did all hands-on activities, she gave the wrong concept from the first activity. Therefore, students constructed a misunderstanding and the wrong concept. Teacher 6 gave opportunities for students to construct scientific understanding based on their hands-on activities. Teacher 7 gave only one opportunity for one activity to construct students' scientific understanding based on their hands-on activity. Teacher 6 did activities that matched each of the learning objectives of the lesson. Teacher 8 demonstrated an activity that matched the learning objective of the lesson. Teachers 7 and 8 lectured and discussed the rest activities by asking questions.

Teachers 5, 6 and 7 created the learning experiences that encouraged not only students' communication skills, problem solving skills, and science process skills but also their independent skills. Although teacher 8 taught communication and problem-solving skills, not all students had the opportunity to take part in the activity. Although teachers 5, 6 and 7 did group work, teacher 8 did not do group work or pair work. Teachers 6 and 7 encouraged students to discuss within the groups.

In stages 3 and 4, teachers 5, 6 and 7 requested that students read and teachers explained. But they did not encourage students to explain their real-life experiences. Teacher 8 skipped this part for teaching. They all did not follow the instructions of teacher's guide.

Concerning **managing classrooms**, teacher 5 gave the required teaching aids attractively, and the classroom was convenient for students. Teacher 6 gave adequate teaching aids and managed the classroom well, but the classroom was so noisy (other classes' voices overwhelmed the class) that students could not hear well and repeated their findings. Teacher 7 had to co-teach with other grades, which could delay and interrupt the flow of teaching. Teacher 8 did not manage to do effective group work or pair work.

Teacher 5 gave more time for students' thinking and answering questions that caused student' disengagement and led to wrong answers. Teacher 6 managed time well (giving adequate time and adjusting the timeline) for all activities, but she gave unnecessary time (reading the question four times), and external disturbance (noise) made it take more time to delay their teaching. Teachers 7 and 8 did not manage time for student's learning (not teach according to allocated time and given instructions). Teacher 5, 6 and 7 made pair work, group work, and class work as directed by the teacher's guide and observed them. But teacher 8 did not do group work or pair work. Teachers 5 and 6 encouraged students to respect each other. While teachers 5 and 6 considered all students to take part in learning opportunities, teachers 7 and 8 were weak in considering individual student's learning. In **assessing and monitoring**, teachers 5, 6 and 7 answered all questions in the exercise of the lesson that assessed students' remembering, understanding, and application. Teacher 8 asked students questions related to real life to engage in lessons. Teacher 8 did not exercise. Teacher 6 asked more questions than the exercise requested. Teachers 6, 7 and 8 made peer assessments. During activities and exercises, all teachers heard student's variety and incorrect or wrong answers; they accepted correct answers and neglected wrong or incomplete answers. They did not give constructive feedback and did not help students reach the right answer. All teachers observed the class, but only teacher 6 checked students' answers to exercises.

Teacher 6 prepared better for the lesson than teachers 5, 7, and 8. Although teacher 6 created learning opportunities for student's interest, engagement, scientific understanding, science process skills, and some 21st century skills through activities, teachers 5, 7 and 8 were weak in creating learning opportunities. All four teachers were weak in stages 3 and 4 of the inquiry-based method; they did not follow the instructions in the teacher's guide. All teachers must manage time effectively in order for students to learn effectively. All teachers needed to develop and use rubric items or verbal questions that could assess student's understanding and application.

Results of Interview

The results of six interview questions were presented as follows:

1. What are the **strengths and weaknesses of the new primary science curriculum?**

As **strengths of the new primary science curriculum**, matching with students' needs and daily life or society's needs, qualities of activities, and knowledgeable contents emerged as the results of interviews with twelve teachers.

New science curriculum -

- matched students' needs (n =8).
- matched daily life and society's needs (n =7).
- was good for student and made students more interested and curious about learning (n =4).
- involved activities that were specific and gave students opportunities to explore and cooperate (n =6).
- had more knowledgeable contents for both teachers and students (n =3).

As **weaknesses of the new primary science curriculum**, inadequacy of time and teaching materials, as well as difficulty of content and assessment, were explored.

- Teaching aids were not adequate for all students (n =2).

- Time allowed was not sufficient for doing activities (n =1).
- They did not know well some of the contents involved in the new curriculum, and some were difficult for students to understand (n=2).
- There was no clear instruction on how to assess lower primary students (n =1).

2. What are the **differences between the old and new primary science curricula**?

Two of the teachers said that they were not quite different because one teacher explained that he taught old and new curriculum with CCA approaches and another teacher said that most experienced teachers taught new curriculum in old ways. There were **differences between the old and new primary science curricula** in the areas of contents, teaching methods, nature of activities, students' interests, and assessment.

- New curriculum involved more activities than the old curriculum (n =11).
- These activities were specific, related to real life, and motivated students not only to learn but also to cooperate among themselves (n =5).
- New curriculum content structure was more attractive than the old because of its structure (activities, figures, etc.) are attractive (n =1).
- New curriculum involved more and new contents, and teachers needed to learn more than the old curriculum (n =4).
- Teaching new curriculum was easier than teaching new curriculum with the help of a teacher's guide (n =2).
- Old curriculum focused on rote learning and lecturing by teachers; that was different from the new curriculum, where real objects and teaching aids were used to teach students (n =4).
- Assessment for the old curriculum was focused on examination, whereas in the new curriculum, students were assessed based on their performance (n=2).

3. How do you do **assessment practices in the new science curriculum implementation**?

Related to **assessment practices used in the new science curriculum implementation**, students were assessed monthly or in chapter-end tests four times per year.

- Students' performance was assessed (viva) monthly with item types and rubric types, and they were recorded for each subject (n=5).
- Students' performance was assessed by using exercises included in the lessons (n=3).
- Students' performance was assessed after two chapters (n=1, Private).
- Students were assessed four times per year for both the lower and upper primary levels, then report cards were sent to parents. (n=12).
- Peer assessment was also made in her class (n=1, Grade 5).
- There was no verbal assessment for Grade 5 students (n=1).
- Grade 5 students were assessed by the district at the end of the academic year (n=3).

4. What are the **difficulties faced during implementing the new science curriculum and how to overcome these difficulties**?

Some teachers answered that there were no difficulties for curriculum implementation.

- There were no difficulties in planning lessons with the help of teachers' guides (n=6).
- There was no difficulty in time allocation for the lessons and activities (n=3).

- There was no difficulty in her teaching because she had an assistant teacher (n=1, Private).

The **difficulties faced during implementing the new science curriculum and strategies to overcome these difficulties** were difficulties in teaching aids, the insufficiency of teachers, and difficulty in motivating students' interests and communication problems.

- Ten teachers faced difficulties with teaching aids (n =10).
- They solved some of these difficulties by making teaching aids themselves and by requesting others to help in setting up apparatus and sharing resources.
- Since teachers were not sufficient, they could not do activities involved in the contents and could not make all students involved in activities (n=4).
- Some students were not interested in lessons, so they encouraged them to get involved (n=7).
- There was a difficulty in communicating with their students, who were Pa-oh and Shan.
- Some students helped her with translation and communication with their classmates (n=1).

5. Express the **support groups that provided for the implementation of the new primary science curriculum.**

They received support from the government, other organizations, the school, colleagues, parents, and students.

- Government provided teacher's guides, student's books, and teaching aids once per grade, not yearly (n =10, except private).
- Schools provided teacher's guides and teaching aids (n =2, private).
- UNICEF supported some books for school (n =1).
- There were support from colleagues (n =8).
- Parents supported their teaching by donating teaching aids (n =3).
- Students took teaching aids from their homes for teaching (n =8)

6. Please give the **suggestions for successful implementation?**

Teachers suggested in the areas of class size, allocated time, teaching aids, teachers, refresher courses, and professional learning communities.

- Class size should be small (30–35, 25–30 students), or if class size is large (above 60 students), two teachers should be responsible for one class (n=6).
- Adequate time for science teaching should be allocated (n=2).
- Teaching aids should be supported adequately, timely, and annually (n=9).
- A laboratory room for science subjects should be in each school (n=1).
- Refresher courses for the new curriculum should solve teachers' difficulties in implementing the new curriculum (through practical teaching, explaining how to use teaching aids, and providing required resources such as a teacher's guide and teaching materials (n=4).
- Primary teachers should be more knowledgeable and teach according to the guidelines laid down in the teachers' guides (n=4).
- One teacher responsible for the class was suitable for students because she or he could know and manage the class well (n=1, lower primary).

- Teachers should be responsible for specialized subjects in order to teach well in their subjects (n=1, upper primary).
- Principal should hold meetings for sharing teaching strategies or how to use teaching aids among colleagues (n=1).

Results of Documentation

Documents in twelve schools were observed. Documentation related to teacher's guides, notes of lessons, student's books, and reference books related to science, subject wide meetings, books related to assessment (National Assessment Policy, National Assessment Guidelines, etc.), assessment questions, records for students' performance and assessment records, and records for parent meetings were analyzed.

Related to the teacher's guide, all teachers (n=12) had teacher's guides, but a teacher's guide for grade 5 was recently provided (n=5). There were no notes of lesson for the new primary science teachers (n=12), they only had daily diaries. There were student's books adequately for all students (n=12). There were reference books in two schools (n=2), but not in ten schools (n=10).

There were records related to subject-wide meetings in all schools (n=12) but teachers did not do subject wide meetings as well as continuous professional development (CPD) program (n=11), except in one school (n=1). In the last academic year (2021-2022), they held subject wide meetings (n=2). Teachers discussed, especially for assessment; which contents and questions were made for the assessment (n=4). Teachers were provided required courses according to school-based programs and meeting if required (n=2).

There were books related to assessment supported for the school but not for the specific grades (n=10), except in private schools (n=2). Although one school had both rubric items and item types for each chapter (n=1), other schools (n = 11) only had item types for assessment (four times per year).

Students were assessed four times per year and made report cards (n=12). Students' performance was recorded for each chapter (n=2). Student's performance was recorded for all subjects monthly as performance records: teachers assessed student's performance by observing during the lessons (n=5). Teachers did not meet parents twice a year, and they met when needed (n=11), except at one school where parents were met after each exam (n=1). Table 4.88 showed the summary results of documentation from 12 schools.

Conclusion and Discussion

Generally, teachers practiced to a **moderate extent in planning**. With respect to the highest and lowest mean values of twelve items, teachers **practiced to a great extent** in preparing to select the sequence of lesson to cover the topic systematically and they **practiced to some extent** in planning lessons for further study in science. **As the observation results showed**, most teachers prepared according to teacher's guide, but they were all not prepared for further studies in science. Although some teachers prepared teaching aids adequately for all students and for all activities, most teachers did not prepare teaching materials for students and activities (students did not access teaching material and were involved in learning activities, and as a result, they did not get the required skills by studying science).

They still needed to understand and prepare lessons according to the teacher's guide and the students' different abilities. Furthermore, they still needed to consider how to assess students' performance based on the lesson (by preparing rubric items). The National Research Council (1996) stated that teachers of science need regular, adequate space for science, and effective science teaching depends on the availability and organization of materials, equipment, media, and technology. But teachers had difficulties in planning lessons because of inadequate teaching aids, insufficient time (most teachers were responsible for all subjects in one grade or two or more subjects in many grades or all subjects in two or more grades), an unbalanced teacher-pupil ratio, limited space for activities, etc.

In **teaching**, although teachers practiced to a moderate extent, some of them did not teach the lessons according to the guidelines of the teacher's guide. At the first stage of inquiry-based teaching (answering questions), some teachers gave the answer first and then made hands-on activities that reduced students' curiosity, interest, and learning. It was contrast with the BSCS 5E instructional model, in which teachers should create interest, generate curiosity, raise questions, and elicit student's responses (prior knowledge) related to the topic (not correct answers) at the stage of engagement (Bybee et al., 2006). Teachers should focus not only on finishing the lesson but also on developing science process skills because most teachers do not focus on learning objectives that promote students' science process skills and independent skills to get scientific understanding.

At stage 2 (exploring), some teachers did activities that generated students' scientific understanding, and science process skills. "Exploration experiences provide students with the activities in which teachers help students use prior knowledge to generate new ideas, explore questions and possibilities, and design and conduct a preliminary investigation" (Bybee et al., 2006, p. 2). But most teachers did not give all students opportunities to participate in activities. Most teachers explained science concepts through lecture or demonstration. Therefore, students did not develop required skills such as science process skills, problem-solving skills, communication skills, creativity, and etc. Shamas-Brandt (2012) also found that the students of the teacher who followed the curriculum more closely and employed more structured inquiry did not grow in their process skills, and their attitudes followed a normal distribution.

At stage 3 (Reading), although teachers' guides instructed to promote students' learning and supported further learning, at stage 4 (Elaboration), teacher's guide instructed teachers to assess students' understanding of the lessons (activities) by asking and discussing with students (their own words). If students did not understand the lessons well, teachers needed to reteach or change teaching styles. Most teachers only read and explained these two stages, and some teachers skipped this stage.

According to the BSCS 5E instructional model, the third stage (explain) aims to provide students with opportunities to demonstrate their conceptual understandings, process skills, and behaviors, and teachers need to guide students towards a deeper understanding. Varelas et al. (2014) also suggested that students should be given opportunities for discussions to connect science activities and text to resonate with their experiences. The purpose of stage 4 (extend) is to help students use their new knowledge, continue to explore its implications, develop deeper and broader understanding, more information, and adequate skills.

It was also stated as 5 strategies and tips for implementing inquiry-based learning, in which the third stage (Encourage Communication) was to encourage students' discussion of their ideas with each other. This may lead to a better understanding of the science. The fourth stage (Provide resources) aims to develop student's better understanding of the concepts and give them access to further learning, such as online learning platforms, which can enhance students' knowledge (*What Is Inquiry-Based Learning? Types, Benefits, Examples*, 2022).

Inquiry-based method used in Myanmar was in contrast with the above two methods of inquiry-based learning, especially in stages 3 and 4. They focus students' discussion or communication first and extend their understanding by providing resources. Myanmar focuses on giving resources first and students' discussions later.

Most teachers did not understand and follow the teacher's guide, especially in stages 3 and 4, and could not extend student's understandings based on the taught lesson and daily life. This could reduce students' scientific understanding, critical thinking skills, creativity, problem-solving skills, etc.

While some teachers did hands-on activities for all students with adequate teaching materials that were prepared by themselves as much as they can, most teachers did not make hands-on activities for many reasons: inadequate teaching aids (some could not be afforded and some were not easily available), insufficient time, insufficient spaces, unbalanced teacher-pupil ratio (most teachers with large class size made difficult to do activities that needed more time and more teaching aids), content difficulties for teachers and students (especially Grade 5), etc. Bradbury et al. (2018) suggested that the difficulties of inadequate resources were solved by using resources available through the university (school) and by creating their own.

The teacher's guide sometimes caused teachers' and students' misunderstandings. For example, in the lesson Work Done (Grade 5), the answer for the direction of the force (Activity 2, No. 3) was not present in the teacher's guide. The teacher interpreted that if there was no work done, there was no force. Similarly, in the lessons of Kinetic Energy and Potential Energy (Grade 5), the figure of activity 3 made students' misconceptions and caused a mismatch between the students' answers and the answers presented in the teacher's guide. A teacher's misunderstanding can also hinder successful curriculum implementation, and that may be due to the fact that teachers acknowledged a lack of awareness, familiarity, or training about the new curriculum implementation practices in the classroom (Bantwani, 2010, as cited in OECD, 2019).

According to the results of qualitative findings on **managing classrooms**, most classrooms were crowded and had little space for activities. The structure of the class (no partition) made teachers' classroom management difficult. Although the classrooms were narrow for many students, they managed seating arrangements and teaching aids as much as they could so as to ensure the student's learning effectiveness. But most teachers did not manage seating arrangements if the classroom was easily manageable. They needed to prepare the physical arrangement of the class for students' learning effectiveness and to prepare teaching materials as much as possible. Some teachers used effective group work, pair work, and class work to improve student's cooperation, and communication skills. But most teachers needed to do so because they did not encourage these skills through activities.

Although most teachers answered that they had inadequate time for teaching, they taught less than the allocated time, but they had other duties such as assigning teachers to collect the list of votes, meetings, ceremonies, etc. Teachers needed to manage time effectively for the activities because most students did not have opportunities to take part in them. The teacher must give opportunities for students to take responsibility for their own learning, individually and as members of groups (NRC, 1996).

Teachers still needed to nurture students not only to take responsibility but also to develop values such as integrity, honesty, respect, etc., because nowadays students need to develop not only their intelligent quotient but also their emotional and social quotient for a successful life. Teachers should display and demand respect for the diverse ideas, skills, and experiences of all students (NRC, 1996).

Related to **assessing and monitoring**, teachers practiced to a great extent; most teachers asked questions to arouse students' interest and curiosity. But most of them did not redirect and gave constructive feedback on the students' answers.

The teacher's guide instructed to summarize the lesson for the student's understanding and assess the student's knowledge, understanding, and application. Most teachers summarized lessons by reading and explaining. They did exercises presented in the textbook. But some gave homework, and some skipped this part (because they said these were the same as questions in the activities). That made students lose their opportunities to develop their creativity and application skills. Moreover, most teachers did not prepare assessment questions related to their lessons. Although some teachers monitor students' learning and progress, most of them do not monitor students' learning.

As the qualitative results, teachers were responsible for many subjects or many grades that made it difficult to manage time in order to implement successfully. Organization for Economic Co-operation and Development (2019) indicated that teachers' stressful workloads and lack of time were obstacles to implementation. Furthermore, Lowe and Appleton (2015) found that the problems of teachers in implementing new curriculum involve time for reading and understanding curriculum, training for new curriculum and changing current educational processes.

As the result of quantitative results teachers practiced to a moderate extent in new science curriculum implementation at the primary level. But as the result of observation, teachers needed to practice in all areas of curriculum implementation to implement new science curriculum successfully. Furthermore, teachers needed to understand and practice the stages of inquiry-based learning. As the results of qualitative findings, there were many difficulties for successful curriculum implementation, such as resources: teacher's quality, adequate teachers, teaching aids, time, space, etc., and trainings that supported teacher's knowledge and skills. They also suggested to address these difficulties concerning class size, allocated time, teaching aids, adequacy of teachers, refresher courses, and professional learning communities.

Recommendations

Recommendation for teachers, principals, government and other agencies were presented here.

Recommendation for Teachers

- Teachers should try to understand the guidelines of teacher's guide and implement the curriculum according to guidelines of it: they should plan, teach, manage and assess according to it.
- Teachers should practice effective group work, pair work and class work to improve student's collaboration, cooperation, communication skills.
- Teachers should study assessment strategies to assess students' learning and give constructive feedback as required.

Recommendation for Principals

- School principals should encourage teachers to develop their knowledge about curricular, content, students, pedagogical and assessment knowledge as well as skills through training, professional learning community or self-learning.
- Principal should encourage and support teachers' collaboration and have meetings and seminars to address teachers' difficulties in implementation at school level.
- Principal should allocate teacher's teaching subjects according to their specialization.
- The principal should manage a classroom with partition between classes in order to reduce noise disturbance during teaching.
- Teaching aids should be supported adequately for all activities and for all students by requesting and taking allocated teaching materials on time.

Recommendation for Government and Other Agencies

- Difficulties (inadequacy of teachers, resources such as time, space, teaching aids) faced by teachers during implementation should be considered and addressed as much as possible in order to implement the curriculum successfully.
- Teachers' quality should be upgraded by encouraging self-learning, peer collaboration, giving them opportunities to promote their profession, such as training and appraisal systems.
- Professional development programs, especially refresher courses for curriculum implementation, should focus on teachers' needs: subject matter mastery, usage of teaching aids, etc.
- Teacher- pupil ratio should be balanced in order to implement curriculum successfully because new science curriculum emphasizes science process skills through activities.
- Teachers should be appointed according to their specialization.
- Teachers' guides should be mandated to avoid teachers' and student's misunderstandings.
- The government and others agencies should survey whether the curriculum implementation was successful or not and be revised when necessary.
- Monastic schools should be supported by teachers, adequate salary, teaching materials and other requirements similar to basic education.

Acknowledgements

We would like to offer our respectful gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-rector, Yangon University of Education) and Dr. Nyo Nyo Lwin (Pro-rector, Yangon University of Education) for allowing us to do this study. And we would like to express our honorable gratitude to Dr. Khin Mar Ni (Professor and Head,

Department of Educational Theory and Management, Yangon University of Education) for her great support and expert guidance for this study. I would like to express my deep gratitude to my supervisor, Dr. Phyu Zar Zar Theint (Lecturer, Department of Educational Theory and Management, Yangon University of Education) and to my co-supervisor, Dr. Su Chan Myae (Lecturer, Department of Educational Theory and Management, Yangon University of Education) for their kindly support, deeply patient, precious guidance, and valuable and timely advice to complete this study. Then, we would like to special thanks to all participants of this study.

References

- Alake-Tuenter, E., Biemans, H. J. A., Tobi, H., Wals, A. E. J., Oosterheert, I., & Mulder, M. (2012). Inquiry-based science education competencies of primary school teachers: A literature study and critical review of the American perspective. *International Journal of Science Education*, 34(17), 2609-2640. <https://doi.org/10.1080/09500693.2012.718098>
- Bediako, S. (2019). *Models and concepts of curriculum implementation, some definitions and influence of implementation*. <https://doi.org/10.13140/RG.2.2.17850.24009>
- Bantwini, B. D. (2010). How teachers perceive the new curriculum reform: Lessons from a school district in the Eastern Cape Province, South Africa. *International Journal of Educational Development*, 30(1), 83-90. <https://doi.org/10.1016/j.ijedudev.2009.06.002>
- Belgeonne, C., Bloomfield, P. M., Moore, L. L., & Spurrell, J. (2003). *Professional Standards for Qualified Teacher Status and Requirements for Initial Teacher Training*. /paper/Professional-Standards-for-Qualified-Teacher-Status-Belgeonne-Bloomfield/501f63aa35cc73544f55af404f889935e35ae37d.
- Bradbury, L. U., Wilson, R. E., & Brookshire, L. E. (2018). Developing Elementary Science PCK for Teacher Education: Lessons Learned from a Second Grade Partnership. *Research in Science Education*, 48(6), 1387–1408. <https://doi.org/10.1007/s11165-016-9607-x>
- Bybee, R., Taylor, J., Gardner, A., Van, P., Carlson, J., Westbrook, A., Landes, N., Spiegel, S., Stuhlsatz, M., Ellis, A., Thomas, H., Bloom, M., Moran, R., Getty, S., & Knapp, N. (2006). *The BSCS 5E Instructional Model: Origins and Effectiveness A Report Prepared for the Office of Science Education by 5415 Mark Dabbling Boulevard*.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). Sage.
- Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th ed.). Sage.
- Fetsco, T., & McClure, J. (2005). *Educational psychology: An integrated approach to classroom decisions* (2nd ed.). Pearson.
- Gupta, H. (2023, August 7). *An Alternative Perspective on The Teachers' Role In Curriculum Development*. eLearning Industry. <https://elearningindustry.com/alternative-perspective-on-the-teachers-role-in-curriculum-development>
- Hopkins, N. (2014). The Democratic Curriculum: Concept and Practice: The Democratic Curriculum. *Journal of Philosophy of Education*, 48(3), 416–427. <https://doi.org/10.1111/1467-9752.12088>
- Khin Zaw, Dr. (2001a). *Advanced educational psychology*. PhD Programme Course Material, Yangon University of Education
- Khin Zaw, Dr. (2001b). *Theoretical pedagogy (I) (Ontology)*, PhD Programme Course Material, Yangon University of Education
- Lowe, B., & Appleton, K. (2015). Surviving the Implementation of a New Science Curriculum. *Research in Science Education*, 45(6), 841–866. <https://doi.org/10.1007/s11165-014-9445-7>
- MacMath, S. (2008). *Implementing a Democratic Pedagogy in the Classroom: Putting Dewey into Practice*. Undefined./paper/Implementing-a-Democratic-Pedagogy-in-the-Putting-MacMath/cabed46a520d 1394 d2dfc 35eee4b298b2e05631e
- Mamluk-Naaman, R. (2017). Curriculum Implementation in Science Education. In K. S. Taber & B. Akpan (Eds.), *Science Education: An International Course Companion* (pp. 199–210). SensePublishers. https://doi.org/10.1007/978-94-6300-749-8_15

- Ministry of Education [MOE] (2016). *National Education Strategic Plan 2016–2021*. Myanmar. The Government of the Republic of the Union of Myanmar.
- National Research Council. (1996). *National science education standards*. National Academy Press.
- Organisation for Economic Co-operation and Development (OECD). (2019). *OECD Future of Education and Skills 2030: Curriculum analysis*. https://www.oecd.org/education/2030-project/contact/Change_management_for_curriculum_implementation_Facilitating_and_hindering_factors_of_curriculum_implementation.pdf
- Schunk, D. H. (2012). *Learning theories: An educational perspective* (6th ed.). Pearson.
- Shamas-Brandt, E. (2012). *Utilizing an early childhood science curriculum: Factors influencing implementation and how variations affect students' skills and attitudes* [Ph.D., University of Colorado at Denver]. <http://search.proquest.com/pqdtglobal/docview/1013994489/abstract/1092B14DDE5E> C33PQ/17
- Varelas, M., Pieper, L., Arsenault, A., Pappas, C. C., & Keblawe-Shamah, N. (2014). How science texts and hands-on explorations facilitate meaning making: Learning from Latina/o third graders: SCIENCE TEXTS & HANDS-ON EXPLORATIONS. *Journal of Research in Science Teaching*, 51(10), 1246–1274. <https://doi.org/10.1002/tea.21173>
- What Is Inquiry-Based Learning? Types, Benefits, Examples. (2022, March 17). <https://www.splashlearn.com/blog/what-is-inquiry-based-learning-a-complete-overview/>

THE IMPACT OF QUALITY OF WORK LIFE ON TEACHERS' WORK ENGAGEMENT

Khin Thet Swe¹, Zin Nwe Than² and Khaing Khin Kyaw³

Abstract

The main aim of this study is to investigate the impact of quality of work life (QWL) on teachers' work engagement. The specific objectives are to assess teachers' perceptions of their QWL and work engagement, examine the relationship between QWL and work engagement, investigate the impact of QWL on work engagement, and propose a QWL model for enhancing teachers' work engagement. Both quantitative and qualitative methods were used. Using proportionate stratified sampling, 603 teachers from 32 Basic Education High Schools in Mandalay City Development Area were selected as samples. Instruments were developed by the researcher after reviewing the related literature. The reliability coefficients for QWL and work engagement were 0.94 and 0.95 respectively. Statistical analysis, including descriptive statistics, Pearson product moment correlation, multiple regression, and path analysis, was run. The findings indicated that teachers perceive a high QWL and work engagement, with a positive and strong correlation between QWL and work engagement. The dimensions of QWL—"working environment," "developmental opportunities," "interpersonal relationships," "work-life balance," and "work-related attitudes"—predict teachers' work engagement significantly. The path model shows the direct and indirect effects between variables, explaining 48% of the variance in work engagement. The qualitative study, comprising interviews and observations, supports the quantitative findings. This study concludes that prioritizing a high QWL is essential for enhancing teachers' work engagement.

Keywords: Quality of Work Life, Work Engagement, Teacher's Work Engagement

Introduction

With the purpose of creating an education system that can fulfill the rapidly evolving needs of the emerging economy technology-based society and align with ASEAN regional qualification standards, the Myanmar government has launched the education system reform. Teachers play a key role in the successful rollout of the new curriculum, the adoption of the new interactive pedagogy, and the application of a new assessment system (Ministry of Education [MOE], 2016). The engaged teachers are innovative, passionate, highly productive, and harness available resources at their disposal towards goal attainment; they do not work just for payment or fringe benefits but for the love of their job, which they accord priority attention to (Oyeh & Oluwuo, 2018). Efforts to improve teachers' work engagement are the most serious management challenges. Therefore, it is predominantly important for school administrators to reduce teacher burnout and to promote environments that contribute to the proliferation of engagement (Schaufeli, 2013). Previous research (Abebe & Assemie, 2023; Erturk, 2022) indicates that a good QWL can increase teachers' job satisfaction, enhance their organizational commitment, and reduce their turnover rates. With the recognition of engagement as critical, this study is intended to study the impact of QWL on teachers' work engagement.

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Significance of the Study

A nation's prosperity in today's competitive world is largely dependent on the knowledge, abilities, and competencies of its citizens. National building and national cohesion depend heavily on education. Teachers play a crucial role in educational practice directly and are responsible for student learning achievements (Runhaar, 2017). This is because there is convincing international research evidence that highlights a crucial role to be played by teachers in the successful implementation of education system reform (MOE, 2016). Particularly in Myanmar, work engagement has been studied not only in educational institutions but also in companies, factories, and hospitals. In their studies, it was observed that only work-related factors were taken into account for enhancing work engagement.

Clark (2000) highlighted that changes in society that required individuals to have significant responsibilities both at home and at work fueled further inquiry into the interdependencies between work and home life. To fill the research gap, it is necessary to study how to promote teachers' work engagement by considering both aspects of work life and personal life. The interest in how to promote teachers' work engagement triggers the researcher to investigate the impact of the QWL on teachers' work engagement. It is researchable due to the fact that current education system reform is in need of a great workforce and quality teachers. The current study provides empirical data and useful knowledge regarding the aspects of establishing high QWL for teachers. The information obtained offer new insight to scholars as well as practitioners in designing strategies that will help enhance teachers' work engagement. The findings of this study will fill this gap and extend the knowledge of the QWL and work engagement of teachers in Basic Education High Schools.

Aim of the Study

The main aim of this study is to investigate the impact of the QWL on teachers' work engagement at Basic Education High Schools in Mandalay City Development Area. The specific objectives of this study are:

1. to examine the teachers' perceptions of their QWL at selected Basic Education High Schools in Mandalay City Development Area,
2. to find out the teachers' perceptions of their work engagement at selected Basic Education High Schools in Mandalay City Development Area,
3. to examine the relationship between QWL and teachers' work engagement,
4. to explore the impact of the QWL on teachers' work engagement, and
5. to develop a proposed model of QWL for enhancing teachers' work engagement.

Research Questions

1. What are the teachers' perceptions of their QWL at selected Basic Education High Schools in Mandalay City Development Area?
2. What are the teachers' perceptions of their work engagement at selected Basic Education High Schools in Mandalay City Development Area?
3. Is there any relationship between the QWL and teachers' work engagement?
4. Does the QWL have an impact on teachers' work engagement?
5. What is the proposed model of QWL for enhancing teachers' work engagement?

Scope of the Study

The scope of this study is limited to Basic Education High Schools in Mandalay City Development Area. The participants in this study are teachers who have at least one year of teaching experience at their current schools.

Definitions of Key Terms

Quality of Work Life. QWL is defined as the impact of the workplace on satisfaction in work life (job satisfaction), satisfaction in non-work life domains, and satisfaction with overall life (Sirgy et al., 2001).

Work Engagement. Work engagement is defined as the harnessing of organization members selves to their work roles; in engagement, people employ and express themselves physically, cognitively, emotionally, and mentally during role performance (Kahn, 1990).

Teacher's Work Engagement. Teacher's work engagement is defined as a motivational construct reflecting the voluntary allocation of teachers' resources and energy across teaching-related activities (Klassen et al., 2012).

Operational Definitions

Quality of Work Life. In the current study, QWL refers to job-related experiences in schools covering five dimensions: working environment, developmental opportunities, interpersonal relationships, work-life balance, and work-related attitudes that the participant teachers have. Teachers' perceptions of their QWL were determined by the mean values they rated on a four-point Likert scale questionnaire of 60 items. The level of teachers' perceptions of their QWL increases with the mean values of the responses.

Work Engagement. In this study, work engagement is teachers' approach to the workplace that is characterized by physical, cognitive, and emotional attachment to the workplace and social engagement with students and colleagues. Teachers' work engagement was measured using a four-point Likert scale consisting of a total of 48 items in four dimensions: cognitive engagement, emotional engagement, physical engagement, and social engagement. The higher the mean values, the greater the level of teachers' work engagement.

Theoretical Framework

In creating a high QWL, complete satisfaction is not a sufficient condition for sanity and mental health (Walton, 1973). According to Dr. Khin Zaw (2001b), it is also necessary to consider the satisfaction of those needs: the need for relatedness, transcendence, rootedness, a sense of identity, and a frame of orientation and devotion. Maslow's needs hierarchy theory, Herzberg's motivation-hygiene theory, and spillover theory were used for the study of the QWL. In addition, the dimensions of QWL were explored through an extensive review of the relevant literature. Moreover, an interview was carried out with thirty teachers from six Basic Education High Schools in Pyin Oo Lwin Township in order to study the current conditions of the schools and the nature of the current study area. Then, five dimensions of QWL were identified: *working environment, developmental opportunities, interpersonal relationships, work-life balance, and work-related attitudes*.

In *working environment*, there are two components: the physical working environment and the psychological working environment of the school. The physical working environment includes aspects of the school that include the general physical setting, environmental factors,

and resource availability. The second component of the psychological working environment is associated with psychological aspects that consist of personal relationships at school, a fun and engaging atmosphere, and empowerment. *Developmental opportunities* are composed of two components: professional development and personal development. Professional development is the process of developing the necessary knowledge and skills that teachers require to carry out their role effectively. Secondly, personal development is the result of activities that improve personal skills such as problem-solving skills, creativity, and critical thinking.

Interpersonal relationships are comprised of four portions: interaction between principal and teachers; interaction among teachers; interaction between teachers and students; and interaction between teachers, and parents and the community. The interactions are based on open discussion, colleague support, harmonious relationships, and showing trust and mutual respect. *Work-life balance* comprises three components: work interference with personal life, personal life interference with work, and work/personal life enhancement. Teachers do not have enough time for relaxation, family obligations, and personal affairs because of work. In contrast, teachers experience conflict in school because of family issues and socioeconomic issues. Then, if work and personal life enhancement occur, teachers feel pleasant and confident about themselves at work because of the support of their family members.

Regarding *work-related attitudes*, there are three components, namely job satisfaction, organizational commitment, and job involvement. Job satisfaction is concerned with teachers' pleasurable or positive emotional state resulting from satisfaction with career expectations and opportunities. Organizational commitment represents the relative strength of teachers' identification with the school. Job involvement indicates the extent to which teachers are interested in and committed to assigned tasks, viewing their work as a principal part of their lives, and the eagerness of a person to work hard and apply effort beyond normal job expectations.

On the other hand, to study teachers' work engagement, theory of work engagement (Kahn, 1990), the conservation of resources theory (Hobfoll et al., 2017), the teacher engagement model (Klassen et al., 2013), and the model of work engagement (Macey & Schneider, 2008) were used, and four dimensions were identified: *cognitive engagement*, *emotional engagement*, *physical engagement*, and *social engagement*.

Cognitive engagement is defined as the intentional and actively focused awareness of one's tasks, objectives, or organizational activities, that is characterized by willingly calling one's attention to and having positive thoughts about one's work with the purpose of improving one's effectiveness at those tasks, objectives, or activities (Kuok & Taormina, 2017). Teachers' cognitive engagement is related to their attention, absorption, goal clarity, line of sight, and self-confidence. *Emotional engagement* refers to the experience of feeling or having an emotional connection to one's organization or something or someone within it (Kahn, 1990). Teachers need to have emotional attachment to the school, emotional attachment to the profession, and emotional attachment to the organization's members.

Physical engagement refers to observable behaviour in the work context and includes innovative behaviours, initiative, proactive behaviours and going above and beyond what might otherwise be expected (Leiter & Bakker, 2010). Teachers' physical engagement is characterized

by their adaptive behaviour, proactive behaviour, seeking feedback or negotiation, being eager to accept and carry out the assigned tasks, and role expansion. *Social engagement* refers to the experience of connectedness with other people, who could be colleagues or anyone that the work role provides an interface with (Soane et al., 2012). Social engagement with students deals with teachers' ability to create a warm and friendly relationship with students. Social engagement with colleagues is concerned with how teachers can build strong relationships with their colleagues.

Review of Related Literature

Quality of Work Life

In the late 1950s, the concept of QWL was gradually establishing itself in the specific context of working conditions in industrialized nations (Martel & Dupuis, 2006). In the late 1960s, according to Lawler (1982), the term QWL was introduced as a way of focusing on the effects of employment on health and general well-being and ways to enhance the quality of a person's comfort on the job experience. In 1979, Richard Walton, who can be considered the major contributor to the concept of QWL, conducted extensive research on QWL. The aim of QWL is to enhance the overall workplace atmosphere within the organization so that the teachers enjoy working because they perceive their working environment as pleasant and conducive to positive interactions with one another (Kondalkar, 2007). Shamir and Solomon (1985, as cited in Narehan et al., 2014) defined QWL as a comprehensive construct that includes well-being related to an individual's job and the degree to which work experiences were rewarding, fulfilling, and reduced stress. Nordenfelt (1996) possessed similar ideas, and he claimed that QWL is something that has to do with the values of welfare or well-being. Kaur (2016) defined QWL in education as the connection that exists between the teachers and the working milieu within the universities. The definition of QWL points to an equilibrium between the work or career and personal lives of an employee with job satisfaction and refraining from job stress (Inarda, 2022). Aside from its different meanings, there is agreement that QWL mainly emphasizes organizational members' well-being and organizational effectiveness.

Work Engagement

Employees' psychological connection with their work has gained critical importance in the information and service economy of the 21st century (Leiter & Bakker, 2010). The concept of work engagement has garnered attention in both the practitioner and academic communities (Shuch, 2011). Macey and Schneider (2008) described engagement as a broad construct consisting of state, trait, and behavioral forms that connote a blend of affective energy and discretionary effort directed to one's work and organization. Engagement is a two-way process: organizations must work to engage the employee, who in turn has a choice about the level of engagement to offer the employer (Cook, 2008). Everyone shares responsibility for developing vibrant, engaging work environments (Leiter & Bakker, 2010). Work engagement is the involvement of the self and the presence of positive work-related feelings (Rich et al., 2010). Teachers' work engagement is an essential aspect of achieving the success of school organizations. Leiter and Bakker (2010) viewed teachers' work engagement as an essential factor in improving the performance of teachers and the efficiency level of educational organizations, which are reflected by enthusiasm, dedication, and job absorption. Although the definition and

meaning of engagement in the practitioner literature often overlap with other constructs, in the academic literature, it has been defined as a distinct and unique construct that consists of cognitive, emotional, and behavioral components that are associated with individual role performance (Saks, 2006).

Methodology

Population and Sample

All teachers from Basic Education High Schools in Mandalay City Development Area (MCDA) were regarded as the population of this study. For the quantitative study, data were collected from 603 teachers at 32 Basic Education High Schools from seven townships of the MCDA through a questionnaire survey using the proportional stratified sampling method. For the qualitative study, a stratified, purposeful sampling method was employed, and six principals and 36 teachers from three strata—large schools, medium schools and small schools—participated.

Instrumentation

The questionnaire, which included three parts, was developed by the researcher based on the related literature. In part I, teachers' demographic data were asked, and in part II, teachers' perceptions of their QWL were investigated using 60 items, and each item was rated on a four-point Likert scale ranging from strongly disagree (1) to strongly agree (4). Part III includes 48 items for measuring teachers' perceptions of their work engagement. Items were developed on a four-point Likert scale ranging from 1 to 4 (1 = never, 2 = sometimes, 3 = often, and 4 = always). In qualitative study, data collection was conducted through the use of triangulation, which included interviews and observations. The interview form for principals was composed of five items, whereas the interview form for teachers was organized with seven items. Furthermore, observation checklists were also used.

Data Collection Procedure

A panel of experts who had special knowledge of the area of educational administration and supervision reviewed the instrument before the pilot study. The obtained reliability coefficient (Cronbach's alpha) for QWL was 0.94, and for teachers' work engagement, it was 0.95. The permission of the responsible persons for data collection was requested. The questionnaires were delivered to the selected schools between September 22, 2022, and October 30, 2022. The participants were given two weeks to complete the questionnaires. Then, all completed questionnaires were collected. Data were cleaned, coded, and prepared for analysis.

Data Analysis

Using the Statistical Package for Social Science software (SPSS), the assumption of normality was checked using two measures: kurtosis and skewness. Then, descriptive statistics and the Pearson product moment correlation were utilized. Multiple regression analysis was also conducted to find out the potential factors of QWL affecting teachers' work engagement. Finally, the Analysis of Moment Structures (Amos) statistical module was also run for conducting the path analysis to develop a path model. Qualitative data analysis was carried out through a multistage process of organizing, categorizing, synthesizing, and interpreting the interview and observation (Gay et al., 2012).

Research Findings

Phase I: Quantitative Study

Investigating the Perceptions of Teachers of Their QWL

The dimension with the greatest mean value was “working environment” (3.25), followed by “work-related attitudes” (3.17), “interpersonal relationships” (3.15), “developmental opportunities” (3.13) and “work-life balance” (2.98). The overall mean value is 3.13, with a standard deviation of 0.24 (see Table 1).

Table 1 Mean Values and Standard Deviations for QWL Perceived by Teachers (N=603)

Dimension	Mean	SD	Remark
Working Environment	3.25	0.35	High Level
Developmental Opportunities	3.13	0.33	High Level
Interpersonal Relationships	3.15	0.32	High Level
Work-Life Balance	2.97	0.26	Moderate Level
Work-Related Attitudes	3.17	0.33	High Level
Overall QWL	3.13	0.24	High Level

Note. The scoring direction is as follows:

1.00 – 2.00 = Low Level 2.01 - 3.00 = Moderate Level 3.01 – 4.00 = High Level

The overall mean value of QWL fell between 3.01 and 4.00. Therefore, it can be said that teachers from all selected schools perceived a high level of QWL. Specifically, except for “work-life balance”, the last four dimensions perceived by selected teachers were at a high level. The level of teachers’ perceptions of their “work-life balance” was moderate.

Investigating Teachers’ Perceptions of Their Work Engagement

The mean value of overall work engagement perceived by teachers was 3.23 with a standard deviation of 0.23. The mean value of “emotional engagement” was the highest (3.28), followed by “social engagement” which had a mean value of 3.23, “cognitive engagement” which had a mean value of 3.21, while “physical engagement” reported the lowest mean (3.19) (see Table 2). The overall mean value fell in the range of 3.01 to 4.00, indicating that teachers exhibited a high level of work engagement.

Table 2 Mean Values and Standard Deviations for Teachers’ Perceptions of Their Work Engagement (N=603)

Dimension	Mean	SD	Remark
Cognitive Engagement	3.21	0.32	High Level
Emotional Engagement	3.28	0.37	High Level
Physical Engagement	3.19	0.32	High Level
Social Engagement	3.23	0.34	High Level
Overall Work Engagement	3.23	0.23	High Level

Note. The scoring direction is as follows:

1.00 – 2.00 = Low Level 2.01 - 3.00 = Moderate Level 3.01 – 4.00 = High Level

The Relationship Between QWL and Teachers' Work Engagement

Pearson correlation coefficient illustrated that there was a high positive correlation between QWL and work engagement, $r(601) = .69, p < .01$ (see Table 3). It can be assumed that teachers who experience the relatively high QWL tend to exhibit a high level of work engagement.

Table 3 Correlation Between QWL and Teachers' Work Engagement

	QWL	Work Engagement
QWL	1	.69**
Work Engagement	.69**	1

** . Correlation is significant at the .01 level (2-tailed).

The Potential Factors of QWL Affecting Teachers' Work Engagement

Firstly, the major assumptions were tested, including linear relationship, homoscedasticity, no multicollinearity, and multivariate normality. Since the assumptions were met, the multiple linear regression analysis was computed.

Table 4 Means Values, Standard Deviations and Intercorrelations for Teachers' Work Engagement and Predictors Variables

Variable	Mean	SD	1	2	3	4	5
Work Engagement	3.23	0.23	.52***	.54***	.58***	.44***	.59***
Predictors Variables							
1. Working Environment	3.25	0.35	1.00	.52***	.70***	.29***	.57***
2. Developmental Opportunities	3.13	0.33		1.00	.63***	.28***	.48***
3. Interpersonal Relationships	3.15	0.32			1.00	.31***	.62***
4. Work-Life Balance	2.97	0.26				1.00	.51***
5. Work-Related Attitudes	3.17	0.33					1.00

Note. *** $p < .001$

It was found that teachers' work engagement was positively and significantly correlated with "working environment" ($r = .52, p < .001$), "developmental opportunities" ($r = .54, p < .001$), "interpersonal relationships" ($r = .58, p < .001$), "work-life balance" ($r = .44, p < .001$), and "work-related attitudes" ($r = .59, p < .001$) (see Table 4).

Table 5 Simultaneous Multiple Regression Analysis for QWL Variables Predicting Teachers' Work Engagement

Variable	B	Std. Error	Beta	t	p	R	R ²	Adjusted R ²	F
(Constant)	1.1	.10		10.10	.000***	.79	.48	.48	112.99
Working Environment	.07	.03	.10	2.45	.016*				
Developmental Opportunities	.17	.03	.22	5.68	.000***				
Interpersonal Relationships	.14	.04	.18	3.83	.000***				

Variable	B	Std. Error	Beta	t	p	R	R ²	Adjusted R ²	F
Work-Life Balance	.17	.03	.19	5.28	.000***				
Work-Related Attitudes	.17	.03	.21	5.18	.000***				

Note. * $p < .05$, *** $p < .001$

The combination of variables to predict teachers' work engagement includes "working environment", "developmental opportunities", "interpersonal relationships", "work-life balance" and "work-related attitudes", $F(5, 597) = 112.99$, $p < .001$ (see Table 5). The adjusted R squared value was .48. This indicated that 48 % of the variance in teachers' work engagement was explained by the model. According to Cohen (1988), this is a large effect. The beta weight suggested that accessing "developmental opportunities" contributes most to predicting teachers' work engagement and that possessing positive "work-related attitudes" appears to be the second best predictor of teachers' work engagement. Moreover, having a desirable "work-life balance", establishing good "interpersonal relationships" and having a desirable "working environment" also contribute to this prediction.

Developing a Model of QWL for Enhancing Teachers' Work Engagement

This model indicated a reasonably good fit to the data as Goodness-of-Fit Index (GFI) = .99, Adjusted Goodness-of-Fit Index (AGFI) = .95, the Normal Fit Index (NFI) = .99 and the Comparative Fit Index (CFI) = .99, and Tucker-Lewis Index (TLI) = .97, Root Mean Square Error of the Approximation (RMSEA) = 0.07 and all were linked theoretically. All the observed fit index values satisfied the recommended criteria.

Table 6 Summary of Causal Effects for the Path Model (Work Engagement)

Outcome	Determinant	Causal Effects		
		Direct	Indirect	Total
Work Engagement ($R^2 = .48$)	Working Environment	.11*	.22**	.33**
	Developmental Opportunities	.22**	.28**	.50**
	Interpersonal Relationships	.19**	.15**	.34**
	Work-Life Balance	.18**	.14*	.32**
	Work-Related Attitudes	.22**	-	.22**

Note. * $p < .05$, ** $p < .01$

According to Table 6, the path analysis indicated that "working environment" had a significant direct effect on "work engagement" and a significant indirect effect on "work engagement" through "interpersonal relationships" and "work-related attitudes" as mediators. Its total effect on "work engagement" was 0.52. "Developmental opportunities" also had a significant direct effect on "work engagement" and an indirect effect on "work engagement" through "working environment" and "interpersonal relationships" as mediators. The total effect on "work engagement" was 0.50. "Interpersonal relationships" had a significant direct effect on work engagement. Through the mediation of "work-related attitudes" and "work-life balance", "interpersonal relationships" also had a significant indirect effect on "work engagement". The

total effect was 0.34. “Work-life balance” also had a significant direct effect on “work engagement” and a significant indirect effect on “work engagement” through “work-related attitudes” and “developmental opportunities” as mediators. Its total effect on “work engagement” is 0.32. Among them, “work-related attitudes” had only a direct effect on work engagement, and its effect was 0.22.

The path model can explain 48% of the variance in work engagement.

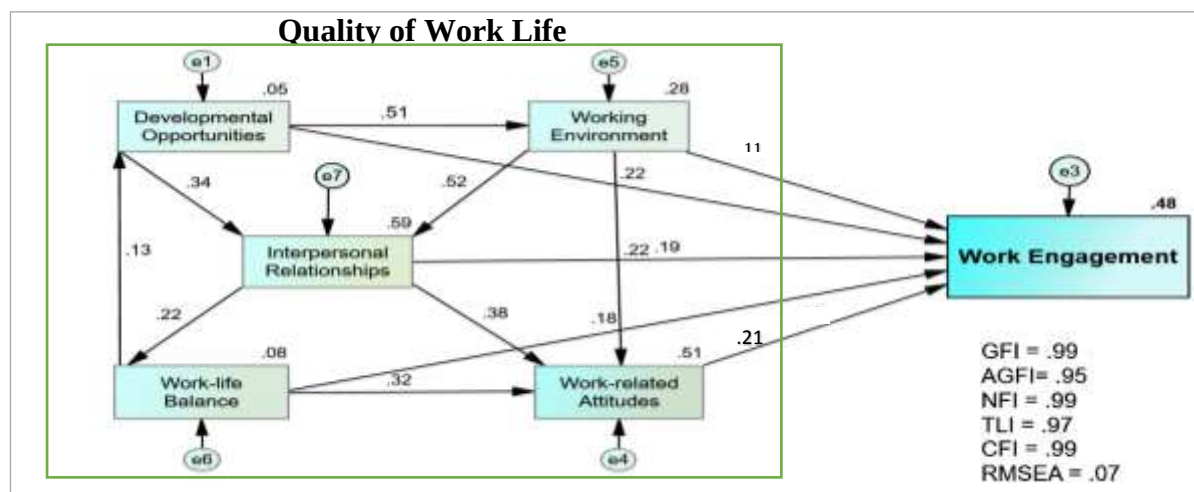


Figure 1 Proposed Model of QWL for Enhancing Teachers' Work Engagement

Phase II: Qualitative Research Findings

The follow-up qualitative study, including interviews and observation, was also undertaken.

Interview Responses of Principals

The interview form for principals included five items that can explore the QWL in their schools and work engagement of teachers.

Creating a Supportive Teaching and Learning Environment. All principals from both groups paid attention to teaching and learning effectiveness. However, the principals of Group A could create a conducive learning environment for both students and teachers. The principals of Group B faced inadequate resources, and weak parent participation.

Support for Professional Development. Both groups' responses were not different. They arranged professional development activities in their respective schools and encouraged teachers to engage in professional development activities.

Delegation of Duties. Principals from both groups delegated duties according to teachers' specializations, expertise, interests, and hobbies. Principals from Group A practice delegation of authority to teacher leaders. Principals from both groups supported teachers' personal issues and allowed them to take leave if it was necessary. Principals from Group A practiced a supportive atmosphere.

Principals' Approaches to Addressing the Challenges Faced by Teachers. Principals from Group A had no difficulty regarding teaching. They regularly undertook classroom observation, and practiced authority delegation in handling the disciplinary problems of students.

Principals from Group B often faced some difficulties in handling the disciplinary problems of students because of the local context.

Principals' View on Teachers' Engagement. Principals from Group A were satisfied with teachers' engagement. One principal from Group A pointed out that at the lower secondary level, teachers stuck to traditional teaching methods due to ineffective online new curriculum training courses during the COVID-19 pandemic. Although principals from Group B were satisfied with half of the teachers' engagement in their work, they had to motivate and encourage some teachers who lacked enthusiasm and held pessimistic attitudes, to engage cognitively, emotionally, and physically in their work.

Interview Responses of Teachers

The interview form for teachers included seven items investigating their perceptions, experiences, practices, and suggestions on the QWL and their work engagement.

Working Environment. Most of the teachers ($n = 17$, 94%) from Group A feel satisfied with the physical condition of their schools, such as spacious classrooms, support for teaching aids, and duty delegation. In contrast, most of the teachers ($n = 13$, 72.22%) from Group B feel discontented with the supply of teaching aids, adequacy of students chairs and desks, classroom conditions, duty delegation, and students' behaviour. Both groups share a common concern about the challenges of student-teacher ratio.

Developmental Opportunities. Both groups exhibited similar practices for professional development, involving reading blogs, journals, and books, watching educational videos, and engaging in discussions with experts. One school from Group A ($n = 2$, 11.11%) organized unique efforts such as KG to Grade 5 refresher courses, updating the school library, and instructing teachers for assembly speeches. Differences between the groups are noted in the organization of meetings for continuing professional development and the management of school libraries.

Interpersonal Relationships. All teachers from Group A ($n = 18$, 100%) and some teachers from Group B ($n = 6$, 33.33%) exhibited positive relationships between principals and teachers. However, two principals in Group B were criticized for weak disciplinary practices. Interactions among teachers in both groups were characterized by friendliness and openness. Teacher-student relationships were close and friendly in both groups. Both groups faced challenges with overaged children. Group A experienced more extensive parental participation and interest in children's education, while Group B faced issues of parents' lower engagement due to socioeconomic factors. Teachers in Group B sometimes had to deal with disrespectful parents.

Work-Life Balance. Over half of the teachers ($n = 10$, 55.56%) from Group A could balance work and personal life, but they sometimes missed family or social occasions because of their work. Although some teachers ($n = 6$, 33.33%) from Group B could balance work and personal life, most ($n = 12$, 66.67%) were not satisfied with work-life balance. They encountered unfairness in duty delegation and a high student-teacher ratio and consequently, some had a heavy workload.

Work-Related Attitudes. Both groups of teachers share common reasons for entering the teaching profession. More than half of the teachers ($n = 10$, 55.56%) from Group A and half of the teachers ($n = 9$, 50%) from Group B chose the teaching profession because of their passion or

parental encouragement. Three teachers from Group A and four teachers from Group B became teachers due to their desire for employment. They valued the school uniform and were dedicated to the success of their students. All teachers express a collective desire for effectiveness in their respective schools.

Work Engagement. Teachers from both groups employed modernized teaching methods and utilized teaching aids in their teaching. A few teachers from Group A ($n = 2$, 11.11%) faced the problem of a high student-teacher ratio, whereas teachers from Group B ($n = 4$, 22.22%) encountered the issues of a lack of parents' interest in their children's education and a high student-teacher ratio. Again, most teachers from Group A ($n=12$, 66.67%) were open to constructive criticism and actively sought suggestions from colleagues for improving their teaching. However, some teachers in Group B ($n=4$, 22.22%) have experienced destructive criticism.

Suggestions for the Improvement of the Schools. Both groups expressed concerns about collaboration among stakeholders and aspects of school infrastructure. Group A emphasized on the importance of effective teaching methods and a well-equipped library, while Group B placed a strong emphasis on principals' leadership skills, disciplinary practices in schools, and the urgent need for infrastructure improvement.

The Results of Observation

To get the live data, the observation was also conducted with (11) factors. In the case of schools in Group A, all schools have enough school buildings, but some need renovation; all schools have green spaces, such as gardens, trees, and plants on their campuses; all schools maintain cleanliness in classrooms and hallways; two schools implement effective COVID-19 prevention measures, while the last school does not have any activities, although it provides sinks and soap near toilets; two schools have appropriate student-teacher ratio with child-centered seating arrangements, while the other school has acceptable class size in secondary levels but overcrowded classes at the primary level; most classrooms of all schools have good lighting and ventilation, but some need electric lighting, and fans are installed in some classrooms to enhance ventilation; all schools have adequate student desks and chairs; all schools have various teaching aids such as educational toys and sport facilities; all schools have electronic devices such as computers, printers and sound boxes; and one school systematically manages and uses laboratory equipment, while the other two store them systematically, but some equipment are unusable and requiring restocking.

In the case of schools in Group B, one school has sufficient buildings, but some are old with classrooms not meeting standards, while the other two schools have unusable buildings due to decay, water damage or safety concerns; one school has some trees and plants, but not in a systematic way, while the other two face challenges in proper greening due to waterlogged areas; two schools have poor cleanliness and hygiene, and one school has fair cleanliness and hygiene but all struggle with disorganized and cluttered classrooms; two schools have hand-washing facilities, while the third has no COVID-19 prevention activities; one school has a reasonable student-teacher ratio, while two have overcrowded classrooms and traditional teaching method prevails; most classrooms in all schools have good lighting and ventilation, but some need electric lighting or more windows; in all schools, the desks and chairs are not enough and not in

good condition; none of the schools have enough teaching aids, with some classrooms relying on charts; in two schools, teachers lack access to electronic devices, while teachers in other schools can use electronic devices in rotation; and all schools have laboratory equipment but do not use it.

Conclusion and Discussion

Discussion

Regarding **first research question**, findings suggested that teachers generally had a high level of QWL, meaning that, as noted by Aviguetero (2021), teachers have a high level of organizational recognition, job fulfillment, job performance, and lower level of turnover and personal hostility. Specifically, the perceptions of “working environment” were the highest. According to the results of open-ended questions and interviews, both principals and most teachers stated that they are quite satisfied with the physical condition of their respective schools. The common difficulty they face is an inadequate number of teachers. Observation results prove that most of the schools have a sufficient number of buildings, though some need renovation. However, teaching aids are not adequately provided in two schools in Group B. A possible explanation for this is that the study area is the city development area, and therefore, most of the schools have adequate infrastructure, school facilities, and instructional materials supported by the government. Furthermore, almost all of the principals of the selected schools are well experienced not only in administration but also in teaching.

Concerning **second research question**, the present study results revealed the high level of work engagement among teachers. These findings suggested that selected teachers were cognitively, emotionally, and physically engaged in their work. Moreover, teachers, as social workers, were able to establish positive relationships with both colleagues and students. The results of the open-ended questions revealed that teachers use various strategies and practices to teach effectively, such as following a monthly schedule, and adjusting to individual students’ needs and backgrounds. Again, according to the results of principals’ interview, at the lower secondary level, junior teachers prefer traditional methods of teaching. They have limited training opportunities on the new curriculum because of the sudden shift to online teaching during COVID-19 pandemic. In contrast, principals in Group B argued that most of the teachers are responsible for their duties, but some teachers lack enthusiasm, so they prefer using traditional teaching methods. Again, teachers’ interview results showed that teachers employ a child-centered approach, are willing to accept positive criticism, and actively seek suggestions from colleagues for improving their teaching. Klassen et al. (2013) claimed that effective teaching is dependent on teachers who are motivated, fully engaged in their work, and engaged not just cognitively and emotionally, but also socially. Engaged teachers are regarded as being psychologically present, fully there, attentive, feeling, connected, integrated, and focused in their role performances (Rich et al., 2010).

As regards **third research question**, the positive relationship exists between teachers’ perceptions of their QWL and work engagement. In the same way, this result is in line with self-determination theory, which states that environmental conditions that foster people’s innate psychological needs and tendencies towards personal growth enable optimum well-being. According to Deci and Ryan (1985), three inherent psychological needs (autonomy, relatedness

and competence) are essential to personal growth and well-being. The findings can reflect Macey and Schneider's (2008) model, which proposes that engagement is a consequence of both environmental conditions and dispositional characteristics and their interactions.

For **fourth research question**, the research findings pointed out that QWL dimensions such as working environment, developmental opportunities, interpersonal relationships, work-life balance and work-related attitudes have an impact on teachers' work engagement. The results of this study are also supported by the JD-R model (Schaufeli & Bakker, 2004), which posits that work engagement can be predicted by balance of demands and resources within the work environment. Consistent with these findings, socio-technical system theorists asserted that the highest levels of productivity can only be achieved in an organization that integrates individual and organizational needs into the design of work itself (Pasmore et al., 1982). The regression model of the present study, 48% of variance in work engagement, follows the study of Kantan and Sadullah (2012) who postulate that 50% of the variance in work engagement is explained by QWL.

As for **fifth research question**, when developing a model of QWL for enhancing teachers' work engagement, there were direct and indirect effects of QWL dimensions on teachers' work engagement. As noted by Smith et al. (2016), people will choose whether or not to engage themselves in relation to the resources they get from their organization. Engagement can also be influenced by factors outside the job, such as having to deal with personal issues, which can distract and deplete energy, or in the case of positive events, can result in approaching work with more enthusiasm (Newman et al., 2010). Dr. Khin Zaw (2001a) also explained that most people have their lives pretty well adjusted to the status quo and of course, they expect progressive improvement, but usually piecemeal inside the status quo as a frame of reference. As a result, teachers exert their fullest effort and become engaged in their work. In accordance with the quantitative and qualitative findings and the strong theoretical foundation, the proposed model of QWL for enhancing teachers' work engagement in MCDA is illustrated in Figure 2.

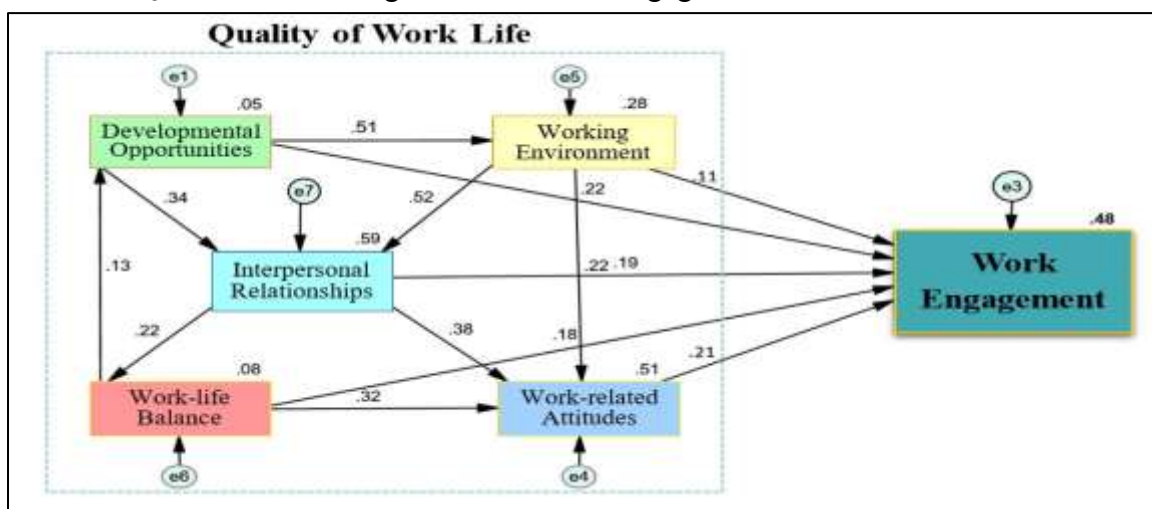


Figure 2 Proposed Model of Quality of Work Life for Enhancing Teachers' Work Engagement

Recommendation

The following recommendations are suggested.

- As **educators and policymakers**, they should allocate resources to address the specific areas for ensuring high QWL for teachers, such as infrastructure improvements; organize professional development activities; emphasize appropriate student-teacher ratios; deal with the problems of specialization mismatches; apply consistent deployment and promotion policies; and consider the academic qualifications of the principals when appointing them to leadership positions.
- As **school principals**, they should allocate resources wisely; focus on maintenance of school buildings, campus and facilities; use motivators such as providing appreciation and recognition; foster open communication channels and deliver constructive feedback; set clear goals and expectations; enforce school disciplines fairly and consistently; design workplace atmosphere in a way that encourages teacher collaboration and cooperation; provide the opportunities for teachers to participate in decision-making; and prioritize and provide continuous professional development opportunities for teachers.
- As **teachers**, they should maintain school property and use it effectively for creating a conducive learning environment; use teaching aids to help students better understand the concepts; seek developmental opportunities; establish open and friendly relationships among colleagues; and take proactive steps to maintain a healthy work-life balance with the recognition of the importance of personal well-being and upholding their professional obligations.
- As **local authorities**, they should focus on having a safe and secure learning environment and should engage in school improvement plans to ensure that the school is responsive and effective for the success and well-being of students and teachers.

Acknowledgements

We would like to offer special thanks to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee and Dr. Cho Kyi Than (Pro-rectors, Sagaing University of Education) for their valuable expertise and coaching, which have enabled us to carry out this research up to this rightful conclusion. We would like to offer our respectful gratitude to Daw Than Than Aye (Associate Professor and Head, Department of English, Sagaing University of Education) for valuable comments and necessary editing toward this paper. Most importantly, we wish to extend a special thanks to principals and teachers from Basic Education High Schools in Mandalay City Development Area for their time, cooperation, and willingness to participate in this study.

References

- Abebe, A., & Assemie, A. (2023). Quality of work life and organizational commitment of the academic staff in Ethiopian universities. *Heliyon*, 9. <https://pubmed.ncbi.nlm.nih.gov/37089320/>
- Aviguetero, J. N. R. (2021). Quality of work life in relation to job performance and stress level of teachers in La Paz South District, Division of Tarlac Province. *International Journal of Research and Innovation in Social Science*, 5(9), 488–504.
- Clark, S. C. (2000). Work/family border theory: A new theory of work/family balance. *SAGE Publication*, 53(6), 747–770.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

- Cook, S. (2008). *The essential guide to employee engagement: Better business performance through staff satisfaction*. Kogan Page.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. Springer Science+Business Media.
- Erturk, R. (2022). The effect of teachers' quality of work life on job satisfaction and turnover intentions. *International Journal of Contemporary Education Research*, 9(1), 191–203. <https://files.eric.ed.gov/fulltext/EJ1339906.pdf>
- Gay, L. R., Mills, G. E., & Airasian, P. W. (2012). *Educational research: Competencies for analysis and applications* (10th ed.). Pearson.
- Hobfoll, S. E., Halbesleben, J., Neveu, J., & Westman, M. (2017). Conservation of resources in the organizational context : The reality of resources and their consequences. *Annual Review of Organizational Psychology and Organizational Behaviour*, 103–130.
- Inarda, A. (2022). A mixed-methods study on the influence of quality of work life on commitment and performance. *Problems and Perspectives in Management*, 20(2).
- Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *The Academy of Management Journal*, 33(4), 692–724.
- Kanten, S., & Sadullah, O. (2012). An empirical research on relationship quality of work life and work engagement. *Procedia - Social and Behavioral Sciences*, 62, 360–366.
- Kaur, K. (2016). Impact of quality of work life on overall job satisfaction level and motivational level: A study of government universities in Punjab. *Pacific Business Review International*, 8(8), 125–140.
- Khin Zaw, Dr. (2001a). *Advanced educational philosophy*. Yangon University of Education.
- Khin Zaw, Dr. (2001b). *Advanced educational psychology*. PhD Programme Course, Yangon University of Education.
- Klassen, R. M., Perry, N. E., & Frenzel, A. C. (2012). *Teachers' relatedness with students: An underemphasized component of teachers' basic psychological needs*. 104(1), 150–165.
- Klassen, R. M., Yerdelen, S., & Durksen, T. L. (2013). Measuring teacher engagement: development of the engaged teachers scale (ETS). *Frontline Learning Research*, 1(2), 33–52.
- Kondalkar, V. G. (2007). *Organizational behaviour*. New Age International (P) Limited, Publishers.
- Kuok, A. C. H., & Taormina, R. J. (2017). Work engagement: Evolution of the concept and a new inventory. *Psychology Thought*, 10(2), 262–287. <https://doi.org/10.5964/psyc.v10i2.236>.
- Lawler, E. (1982). Strategies for improving the quality of work life. *American Psychologist*, 37, 486–493.
- Leiter, M. P., & Bakker, A. B. (2010). Work engagement: Introduction. In A. B. Bakker, & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research*. Psychology Press.
- Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology*, 3–30.
- Martel, J. P., & Dupuis, G. (2006). Quality of work life: Theoretical and methodological problems, and presentation of a new model and measuring instrument. *Social Indicators Research*, 77(2), 333–368. <https://link.springer.com/article/10.1007/s11205-004-5368-4>.
- Ministry of Education (MOE). (2016). *National education strategic plan 2016-2021*. The Government of the Republic of the Union of Myanmar.
- Narehan, H., Hairunnisa, M., Norfadzillah, R. A., & Freziamella, L. (2014). The effect of quality of work life (QWL) programs on quality of life (QOL) among employees at multinational companies in Malaysia. *Procedia - Social and Behavioral Sciences*, 112, 24–34.
- Newman, D. A., Joseph, D. L., & Hulin, C. L. (2010). Job attitudes and employee engagement: considering the attitude “A- factor.” In S. L. Albrecht (Ed.), *Handbook of employee engagement: Persepctives, issues, research, and practice*. Edward Elgar Publishing.
- Nordenfelt, L. (1996). *Quality of life, health and happiness*. Aldershot: Avebury.
- Oyeh, N. L., & Oluwuo, S. O. (2018). Relationship between teachers' quality of work life and their job engagement in secondary schools in Rivers State. *International Journal of Innovative Psychology & Social Development*, 6(3), 53–66. <https://seahipaj.org/journals-ci/sept-2018/IJIPD-S-9-2018.pdf>.

- Pasmore, W., Francis, C., & Haldeman, J. (1982). Sociotechnical systems: A North American reflection on empirical studies of the Seventies. *Human Relations*, 35(12), 1179–1204.
- Rich, B. L., Lepine, J. A., & Crawford, E. R. (2010). Job engagement: Antecedents and effects on job performance. *Academy of Management Journal*, 53(3), 617–635.
- Runhaar, P. (2017). How can schools and teachers benefit from human resources management? Conceptualizing HRM from content and process perspectives. *Educational Management Administration & Leadership*, 45(4), 1–18. <https://doi.org/10.1177/1741143215623786>
- Saks, A. M. (2006). Antecedents and consequences of employee engagement. *Journal of Managerial Psychology*, 21(7), 600–619.
- Schaufeli, W. B. (2013). What is engagement?. In C. Truss, K. Alfes, A. S. R. Delbridge, & E. Soane, *Employee engagement in theory and practice*. Routledge.
- Schaufeli, W. B., & Bakker, A. B. (2004). Job demands, job resources and their relationship with burnout and engagement: A multi-sample study. *Journal of Organizational Behaviour*, 293–315.
- Shuch, B. (2011). Four emerging perspectives of employee engagement: An integrative literature review. *Human Resource Development Review*, 10(3), 304–328.
- Sirgy, M. J., Efraty, D., Siegal, P. H., & Lee, D. J. (2001). A new measure of quality of work life (QWL) based on need satisfaction and spillover theories. *Social indicators research*, 241-302.
- Smith, S. S., Peters, R., & Caldwell, C. (2016). Creating a culture of engagement: Insights for application. *Business and Management Research*, 5(2), 70–80. <https://doi.org/10.5430/bmr.v5n2p70>
- Soane, E., Truss, C., Alfes, K., Shantz, A., Rees, C., & Gatenbytt, M., (2012). *Development and application of a new measure of employee engagement: The ISA engagement scale engagement*. <https://doi.org/10.1080/13678868.2012.726542>
- Walton, R. E. (1973). Quality of working life. What is it? *Sloan Management Review*, 42(2), 16–17.

RELATIONSHIP BETWEEN ORGANIZATIONAL PROTECTIVE PROCESSES AND TEACHER RESILIENCE

Htet Htet Aung¹ and Nyein Ma Ma Khin²

Abstract

The purpose of this study was to investigate the relationship between organizational protective processes and teacher resilience at selected Basic Education High Schools in Mandalay. Mixed research methods were applied to collect the required data. The sample for quantitative study was selected through purposive sampling, which included 310 teachers from eight selected Basic Education High Schools in Mandalay. For the quantitative study, two instruments “*Organizational Protective Factors Survey*” developed by Tanum (2007) to assess the perceptions of teachers on organizational protective processes and “*Personal Resilience Questionnaire*” developed by Conner (1993) to evaluate the perceptions of teachers on their resilience, were mainly used. Moreover, interviews were conducted with 27 teachers from five selected Basic Education High Schools in Mandalay to obtain detailed information about organizational protective processes and teacher resilience. Data was computed by utilizing descriptive statistics and Pearson product-moment correlation analyses through SPSS software. According to the results of this study, organizational protective processes were positively and moderately correlated with teacher resilience ($r=0.469$, $p<0.01$). The qualitative data provided by interviews with teachers was consistent with the qualitative findings. Therefore, it can be concluded that when the levels of organizational protective processes increase, the levels of teacher resilience will also increase. Further research should be conducted in other townships, states and divisions of our country.

Keywords: organizational protective processes, teacher resilience

Introduction

Education is the most powerful weapon and can change the world. It is an important issue in one's life. It is the key to success in the future and to having many opportunities in life. Having education in an area helps people think, feel and behave in a way that contributes to their success, improves not only their personal satisfaction but also their community. Education polishes our minds, reinforces our thoughts, and strengthens our character and behaviors toward others. Teachers are one of the elements in the overall growth and development of education. They are keystones of the learning process in all educational fields. They are the strength of the nation, since they are the ones who lead the system of education into success or failure (Al-Siyabi, 2016).

Teaching is a challenging profession, and teacher turnover is creating difficulties for school systems nationwide. Organizational processes also cause teachers to leave the profession. Ingersoll (2001) asserted that when teachers leave a school, the shortage can lower the school's performance and cause staffing pressures. State departments of education are being forced to issue provisional certificates in order to staff schools and fill these critical position needed. School districts should provide interventions to deal with teachers who have entered the stages of career withdrawal. They can address teacher withdrawal by providing programs and interventions that address the teacher's withdrawal stages in order to keep the teacher in the profession. By promoting organizational protective processes such as collaboration, empowerment,

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administrative support, mentoring and staff development that foster personal resilience in teachers, systems may lower the turnover rate and keep teachers productive throughout the career cycle (Steffy, Wolf, Pask, & Entz, 2000, as cited in Tanum, 2007).

Teacher resilience is the quality that allows teachers to maintain their commitment to teaching as a series of specific strategies that teachers employ when they experience an adverse situation at school and as the teacher's ability to successfully overcome personal vulnerabilities and environmental stressors. When resilient teacher face the uncertainty, anxiety, and loss of control that come with change, they tend to grow stronger rather than be defeated (Isaacs, 2003). According to Patterson (2001, as cited in Pepe, 2011), teachers should see change as a challenge by accepting their responsibilities and move ahead in the face of adverse, as a result, they become more resilient by accepting their responsibilities. Resilient teachers exhibit characteristics that are positive, professional, and reflective in their teaching careers. The teachers are able to withstand the career-ending obstacles of health problems, boredom, and loss of interest, and stay instructional and professionally productive in spite of their longevity in the career. Organizational protective processes can help the teacher to move through the reflection-growth-renewal cycle and never withdraw from the profession (Tanum, 2007). The focus of this study is to examine the relationship between organizational protective processes and teacher resilience at selected Basic Education High Schools in Mandalay.

Significance of the Study

Teachers provide an education that improves the quality of life, therefore bringing so much to both individuals and society as a whole. Teachers have the ability to shape leaders of the future in the best way for society, to build positive and inspire future generations and therefore design society, both on a local and global scale. Teaching is one of the most important professions in today's world. Teaching is the process of attending to people's needs, experience and feelings, and intervening so that they learn particular things and go beyond the given. Teaching is extremely significant for instilling values, attitudes, and behaviors in students. A teaching career is a tough job, but it is one where you can make the most impact on another person's life. Teaching careers appear to be enriched by the organizational protective processes that foster resilience in teachers (Tanum, 2007).

It is important to look at organizational protective processes for teachers. There are five organizational environmental processes that act as organizational protective processes for teachers: collaboration, empowerment, administrative support, mentoring, and staff development (Bobek, 2002). Gabriel (2005 as cited in Tanum, 2007) stated that collaboration and cooperation are critical for success, both personal and standardized. Collaboration appears to be an organizational process that is tremendously beneficial to teachers. According to Gideon (2002), everyone in school must work to make collaboration the norm. Empowerment as an organizational protective process may be a key factor in fostering resilience in teachers. Empowerment appears to be an intrinsic factor that leads to teacher retention (Tanum, 2007). The importance of empowerment is also illustrated by its role in increasing teacher motivation, improving problem-solving skills, and all of which are vital to improving learning outcomes for every student.

The administrative support fosters teacher retention. Darling-Hammond (2003) asserted that good teachers gravitate towards schools where administrators will support them. Administrators must support teachers' efforts in the classroom on a daily basis. The administrator support makes it easier for a school organization to run smoothly without any issues whatsoever and it is important to the development of the brand that it is attached with. Mentoring is a positive process for both beginning and experienced teachers. Georgia Teacher Retention Study (2004) found mentoring to be an essential component for retaining teachers. Holloway (2003 as cited in Tanum, 2007) mentioned staff development as one particular effort that can reduce teacher attrition and turnover and sustain teachers in the profession. Staff development is a means to retain teachers and raise student achievement.

Resilience is more than an individual trait. It is a capacity that arises through interactions between people within organizational contexts. Teacher resilience is the ability to adjust to varied situations and increase one's competence in the face of adverse conditions (Gordon and Coscarelli, 1996). Teacher resilience is a relatively recent area of investigation which provides a way of understanding what enables teachers to persist in the face of challenges and offers a complementary perspective to studies of stress, burnout, and attrition (Beltman, Mansfield & Price, 2011). Resilience is of importance in teaching for three reasons. Firstly, it is unrealistic to expect pupils to be resilient if their teachers, who constitute a primary source of their role models, do not demonstrate resilient qualities (Henderson & Milstein, 2003). Secondly, teaching is a demanding job in an emerging "age of diversity and sustainability" (Hargreaves & Fink, 2006,). A shift in focus from teacher stress and burnout to resilience provides a promising perspective to understand the ways that teachers manage and sustain their motivation and commitment in times of change. Thirdly, resilience is the capacity to continue to "bounce back", to recover strengths or spirit quickly and efficiently in the face of adversity, is closely allied to a strong sense of vocation, self-efficacy, and motivation to teach which are fundamental to a concern for promoting achievement in all aspects of students' lives.

Day and Gu (2010, as cited in Razak, 2013) also pointed out the resilience is not only the capacity to continue to bounce back to recover strengths or spirit quickly and efficiently in the face of adversity but is also closely allied to a strong sense of vocation, self-efficacy, and motivation to teach, which are fundamental to sustaining a commitment to promoting achievement in all aspects of students' lives. The more schools give for collaboration, empowerment, administrative support, mentoring, and staff development, the more he or she becomes a resilient teacher to direct his or her trust towards school-wide improvements despite of the many demands of his or her work.

For the reasons mentioned above, this study is important as it helps to find out the perceptions of teachers on organizational protective processes and teacher resilience. Moreover, this study will explore the relationship between organizational protective processes and teacher resilience.

Purpose of the Study

The main purpose of the study is to investigate the relationship between organizational protective processes and teacher resilience at selected Basic Education High Schools in Mandalay.

Specific objectives of the study are as follows:

1. to study the levels of organizational protective processes as perceived by teachers at selected Basic Education High Schools in Mandalay.
2. to study the levels of teachers' resilience perceived by themselves at selected Basic Education High Schools in Mandalay, and
3. to investigate the relationship between organizational protective processes and teacher resilience at selected Basic Education High Schools in Mandalay.

Research Questions

1. What are the levels of organizational protective processes as perceived by teachers at selected Basic Education High Schools in Mandalay?
2. What are the levels of resilience as perceived by teachers at selected Basic Education High Schools in Mandalay?
3. Is there any relationship between teachers' perceptions of organizational protective processes and their resilience at selected Basic Education High Schools in Mandalay?

Definitions of Key Terms

- **Organizational Protective Processes:** Organizational protective processes can be defined as the systemic processes that protect the teacher from withdrawal (Tanum, 2007).
- **Teacher Resilience:** Teacher resilience can be defined as using their energy productively to achieve school goals in the face of adverse conditions (Patterson, Collins and Abbott, 2004 as cited in Razak, 2013).

Conceptual Framework of the Study

The purpose of this research was to ascertain the relationship between organizational protective processes and teacher resilience. Protective processes have been studied in other fields but have not been studied extensively in education, and specifically for teachers. The conceptual framework for this study showed that five organizational processes may provide personal resilience for teachers. Teachers' beliefs of how these processes have impacted their career and fostered resilience can be of great benefit to schools as organization in their attempts to retain teachers.

Tanum (2007) developed “*Organizational Protective Factors Survey*” comprised of the following dimensions: (1) Collaboration (2) Empowerment (3) Administrative Support (4) Mentoring and (5) Staff Development to examine the levels of organizational protective processes.

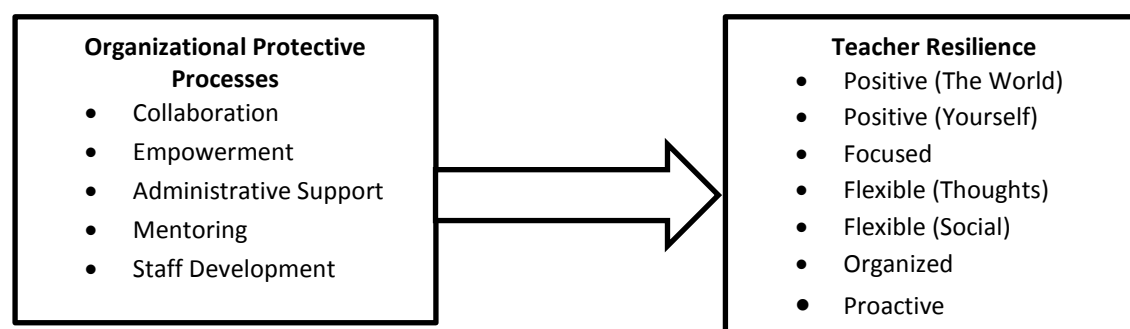


Figure 1.1 Conceptual Framework of the Study

On the other hand, Conner (1993) developed “*Personal Resilience Questionnaire (PRQ)*” comprised of the following dimensions: (1) positive-the world (2) positive-yourself (3) focused (4) flexible-thoughts (5) flexible-social (6) organized and (7) proactive to examine the levels of teacher resilience.

Review of Related Literature

Organizational Protective Processes

It is important to look at organizational protective processes for teachers. Bobek (2002) believed that there are five organizational protective processes that act as organizational protective processes for teachers: collaboration, empowerment, administrative support, mentoring, and staff development.

Organizational protective processes that act as protective processes for teachers in schools. Luthar, Cicchetti, and Becker (2000) stated that certain themes recur across studies, when dealing with the small amount of research on protective factors and correlates of resilience. They reported that close relationships with supportive adults, effective schools, and connections with pro-social adults are recurring themes. Ingersoll and Smith (2003) found organizational factors such as administrative support and mentoring help to prevent turnover and retain teachers. Ingersoll (2001, as cited in Tanum, 2007) found that organizational processes have significant influences on teacher retention and that school systems should focus resources on those processes that alleviate teacher turnover.

Achinstein (2002) asserted that collaboration in schools may also serve another important purpose. The micro-political process of collaboration plays a role in organizational learning and has a strong effect on things such as school reform efforts and the building of school culture. The idea that giving teachers a greater hand in their destiny and decision making leads to increased resilience and reduced levels of stress and burnout. Byrne (1999, as cited in Giroux, 2007) stated that the problems that may occur if teachers are not empowered: A major stressor for teachers is their lack of involvement in decisions that bear directly on the quality of their work life. Participation in the organization's decision-making process has emerged as a critical factor in maintaining worker morale, teachers, in general, are permitted only minimal input into decisions that directly concern them, over time the cumulative effects lead to job stress and ultimately burnout.

Mentoring is the process of having more experienced teachers guide those who are new to the profession through their first year and support them by being there to listen and problem solve, offering advice when appropriate. Mentoring is crucial to building resilience. In terms of promoting resilience, this relationship is not just beneficial to the younger teacher who is the recipient of the mentoring (Schwab, Jackson & Schuler, 1986, as cited in Giroux, 2007). Administrative support may often be well outside of a teacher's sphere of influence and demonstrates that it is a crucial element in promoting resilience. Bobek (2002) asserted that the primary reason that teachers give for leaving the profession is poor administrative support. The strong administrative support can protect teachers from being at risk. Steffy, Wolf, Pasch, and Enz (2000, as cited in Tanum, 2007) asserted that to retain teachers in the profession, a framework for designing staff development must be implemented to support professional growth. Staff development is crucial to building resilience.

Bobek (2002) identified the following five organizational processes. Each process is discussed in the context of it acting as a protective factor for teachers. The Georgia Teacher Retention Study (2004) stated that teamwork and collegiality are factors that lead to teacher retention. It asserted that all teachers need to share ideas with grade-level colleagues about what works in the classroom. This collaborative process leads to the retention of teachers. Gabriel (2005) stated that "Collaboration and cooperative are critical for success, both personal and standardized". Collaboration appears to be an organizational process that is tremendously beneficial to teachers. Schmoker (2004) stated that if there is anything that the research community agrees on, it is the need for strong teacher collaboration structures. Schools must make the collaborative process a priority. Collaborative culture will not produce itself on its own. According to Gideon (2002, as cited in Tanum, 2007), everyone in the school must work to make collaboration the norm. By implementing collaborative processes within the school, administrators can assure that both new teachers and veteran teachers are not working in isolation.

Teacher empowerment was defined by Short (1994) as "a process whereby school participants develop the competence to take charge of their growth and resolve their problems". Empowerment as an organizational process may be a key factor in fostering resilience in teachers. Empowerment appears to be an intrinsic factor that leads to teacher retention. The organizational protective process of administrative support fosters teacher retention. Hammond (2003, as cited in Tanum, 2007) asserted that good teachers gravitate towards schools where administrators will support them. Great school leaders create nurturing school environments in which accomplished teaching can flourish and grow. Yoon and Gilcrest (2003) found that administrative support involves staff development training for teachers to learn how to handle difficult students. Administrators' direct involvement with student discipline had the highest frequencies of responses. It was followed by emotional support, teamwork, and parent involvement. Administrators must support teachers' efforts in the classroom daily.

Mentoring is a positive process for both beginning and experienced teachers. Moir (2003) stated that mentoring has a positive effect on veteran teachers, as it tends to revitalize them in the process of passing on knowledge to a new generation of teachers. Mentoring is one organizational process that acts as a protective mechanism for the retention of teachers. Burke (2001, as cited in Tanum, 2007) felt that staff development is a means to increase the effectiveness of instruction for teachers. Kent (2004) asserted that high-quality staff development is crucial to the future of education. Schools must provide pertinent staff development to teachers so they can meet the instructional needs of their students. Holloway (2003) mentioned professional development or staff development as one particular effort that can reduce teacher attrition and turnover and sustain teachers in the profession. Staff development is a means to retain teachers and raise student achievement.

Dimensions of Organizational Protective Processes

Bobek (2002) developed five organizational protective processes that act as organizational protective processes for teacher: (1) collaboration, (2) empowerment, (3) administrative support, (4) mentoring, and (5) staff development.

(1) Collaboration

Collaboration is the development of close relationships with colleagues; collaboration can foster resilience. This is extremely important for new teachers and remains a protective process for teachers throughout their career. A teacher's support group may include administrators, parents, and teachers within and outside their building. Administrators can take the lead in fostering collaborative activities in the school by providing common planning, grade level meetings and common teaching assignments.

(2) Empowerment

Empowerment is another protective process. Nir (2002 as cited in Tanum, 2007) found that school based management and empowerment positively affect a teacher's commitment to the teaching profession and student achievement. Personal resilience can also be fostered by involving teachers in the shared decision-making process. Teachers who have input in building level decisions experience a sense of ownership in their career.

(3) Administrative Support

A third organizational protective process is administrative support. Mallak (1998) believed that using positive reinforcement can build resilient organizations. Administrative support should result in trust and a positive exchange of ideas between teachers and administrators. Mallak felt administrators should endorse the processes that lead to teacher resilience and an open exchange of ideas and trust should flow from the school administrators and teachers.

(4) Mentoring

Pavia, Nissen, Hawkins, Monroe, and Filimon-Demyen (2003) stated that mentoring of new and experienced teachers, another of Bobek's (2002) five protective processes, is a widely accepted practice for supporting teachers' professional development. They asserted that new teachers may increase their resilience by fostering relationships with older, more experienced teachers. Mentoring gives teachers support that otherwise would not be available to them. They asserted that mentoring of new and experienced teachers is a widely accepted practice for supporting a teacher's professional development.

(5) Staff Development

"To develop resilience, new teachers must be lifelong learners, willing to venture into areas that may challenge their current views of themselves and their practices"(Bobek, 2002). Bobek believed this could be done with pertinent staff development, the fifth protective process. She asserted that staff development should be afforded to both beginning as well as practiced teachers. Staff development keeps teacher current with the latest teaching methods that may increase student achievement.

All of these organizational protective processes may have the capacity to lead to resilience in teachers. The connection between these processes and resilience in teachers has yet to be significantly studied. By studying resilient teachers, the researcher may determine how protective processes in schools contribute to the resilience. School systems can then utilize these protective processes to aid in the wellbeing and retention of teachers.

Teacher Resilience

Teacher resilience can be defined as using their energy productively to achieve school goals in the face of adverse conditions (Patterson, Collins and Abbott, 2004 as cited in Razak, 2013). According to Henderson and Milstein (2003), teacher resilience is defined as the capacity to spring back, rebound, successfully adapt in the face of adversity, and develop social, academic and vocational competence despite exposure to severe stress or simply to the stress that is inherent in today's world.

Resilience is not innate, it derives from the interaction between the individual to successfully cope with negative life events. Resilience is identified as the human ability of all individuals to modify and change no matter the risks. Thus, resilience is a strategy developed during one's journey through life, which allows a person to bounce back from adversity. Resilience refers to a powerful process encompassing positive adaptation within the context of significant adversity. Resilience is defined as the capacity to bounce back, to withstand hardship, and to repair yourself (Robinson, 2000; Lifton, 1994; & Masten, 1994; Wolin and Wolin, 1991 as cited in D'Souza, 2013).

Teacher resiliency can be defined as the ability to adjust to varied situations and increase one's competence in the face of adverse conditions (Gordon and Coscarelli, 1996). According to Bobek (2002), teacher resilience as the ability to adjust to varied situations and increase one's competence in the face of adverse conditions. Teacher resilience is a process by which teachers learn to adapt to and overcome the enormous challenges they encounter daily in their interactions with students, parents of their students, colleagues and community members. Tait (2005 as cited in Standish, 2014) described resilience as, the human capacity to face, overcome and even be strengthened by experiences of adversity. It is the ability to "bounce back" after a setback. It is also the capacity to see things realistically and to recognize what is possible and what is not. Resilient teachers are able to maintain positive relationships, solve problems skillfully, set limits, stay motivated, and derive some meaning from difficulties and challenges.

Dimensions of Teacher Resilience

Conner (1993) and his associates at ODR (Organizational Development Resources) identified five (seven including sub-characteristics) general characteristics that are related to resilience, namely: (1) Positive (The World), (2) Positive (Yourself), (3) Focused, (4) Flexible (Thoughts), (5) Flexible (Social), (6) Organized and (7) Proactive.

(1) Positive (The World)

Positive people differ in their tendency to focus on the positive view of their environment as complex and challenging. They display a sense of security and self-assurance that is based on their view of life as complex but filled with opportunity. They are able to see opportunities and possibilities in situations that may be difficult for most people. Those who focus primarily on the negative can get into cycles of anxiety and depression that prevent them from seeing value and opportunity in circumstances. They are generally optimistic about their environment and are able to turn negative situations into positive ones.

(2) Positive (Yourself)

People need a strong foundation from which to face uncertainty and stress in the world. This foundation can be developed through realistically assessing one's capabilities and achieving self-acceptance while continuing to learn and grow. When a person feels capable of reaching his or goals, that person is able to take action confidently and can weather failure without losing the feeling of self-worth.

(3) Focused

People who describe themselves as strongly committed to their goals, or who see their life as having meaning or purpose, are better able to manage confusing situations: to sort out the important issues, judge the relative worth of alternatives, and use their personal energy more efficiently. They have a clear vision of what they want to achieve. They have a clear sense of focus and purpose and are goal driven. They are better able to use resources in a positive way to overcome challenging situations.

(4) Flexible (Thoughts)

Many times, when a person is open-minded in finding different ways to view a situation, he or she will have a broader understanding of the problem and be able to form more creative, effective resolutions. Flexible thoughts allow one to find these creative, effective ways to achieve goals. They demonstrate a special pliability when responding to change. They are able to live with paradoxes and contradictions and overcome the stress of an ever-changing environment. They are able to draw from other people and use synergy to overcome obstacles in the environment.

(5) Flexible (Social)

The highly resilient people recognize their interdependence with others. They are characterized by strong social bonds that they can rely on for support during difficult times. They are able to form and maintain close relationships, are willing to engage in the give-and-take of mutually supportive friendships, and can recognize ways in which other people's skills can complement their own.

(6) Organized

Organization enables one to find order in chaos and structure in ambiguity, and to move beyond thought toward action. The discipline required in assessing the available information, choosing a direction in which to proceed, and plan the steps needed to move forward is important. This requires a person to set aside information that is not helpful at the moment, focus on the elements that are important, and logically structure them into a workable, detailed plan. They develop structured approaches to managing ambiguity. They are able to move forward with a detailed plan of action. These people use available resources to find sense in ambiguity and chaos.

(7) Proactive

To be proactive, one must be willing to take some risks and endure discomfort in the belief that positive outcomes will result. Proactive individuals seek challenges rather than avoid them and respond to disruption by investing energy in problem solving rather than withdrawing. They engage change rather than defending against it. They seek challenges rather than avoid them. They are involved in problem solving and finding solutions that will help them move on.

Research Methodology

Research Method

In this study, quantitative and qualitative methods were adopted. In the quantitative method, data were collected by using the questionnaires. The qualitative results were obtained by interviewing the teachers.

Population and sample

The target population of this study was all teachers (primary, junior and senior teachers) from Basic Education High School (not included branch and affiliated high schools) in Mandalay. There are 52 Basic Education High Schools in Mandalay. Among those schools, 8 Basic Education High School were selected for the main study. Therefore, the total sample was 344 teachers from 8 schools in the quantitative study. Although the questionnaires were distributed to all 344 teachers in selected schools, only 310 teachers (90.12%) teachers responded and participated in the study. The total participants for interviewing were 27 teachers (primary, junior and senior teachers) from 5 Basic Education High Schools.

Instrumentation

In this study, two questionnaires and twelve interview questions were chosen as instruments to collect the data. Two questionnaires used by the researcher are “*Organizational Protective Factors Survey*” developed by Tanum (2007) and “*Personal Resilience Questionnaire (PRQ)*” developed by Conner (1993) were used in this study.

Data Collection Procedure

After receiving the permission of the responsible persons, two questionnaires were distributed to 344 teachers from selected Basic Education High Schools in Mandalay on 11 to 13 December 2019 and collected them one week later. Interviews were also conducted with 27 teachers from 5 selected high schools to investigate the relationship between organizational protective processes and teacher resilience.

Data Analysis

Using SPSS (Statistical Package for Social Science), descriptive statistics were calculated for organizational protective processes and teacher resilience. According to Landell (1997), the decision rule for determining the levels of organizational protective processes and teacher resilience were as follows: the mean values 1.00 to 2.33 is defined as low level, the mean values 2.34 to 3.67 is defined as moderate level and the mean values 3.68 to 5.00 is defined as high level. In addition, Pearson-moment correlation coefficient was utilized to know the relationship between organizational protective processes and teacher resilience. Moreover, responses from open-ended questions and interview questions were categorized into similar views that are adopted to sort out them.

Research Findings

To find out the levels of organizational protective processes and teacher resilience perceived by teachers at selected Basic Education High Schools in Mandalay, the descriptive statistics were calculated. The mean scores and standard deviations for organizational protective processes and teacher resilience perceived by teachers at selected Basic Education High Schools in Mandalay are presented by Table 1 and Table 2 respectively.

Table 1 Mean Scores for Organizational Protective Processes of Teachers in All Selected Basic Education High Schools in Mandalay

Dimensions of Organizational Protective Processes	Schools								All Selected Schools N=(310)
	A (n=52)	B (n=62)	C (n=34)	D (n=30)	E (n=26)	F (n=45)	G (n=25)	H (n=36)	
Collaboration	4.31	4.13	4.10	4.06	4.23	4.14	4.21	4.30	4.19
Empowerment	3.90	4.03	3.88	3.81	4.09	4.07	3.97	4.24	4.00
Administrative Support	4.03	3.95	3.84	4.13	4.16	4.01	3.98	4.28	4.03
Mentoring	4.19	4.02	3.86	4.11	4.11	4.06	3.98	4.23	4.08
Staff Development	4.32	4.13	4.16	4.11	4.19	4.16	4.34	4.23	4.20
Overall Organizational Protective Processes	4.15	4.05	3.97	4.04	4.16	4.09	4.09	4.26	4.10

1.00-2.33 = Low Level, 2.34-3.67 = Moderate Level, 3.68-5.00 = High Level

It can be found that the level of organizational protective processes of teachers in each selected school fell in the range between 3.68 and 5.00. Therefore, it can be said that the organizational protective processes of teachers in each school was at high level. According to the overall mean score of teachers' organizational protective processes ($\bar{X}=4.10$), organizational protective processes fell in the limit between 3.68 and 5.00. Therefore, it can be said that the organizational protective processes level of teachers for all selected High Schools was at high level.

Moreover, mean scores of teacher resilience perceived by teachers themselves in selected high schools are described in Table 2. As shown in Table 2, it was found that teachers from selected Basic Education High School in Mandalay had a high level of "overall teacher resilience".

Table 2 Mean Scores for Teacher Resilience of Teachers in All Selected Basic Education High Schools

Dimensions of Teacher Resilience	Schools								All Selected Schools N=(310)
	A (n=52)	B (n=62)	C (n=34)	D (n=30)	E (n=26)	F (n=45)	G (n=25)	H (n=36)	
Positive (the world)	3.93	3.96	3.87	3.89	3.93	3.85	4.12	3.93	3.93

Dimensions of Teacher Resilience	Schools								All Selected Schools N=(310)
	A (n=52)	B (n=62)	C (n=34)	D (n=30)	E (n=26)	F (n=45)	G (n=25)	H (n=36)	
Positive (yourself)	3.89	3.99	3.74	4.03	3.91	3.92	3.88	3.94	3.92
Focused	3.98	4.04	3.86	4.20	4.06	4.00	4.06	3.99	4.02
Flexible (thoughts)	4.03	4.14	3.98	4.12	4.01	4.00	4.25	4.04	4.07
Flexible (social)	3.99	4.07	3.80	4.06	3.93	3.92	4.06	3.99	3.98
Organized	4.02	4.03	3.90	3.95	3.97	3.97	4.03	3.98	3.99
Proactive	3.69	3.57	3.54	3.54	3.58	3.64	3.65	3.63	3.61
Overall Teacher Resilience	3.93	3.97	3.81	3.97	3.91	3.89	4.01	3.93	3.93

1.00-2.33 = Low Level, 2.34-3.67 = Moderate Level, 3.68-5.00 = High Level

To investigate the relationship between organizational protective processes and teacher resilience at selected Basic Education High School in Mandalay, the Pearson-product moment correlation coefficient was calculated.

Table 3 Correlation between Organizational Protective Processes and Teacher Resilience at Selected Schools

Variables	Organizational Protective Processes	Teacher Resilience
Organizational Protective Processes Sig. (2-tailed)	1 	.469** .000
Teacher Resilience Sig. (2-tailed)	.469** .000	1

****Correlation is significant at the 0.01 level (2-tailed)**

According to Table 3, it can be found that organizational protective processes and teacher resilience perceived by teachers were correlated with $r = .469$ at 0.01 level. This finding showed that the direction of the correlation was positive. So, there was a significantly positive and moderate correlation between organizational protective processes and teacher resilience at selected Basic Education High Schools in Mandalay. Therefore, it can be interpreted that if organization protective processes perceived by teachers increases then their resilience will increase, and inversely, if organizational protective processes perceived by teachers decreases then their resilience will decreases.

Open-Ended Responses

In addition to quantitative data, teachers were asked two open-ended questions. The first is “Describe the distinctive performances of their principals concerning with the ways to be perfect schools.” Most of the teachers expressed that the principals collaborated with Parents Teachers Association, gave right rewards for hard work of teachers and students, was equal on teachers, and built up conducive-environment of work in the institution. The second question is “As for teachers, do you have any other adversities in your school? If you have, how your adversities solve?” Most of the teachers reported that they collaborated with colleagues to solve the problems about work, asked the methods from well-experiences headmaster or mistresses, and tried to solve the problems patiently.

Interview Responses

There were twelve interview questions in qualitative study. First, “Which school activities do you collaborate with principal or other teachers? Describe collaborative school activities.” Most of the teacher reported that they co-operate all school activities and religious ceremony with principal and colleagues. Second question, “Do you have empowerment concerning your teaching? Describe one example.” Most teachers stated that they have empowerment concerning their teaching-learning processes. The principal gave empowerment fully in making classroom decisions and most of the teachers’ actions. Third question, “How do principal support teachers to promote their teaching and learning?” Most teachers expressed that their principals establish different school organizations or committees including all teachers and let them talk about their teaching subjects or methods or the most recent news or information about education. Fourth question, “Have the mentoring program in your school? If have, give reasons.” Most of the teachers expressed that they communicate other teachers openly, advise and guide their weaknesses and recognized their strengths and collaborate with other veteran teachers. Fifth question, “How does their principal promote professional development of teachers? Give one example.” Most teachers stated that their principal advised for post-graduate and does not interfere during teachers’ instructions and allow teachers to stay comfortably at their free time. Sixth question, “As teachers, do you have any other difficulties when communicate with other fellow teachers? If your answer is yes, how were your adversities solved? If haven’t, how do you use which methods communicate with other fellow teachers?” Most of the teachers answered that they understand other persons with sympathy and positive point of views.

Seventh question, “Do you have confidence? Give one example. Why?” Most teachers responded that they do not have confidence. They are depressed. They thought that the work they do will be fail. Eighth question, “How do you solve problems in your service? Give one example.” Most of the teachers reported that they must first do their minds conveniently. Then, they draw plans to solve their problems. And, they do according to their plan. Ninth question, “If you do mistakes, how do you control your mind? Give one example.” Most teachers answered that they resolve their mistakes by keeping one’s cool. They apply the best approach to resolve their mistakes. (eg. conducting school matters, punishment on students, misunderstandings on colleagues). Tenth question, “Do you adjust your mind according to current problems with colleagues? Or, do you act according to your mind?” Most teachers reported that they do according to other wishes. They act flexible. (eg. drawing time-table, allocating teaching

subjects) Eleventh question, “Which methods do you use when you get inaccurate tasks and instructions?” Most of the teachers stated that they are prepared examination questions for various conditions. They taught the lessons with a monthly syllabus. Twelfth question, “Do you like the work which has challenges? If you like, why and how do you do this?” Most teachers responded that they like the work which has challenges. They said that the challenges are important parts of their lives that give them experience, make them learn and help them to become wiser and stronger. They invest their energy in problem-solving and teamwork rather than acting in isolation.

Conclusion and Discussion

The main purpose of this research is to examine the relationship between organizational protective processes and teacher resilience in the selected Basic Education High Schools in Mandalay. Organizational Protective Factors Survey by Tanum (2007) and Personal Resilience Questionnaire by Conner (1993) were used to collect data. Organizational Protective Factors Survey involved 22 items and Personal Resilience Questionnaire consisted of 64 items.

Research question one asked teachers to describe their perceptions on organizational protective processes. According to the responses of teachers, it can be concluded that teachers at selected Basic Education High Schools in Mandalay had a high level of organizational protective processes. Moreover, dimensions of organizational protective processes had high mean values. It can be assumed that teachers at selected Basic Education High Schools in Mandalay had a high level of organizational protective processes in empowerment, staff development, mentoring, administrative support and collaboration. Organizational protective processes are essential elements in building teacher resilience and in enhancing teacher performance. Therefore, the teachers maintain their good organizational protective processes. Additionally, the teachers should continually collaborate with their colleagues and staff development should always be done.

Research question two asked teachers to describe their perceptions on teacher resilience. Based on the research findings, teachers at selected Basic Education High Schools in Mandalay had a high level of teacher resilience. In detail, dimensions of teacher resilience had high mean values. It can be concluded that teachers at selected Basic Education High Schools in Mandalay had a high level of teacher resilience in positive, flexible, focused and proactive. So, resilient teachers have a set of personal values that guides their decision-making and have colleagues who support their work emotionally and intellectually.

Research question three studied the relationship between organizational protective processes and teachers' resilience in selected Basic Educational High Schools in Mandalay. According to the findings, organizational protective processes ($r = .469$, $p < 0.01$) was positively and moderately correlated with teacher resilience. This finding is similar to the finding of the study of Tanum (2007). In other words, the more the levels of organizational protective processes increase, the more the level of teachers' resilience also increases. Therefore, organizational protective processes are vital components in improving the effectiveness of the school organization, and it must be able to develop teachers' resilience.

Acknowledgements

First of all, we would like to offer our acknowledgement to Dr. Myat Myat Thaw (Rector, Sagaing University of Education, Dr. Khin Hnin Yee and Dr. Cho Kyi Than (Pro-rectors, Sagaing University of Education) for their valuable expertise and coaching, which have enabled us to carry out this research up to this rightful conclusion. Second, we are eternally grateful to Dr. Zin New Than (Professor and Head of Department, Department of Educational Theory, Sagaing University of Education) for allowing us to work this study, and for her invaluable and professional guidance, patience, trust, and encouragements during the entire study. Thirdly, we would like to offer our respectful gratitude to Daw Than Than Aye (Associate Professor and Head, Department of English, Sagaing University of Education) for valuable comments and necessary editing toward this paper. Most importantly, we wish to extend a special thanks to principals and teachers from Basic Education High Schools in Mandalay City Development Area for their time, cooperation, and willingness to participate in this study.

References

- Achinstein, B. (2002). Conflict and community: The micropolitics of teacher collaboration. *Teacher College Record*, 104(3), 421-455. Retrieved from https://www.google.com/url?q=http://researchhighschools.pbworks.com/f/AchinstConflist.pdf&sa=U&ved=2ahUKEwiyuZn2npPkAhUR7nMBHeZZDuYQFjAE_e_gQIARAB&usg=AOvVaw0Y8LN_11Q_lont9_BF_qz
- Al-Siyabi, N.S. (2016). Job autonomy and job satisfaction of English instructors in the language centers of some private colleges in Muscat, Oman. *Internal Journal of Psychology & Behavior Analysis*, 2(111), 1-6. <http://dx.doi.org/10.15344/24553867/2016/111>
- Beltman, S., Mansfield, C., & Price, A. (2011). Thriving not just surviving: A review of research on teacher resilience. *Educational Research Review*, 6(3), 185-207. Retrieved from
- Bobek, B. (2002). Teacher resiliency: A key to career longevity. *The Clearing House*, 75(4), 202-205. Retrieved from <https://www.tandfonline.com/doi/abs/10.1080/00098650209604932>
- Conner, D. R. (1993). Managing at the speed of change: How resilient managers succeed and prosper where others fail. *New York (NY): Villard Books*. Retrieved from <https://www.strategies-for-managing-change.com>
- Darling-Hammond, L., (2003). Keeping good teachers. *Educational Leadership*, 60(7), 7-13. Retrieved from <http://epaa.asu.edu/epaa/v11n33/>.
- D'Souza, P.C. (2013). A study on the interactive effects of school culture and leadership behavior of school principals on teacher accountability and teacher resilience. Ph.D. dissertation, Mangalore University. Retrieved from <https://shodhganga.inflibnet.ac.in/handle/10603/198021>
- Gabriel, J. (2005). How to thrive as a teacher leader. *Association for Supervision and Curriculum Development, Alexandria Virginia*. Retrieved from
- Georgia Teacher Retention Study (2004). Summary report, division for educator workforce and development. Retrieved from <https://www.doe.k12.ga.us/doe/hr>
- Gideon, B. (2002). Structuring School for Teacher Collaboration. *Principal Leadership*, 3. 41-44. Retrieved from <https://www.eddigest.com>
- Giroux, P. (2007). Resilient teachers: A qualitative study of six thriving educators in urban elementary schools. Ph.D. Dissertation. Western Michigan University. Retrieved from <https://pqdtopen.proquest.com/doc/304798812.html?FMT=ABS>
- Gordon, K., & Coscarelli, W. (1996). Recognizing and fostering resilience. *Performance Improvement* 35(9), 14-17. Retrieved from <https://scholar.google.com/scholar?q=recognizing+and+fostering+resilience&hl=en&as-sdt=O&as-vis=1&oi=scholart#d=gs-qabs&u=%23p%3De4Vt3XrXwCUJ>
- Hargreaves, A., & Fink, D. (2006). Sustainable leadership. *San Francisco, CA: Jossey-Pass*. Retrieved from <https://www.amazon.com/SustainableLeadership-Andy-Hargreaves/dp/0787968382>
- Henderson, N., & Milstein, M. M. (2003). Resiliency in schools: Making it happen for students and educators (2nd ed.). *Thousand Oaks, CA: Corwin Press, Inc*. Retrieved from https://www.amazon.com/Resiliency-Schoolhttps://books.google.com.mm/books/about/How-to-Thrive-as-a-Teacher-Leader/html?id=NTGYBg_AAQBAJ&printsec=frontcover&source=kp-read-button&redir_esc=yhttps://www.google.com/url?sa=t&source=web&rct=j&url=https://www.sciencedirect.com/science/article/pii/S1747938X11000297&ved=2ahUKEw9hO-FvrfjAhUFiXAKHXKGD4QFjAAegQIBBAB&usg=AOvVaw2X3gMvc9_1MqENJfbr_1

- Ingersoll, R. (2001). Teacher turnover, teacher shortages, and the organization of schools. Center of the Study of Teaching and Policy, University of Washington. Retrieved from https://repository.upenn.edu/cgi/viewcontent.cgi?article=1093&context=gse_pubs
- Ingersoll, R., & Smith, T. M. (2003). The wrong solution to the teacher shortage. *Educational Leadership*, 60(8), 30-33. Retrieved from <https://repository.upenn.edu/cgi/viewcontent.cgi?article=1126&context=gsepubs>
- Isaacs, A. J. (2003). An investigation of attributes of school principals in relation to resilience and leadership practices. Ph.D. Dissertation, The Florida State University. Retrieved from <https://diginde.lib.fsu.edu/PDF/viewcontent>
- Kent, A. (2004). Improving teacher quality through professional development. *Education*, 124(3), 427-431. Retrieved from <https://eric.ed.gov/?id=EJ698511>
- Landell, K. (1997). *Management by menu*. Landon: Wiley and Sons Inc. Retrieved from www.ijern.com
- Luther, S., Cicchetti, D., & Becker, B. (2000). The construct of resilience: A critical evaluation and guidelines for future work. *Child Development*, 71(3), 543-562. Retrieved from https://www.google.com/url?q=https://www.researchgate.net/publication/1236692_The_Construct_of_Resilience_A_Critical_Evaluation_and_Guidelines_for_Future_Work&sa=U&ved=2ahUKEwiT3bP_1JDkAhUX7HMBHcRICL8QFjACegQIBRAB&usg=AOvVaw2hQ6CWqQ4JvqW1sH05EBFV
- Mallak, L. (1998). Putting organizational resilience to work. *Industrial Management*, 40(6), 8-13. Retrieved from https://www.google.com/url?q=https://titusngdotcom.files.wordpress.com/2013/01/putting-organizational-resilience-to-work.pdf&sa=U_&ved=2ahUKEwjPqqf8wp_PkAhUh73MBHbWwALkQFjA_BegQIBx_AB&usg=AOvVaw39Iqsmg9FrqTSvEtcU5uh
- Mori, E. (2003). Launching the next generation of teachers through quality induction. *National Commission on Teaching & America's Future*. Retrieved from <https://eric.ed.gov/?id=ED479764>
- Pavia, P., Nissen, H., Hawkins, C., Monroe, E., Fillmon-Dryden, D. (2003). Mentoring Early Childhood Professionals. *Journal of Research in Childhood Education*, 17(25). Retrieved from [https://www.google.com/url?q=https://www.tandfonline.com/doi/pdf/10.1080/02568540309595014&sa=U&ved=2ahUKEwi6xbmOxZPkAhXn6MBHWxnDxkQFjABegQICRAB&usg=AOcVaw1-LcP8Jxx\)LCHYedy4F9m](https://www.google.com/url?q=https://www.tandfonline.com/doi/pdf/10.1080/02568540309595014&sa=U&ved=2ahUKEwi6xbmOxZPkAhXn6MBHWxnDxkQFjABegQICRAB&usg=AOcVaw1-LcP8Jxx)LCHYedy4F9m)
- Pepe, J. (2011). The relationship of principal resiliency to job satisfaction and work commitment: An exploratory study of K-12 public school principals in Florida. Ph.D. dissertation, University of South Florida. Retrieved from <http://scholarcom.mons.usf.edu/viewcontent>
- Razak, A. Z. A. (2013). *Learning about teachers' resilience: Perceptions, challenges and strategies of policy implementation in two secondary schools in Malaysia*. Retrieved from https://www.google.com/url?q=https://mro.massey.ac.nz/bitstream/handle/10179/4266/02_hole.pdf&sa=U&ved=2ahUKEwinoWljirjiAhVHk3AKHHZb7DIoQFjAAegQICBAB&usg=AOvVaw2mPDw6cRajai6eJcSUeyeh
- Schmoker, M. (2004). Start here for improving teaching and learning. *School Administrator*, 61(10), 48-49. Retrieved from <https://eric.ed.gov/?id=EJ707624>
- Short, P. M. (1994). Defining teacher empowerment. *Education*, 114(4), 488. Retrieved from <https://www.questin.com/read/1G1-16138677/defining-teacher-empowerment>
- Standish, D. M. (2014). A qualitative inquiry of resilience and burnout among black secondary teachers in an inner city public schools district. Ph.D. Dissertation, University of Phoenix. Retrieved from https://pqdtopen.proquest.com/doc/163432_0876.html?FMT=ABS
- Tanum, R. D. (2007). Study of the Relationship of Organizational Protective Processes and Teacher Resilience. Georgia Southern University. Retrieved from <https://digitalcommons.georgiasouthern.edu/etd/305>
- Yoon, J., & Gilchrist, J. (2003). Elementary teachers' perception of administrative support in working with disruptive and aggressive students. *Education*, 123(3), 564. Retrieved from <http://go.galegroup.com/ps/anonymous?id=GALE%7CA100806947&sid=googleScholar&v=2.1&it=r&linkaccess=fulltext&issn=00131172&p=AONE&sw=w>

A STUDY OF KINDERGARTEN TEACHERS' PRACTICES AND STAKEHOLDERS' SUPPORT TOWARDS DEVELOPMENTALLY APPROPRIATE PRACTICE

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Abstract

The main purpose of this study is to study kindergarten teachers' practices and stakeholders' support towards developmentally appropriate practice (DAP). Both quantitative and qualitative methods were used in this study. For quantitative study, questionnaires were used to collect required data. For qualitative study, open-ended questions and interview were used to get in detail information. Cornbach Alpha values were **0.85** for kindergarten teachers' practices towards DAP and **0.84** for stakeholders' support. As a sample, 974 kindergarten teachers from 974 Basic Education Schools in Mandalay Region were selected by using simple random sampling. Among them, 10 kindergarten teachers were purposively selected for the qualitative study. The descriptive statistics, Paired Samples *t* Test and Independent Samples *t* Test were used to analyze the quantitative data. To reveal the best predictor of kindergarten teachers' practices towards DAP, Multiple Regression was conducted. The cyclic process was used to analyze the qualitative data. According to the findings, there were significant differences in kindergarten teachers' practices towards DAP in terms of stakeholders' support. It was found that parents' support appears to be the best predictor of kindergarten teachers' practices towards developmentally appropriate practice.

Keywords: Developmentally Appropriate Practice

Introduction

Today, the enrollment of 5 years old in kindergarten is increasing. Children who are nurtured and stimulated during early years are get more opportunities to have all round development that would be needed for their future. Parents are a child's first teachers, but kindergarten teachers are also very important. Consequently, education and training of teachers is of outmost importance.

Kindergarten teachers play a vital important role both to cultivate children's all-round development and to effectively implement modern curricula. Kindergarten is a time of change, challenge, and opportunity. Because of the great individual variation among kindergarteners and the wide age range of kindergarten children, teachers must be responsive to developmental, individual, and cultural variations.

The 21st century has brought in the golden era of endless opportunities and new openings and dimensions, which ultimately has revolutionized the education system completely. For [success](#) in 21st century society and workplaces, children need to be nurtured and taught 21st century skills from an early age as that skills are the need in this century which will equip children to face and overcome the challenges life throws at them. So, reforming the curriculum it started from kindergarten because kindergarten is the most fundamental foundation for an education system.

Some of the researchers have investigated the relationship between beliefs and practices and factors that affect the teachers' actual classroom teaching to know how teachers endorsed or

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opposed DAP concepts. There has been little research on kindergarten teachers' practices towards developmentally appropriate practice in Myanmar although the many research of the early childhood education has been studied.

Significance of the Study

Teachers must also be convinced that every student has the potential to get appropriate development and the teachers have to know how to nurture students with developmentally appropriate practices, how to prepare the classroom in which students can learn through playing and even more important what not to do. It is necessary to create good conditions for students to talk about what they are studying, to discuss, reason, reflect together etc.

In short, understanding teachers' practices about developmentally appropriate practice in their classroom practices may help educators articulate their objectives more clearly both in curriculum requirements and in professional preparation and training. It is also essential to explore how teachers conceptualize their own teaching, how they make judgments and how they achieve the goals they value regarding developmentally appropriate practice. So, kindergarten teachers' practices and stakeholders' support towards developmentally appropriate practice are of paramount importance to improve kindergarten teacher education and education system of Myanmar.

Aim of the Study

The main purpose of this study was to study kindergarten teachers' practices towards developmentally appropriate practice. The specific objectives of this study were described as follows.

- (1) To investigate kindergarten teachers' practices towards developmentally appropriate practice
- (2) To investigate the extent of stakeholders' support for developmentally appropriate practice of kindergarten teachers
- (3) To investigate the stakeholders' support that significantly influences the kindergarten teachers' practices towards developmentally appropriate practice

Definitions of Key Terms

Teachers' Practices

Teachers' practices refer to teachers' delivery and implementation of curriculum and program (Wang, 2000).

Developmentally Appropriate Practice

Developmentally appropriate practice is a teaching perspective in kindergarten where a teacher nurtures a child's all-round development based on child development, what is individually important uncovered through assessment, and the child's cultural background (Bredekamp & Copple, 1997).

Operational Definitions

Teachers' Practices towards Developmentally Appropriate Practice

It refers to teachers' practices that they perform on the extent of practices towards DAP. It is measured by mean values and it is interpreted that the higher the mean values, the more they perform those practices.

Review of Related Literature

The Concept of Developmentally Appropriate Practice

Professionals who endorse a developmentally appropriate type of instruction demonstrate a child-centered approach, focusing on the development of the physical, social, emotional, and cognitive needs of their students (Parker & Neuharth-Pritchett, 2006). Developmentally appropriate practice (DAP) follows the construct of objectives first laid out by Froebel (1887) in meeting the needs of young children previously noted. This philosophy has guided professionals in the field of early childhood development long before it was formally termed developmentally appropriate practice in the 1980s.

According to Copple and Bredekamp (2009), the concept of developmentally appropriate practice was not new, having been used by developmental psychologists for more than a century. DAP is described as a framework for education that focuses on the child from birth to age 8 as a developing human being and life-long learner (Aldridge et al., 2006; Copple & Bredekamp, 2009).

Furthermore, the historical roots of Developmentally Appropriate Practices (DAP) date back to the early 1900s when the International Kindergarten Union (IKU) appointed 19 experts to determine how children developmentally learn and how to teach young kindergarten children to meet their developmental needs. As a result, three reports were identified. One report advocated highly structured and teacher-directed instruction. The second report advocated play-based and child-initiated practice. The third report was a compromise of the other two reports (Aldridge & Goldman, 2007).

The developmentally appropriate classroom has been shown to yield positive outcomes for children, and because early school experiences have an impact on late school success (Copple & Bredekamp, 2009), researchers have investigated the effects of developmentally appropriate classrooms, many times in comparison to developmentally inappropriate classrooms. Developmentally inappropriate classrooms generally include a majority of teacher-directed learning that involves rote memorization, drill-and-practice, lack of student choice, and lack of collaboration with peers. These strategies are directly tied to behaviorist theories of learning and leave little room for integration of content areas or hands-on, concrete learning experiences.

Every child is an individual, with special social, emotional, intellectual, and physical qualities. They are individuals and no two children are alike: physically, emotionally, socially, and intellectually. They will have different personalities- some will be shy, some will be confident, some outgoing and some quiet. They will each have their own life experiences and feelings about themselves. They will have different likes and dislikes, interests and needs.

Every child is special, with unique combinations of abilities and needs that affect their learning. All children deserve the opportunity to learn in the ways that make the most of their strengths and help them overcome their weaknesses. Teachers and parents must understand in their uniqueness and respect their individuality. It will be teachers' job, as a teacher, to prepare teaching and learning activities that respond to and reflect the individual needs of the children in class. By inventing many different ways to explore a subject and giving children many ways to express themselves, all children in class can be given the chance to learn (Thomsen & Ackermann, 2015).

The DAP position statement was developed in 1986 by the National Association for the Education of Young Children (NAEYC) in response to the trend of pushing academic learning further and further down to preschool level (Aldridge & Goldman, 2007). DAP requires teachers to make intentional decisions in the classroom to promote children's development and learning by enacting practices that there are five components for DAP. According to Bredekamp and Copple (1997, 2009), they are:

- creating a caring community of learners,
- teaching to enhance development and learning,
- planning curriculum to achieve important goals,
- assessing children's development and learning,
- establishing reciprocal relationships with families

(a) Creating a Caring Community of Learners

Bredekamp and Copple (1997) comment on the importance of relationships between adults and children, among children, among teachers. The learning environment is a crucial component in developmentally appropriate settings. Teachers make sure that the followings to create a caring community of learners.

- Teachers value each member of the community and recognize for the strengths they bring.
- Teachers nurture relationships with each child, and facilitate the development of positive relationships among children.
- Teachers intentionally model and teach that each member of the community respects and is accountable to the others to behave in a way that is conducive to the learning and well-being of all.
- Teachers prepare the physical environment which protects the health and safety of the learning community members, and it specifically supports young children's physiological needs for play, activity, sensory stimulation, fresh air, rest, and nourishment.
- Teachers make effort to help each child and every child feels psychologically safe and able to focus on being and learning. The overall social and emotional climate is welcoming and positive (Copple & Bredekamp, 2009).

(b) Teaching to Enhance Development and Understanding

Teaching to enhance development and learning encompasses more than teaching approaches. For teaching to enhance development and learning, teachers make sure that the followings.

- Teachers demonstrate and model their commitment to a caring learning community through their actions, attitudes, and curiosity.
- Teachers use their knowledge of each child and family to make learning experiences meaningful, accessible, and responsive to each and every child.
- Teachers effectively implement a comprehensive curriculum so that each child attains individualized goals across all domains and general learning competencies across all subject areas.

- Teachers plan the environment, schedule, and daily activities to promote each child's development and learning.
- Teachers possess and build on an extensive repertoire of skills and teaching strategies.
- Teachers know how and when to scaffold children's learning.
- Teachers know how and when to strategically use the various learning formats and contexts.
- Teachers differentiate instructional approaches to match each child's interests, knowledge, and skills (Copple & Bredekamp, 2009).

(c) Planning Curriculum to Achieve Important Goals

When DAP authors refer to constructing curriculum, they refer to the choices that teachers make, whether adapting an existing curricular model or creating one of their own. Teachers use the following key factors to construct appropriate curriculum.

- Teachers set desired goals that are important for young children's development and learning in general and culturally and linguistically responsive to children in particular have been identified and clearly articulated.
- Teachers plan the program which has a comprehensive, effective curriculum that targets the identified goals across all domains of development and subject areas.
- Teachers use the curriculum framework in their planning to make sure there is ample attention to important learning goals and to enhance the coherence of the overall experience for children.
- Teachers make meaningful connections a priority in the learning experiences they provide each child.
- Teachers collaborate with those teaching in the preceding and subsequent, sharing information about children and working to increase continuity and coherence.
- Teachers make a planned and written curriculum is in place for all children.

However, the choice of materials is only a part of constructing appropriate curriculum; goals and objectives matter as well (Copple & Bredekamp, 2009).

(d) Assessing Children's Development and Learning

DAP authors view assessment in holistic terms stating, in developmentally appropriate programs, assessment and curriculum are integrated, with teachers continually engaging in observational assessment for the purpose of improving teaching and learning (Bredekamp & Copple, 1997). Therefore, assessment includes observation of development, description of children's behavior, collections of work products, and opportunities to demonstrate performance, with the ultimate purpose of contributing to teacher planning for further learning experiences. The teachers at all three sites engaged in informal assessment congruent with DAP as they collected observational impressions of the children's participation in classroom activities. Over time, their observations enabled them to recognize and acknowledge the progress of individuals.

Observing, documenting, and assessing each child's development and learning are essential processes for teachers and programs to plan, implement, and evaluate the effectiveness of the experiences they provide to children. Assessment also consists of both formal and informal

measures as tools for monitoring children's progress towards a program's desired goals. Teachers can be intentional about helping children to progress when they know where each child is with respect to learning goals. Formative assessment (measuring progress towards goals) and summative assessment (measuring achievement at the end of a defined period or experience) are important. Both need to be conducted in ways that are developmentally, culturally, and linguistically responsive to authentically assess children's learning (Copple & Bredekamp, 2009).

(e) Establishing Reciprocal Relationships with Families

Appropriate practice is predicated on an awareness that children develop within a context. Hence, building reciprocal relationships with families and seeking an understanding of the child's broader culture is facilitated when teachers acknowledge parents' choices and goals for children and respond with sensitivity and respect (Bredekamp & Copple, 1997). Teachers make the following descriptions which indicate the kinds of relationships that are developmentally appropriate for children in which family members and educators work together as members of the learning community.

- Teachers take responsibility for establishing respectful, reciprocal relationships with and among families.
- Teachers work in collaborative partnerships with families, seeking and maintaining regular, frequent, two-way communication with them and recognizing that the forms of communication may differ for each family.
- Teachers welcome family members in the setting and create multiple opportunities for family participation.
- Teachers acknowledge a family's choices and goals for their child and respond with sensitivity and respect to those preferences and concerns.
- Teachers and the family share with each other their knowledge of the particular child and understanding of child development and learning as part of day to day and other forms of communication.
- Teachers involve families as a source of information about the child.
- Teachers take care to learn about the community in which they work, and they use the community as a resource across all aspects of program delivery (Copple & Bredekamp, 2009).

Therefore, children are 5–6 years old, learning through play, community, and social interaction with peers in the Kindergarten Year. As a kindergarten teacher it is developmentally appropriate to be modeling positive social interactions in the classroom, fostering positive relationships between students of different cultures and ethnicities, give children leadership roles in the classroom, and teach in whole and small group settings, with peer interaction during instruction. It is important in this year that children spend the majority of the day moving, with little time sitting down and still. They should be working and developing their fine and gross motor skills through this daily movement (Goldstein, 2008).

Moreover, stakeholders' support is an essential part for kindergarten teachers to do activities in accordance with DAP (Dr. Thein Lwin, 2016). Therefore, principal's support, colleagues' support, parents' support and community support will also be investigated in this study.

Principal's support: Principals play a vital role and influence the use and practice of DAP by teachers in the classroom (West, 2001).

Colleagues' support: Kindergarten teachers need support from colleagues to nurture children in accordance with developmentally appropriate practice. Teachers can get better instructional strategies, teaching methods and teaching ideas by sharing ideas and discussing with others teachers.

Parents' support: Copple and Bredekamp (2009) stated that it is important for teachers and families to work together in order to support children's learning and development. Parents need to know and accept the new curriculum implementation for kindergarten and teaching strategies.

Community's support: Shafiquil Alam (2019) said that community plays an important role in childhood education and influences the children's learning. Local community can create a safe and supportive environment inside and outside of the classroom by supporting, engaging, and volunteering for or donating to local schools from neighborhood associations, government, and nonprofit organizations.

Methodology

In this study, mixed-method research design, both quantitative and qualitative method, was used.

Participants of the Study

All 1141 kindergarten teachers from Mandalay Region were selected using simple random sampling method. However, the response rate was 85.36% (N=974). In interview and observation, 10 kindergarten teachers were selected by using purposive sampling method.

Ethical Consideration

After getting the permission of Ethical Research Committee (ERC) of Yangon University of Education and Department of Basic Education to conduct this study, the questionnaires were distributed to 1141 kindergarten teachers from eight Districts in Mandalay Region.

Instruments

For content validity, invaluable advice was appealed to 4 expert teacher educators and 5 expert retired teacher educators from Department of Educational Theory and Management, YUOE. The wordings of some items were revised. Cronbach Alpha values was **0.85** for kindergarten teachers' practices towards developmentally appropriate practice. Moreover, suggestions of kindergarten teachers were requested through the open-ended questions and interview.

Procedure

The related literature and researches were reviewed to study kindergarten teachers' practices towards developmentally appropriate practice. The research instruments, the questionnaire for teachers were constructed by the researcher under guidance of supervisor. A pilot study was conducted in Pyawbwe Township, Mandalay Region. The questionnaires were distributed to 1141 kindergarten teachers from eight Districts in Mandalay Region. Only 974 kindergarten teachers responded the questionnaires and so response rate was 85.36%.

Data Analysis and Findings

According to Table 1, kindergarten teachers practiced to a great extent developmentally appropriate practice because overall mean value of the extent of practice was 3.26 which was between the mean value of 3.26 and 4.00.

Table 1 Mean Values and Standard Deviations of Kindergarten Teachers' Practices towards Developmentally Appropriate Practice (N=974)

Variables	Mean (SD)	Remark
Creating a Caring Community of the Learners	3.44 (.38)	practice to a great extent
Teaching to enhance Development and Learning	3.25 (.41)	practice to a moderate extent
Planning Curriculum to Achieve Important Goals	3.28 (.45)	practice to a great extent
Assessing Children's Development and Learning	3.46 (.43)	practice to a great extent
Establishing Reciprocal Relationship with Families	2.89 (.55)	practice to a moderate extent
Developmentally Appropriate Practice	3.26 (.37)	practice to a great extent

Scoring direction: 1.00-1.75=do not practice at all 1.76-2.50= practice to a somewhat extent
 2.51-3.25=practice to a moderate extent 3.26-4.00= practice to a great extent

As indicated in Table 1, kindergarten teachers perceived the extent of kindergarten teachers' practices towards developmentally appropriate practice with the greatest mean values were assessing children's development and learning (Mean= 3.46) and creating a caring community of the learners (Mean= 3.44) , and followed in descending order, by planning curriculum to achieve important goals (Mean=3.28), teaching to enhance development and learning (Mean=3.25) and establishing reciprocal relationship with families (Mean=2.89). It can be seen clearly in Figure 1.

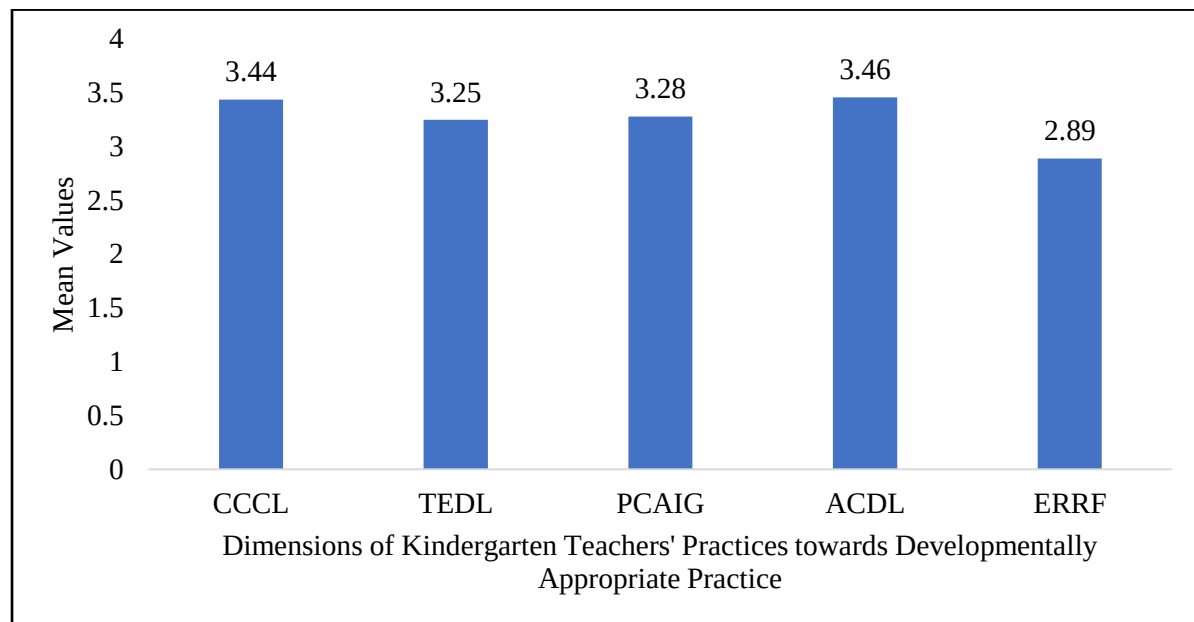


Figure 1 Mean Comparison of Kindergarten Teachers' Practices towards Developmentally Appropriate Practice

Note: **CCL**= Creating a Caring Community of the Learners

TEDL= Teaching to Enhance Development and Learning

PCAIG= Planning Curriculum to Achieve Important Goals

ACDL= Assessing Children's Development and Learning

ERRF= Establishing Reciprocal Relationship with Families

As shown in Table 2, it was found that there were significant differences between the extent of expectation and the extent of receiving stakeholders' support in all kinds of supports at .000 level. According to the paired samples *t*-test analysis, the mean values of the extent of expectation were higher than the extent of received in stakeholders' support ($t(973) = 16.77$, $p = .000$, $d = 0.53$). It can be interpreted that kindergarten teachers received less support from stakeholders than they expected.

Table 2 Mean Values and Standard Deviations of Kindergarten Teachers' Expectation and Receiving Stakeholders' Support (N=974)

Variables	Expectation		Receiving		<i>t</i>	<i>df</i>	<i>p</i>
	Mean (SD)	Remark	Mean (SD)	Remark			
Principal's Support	3.49 (.50)	Expect to a great extent	3.37 (.47)	receive to a great extent	8.80	973	.000
Colleagues' Support	3.43 (.58)	Expect to a great extent	3.32 (.56)	receive to a great extent	7.03	973	.000
Parents' Support	3.20 (.63)	Expect to a great extent	2.85 (.60)	receive to a moderate extent	17.64	973	.000

Variables	Expectation		Receiving		<i>t</i>	<i>df</i>	<i>p</i>
	Mean (SD)	Remark	Mean (SD)	Remark			
Community's Support	3.23 (.68)	Expect to a great extent	2.80 (.68)	receive to a moderate extent	19.27	973	.000
Stakeholders' Support	3.34 (.51)	Expect to a great extent	3.08 (.48)	receive to a great extent	16.77	973	.000

Scoring direction: 1.00-2.00= expect to a little extent

2.01-3.00= expect to a moderate extent

3.01-4.00= expect to a great extent

Scoring direction: 1.00-2.00= receive to a little extent

2.01-3.00= receive to a moderate extent

3.01-4.00= receive to a great extent

Mean comparison of kindergarten teachers' expectation and receiving from stakeholders' support: principal's support, colleagues' support, parents' support and community's support is shown in Figure 2.

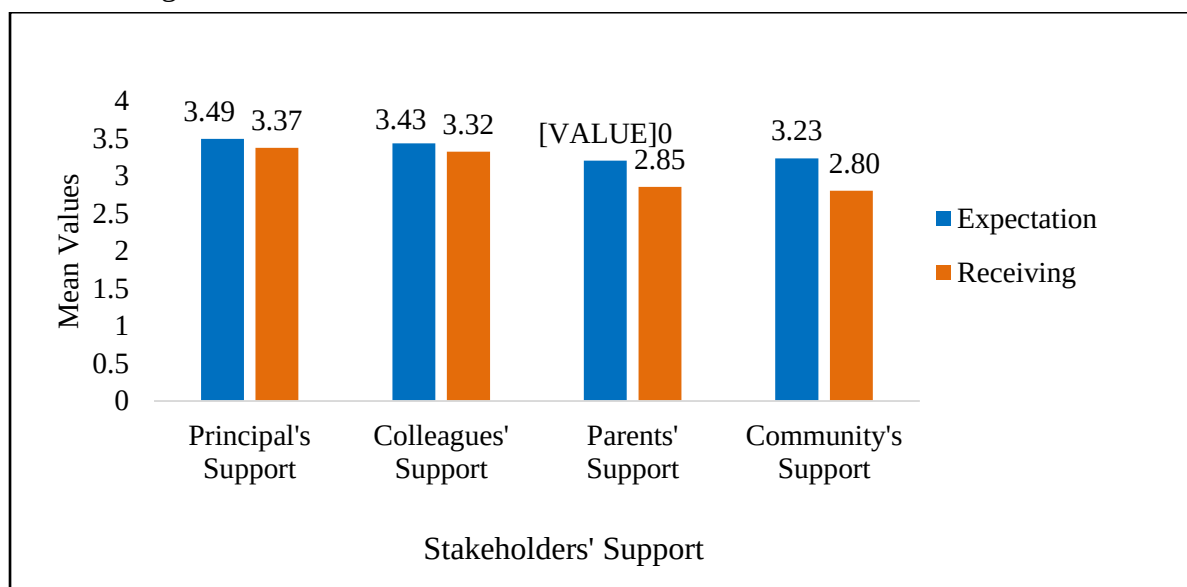


Figure 2 Mean Comparison of Kindergarten Teachers' Expectation and Receiving from Stakeholders' Support

The predictors of kindergarten teachers' practices towards DAP were identified by conducting multiple regression analysis.

Table 3 Mean Values, Standard Deviations and Inter-Correlations for Kindergarten Teacher's Practices towards Developmentally Appropriate Practice (N=974)

Variable	Mean	SD	PS	CS	PAS	COS
Practices towards DAP	3.26	.37	.489***	.461***	.412***	.328***
Predictor Variables						
PS	3.38	.47	-	.701	.511	.425

Variable	Mean	SD	PS	CS	PAS	COS
CS	3.32	.56		-	.571	.444
PAS	2.85	.60			-	.748
COS	2.80	.68				-

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

According to Table 3, it was found that practices towards developmentally appropriate practice was positively and significantly correlated with principal's support ($r = .489$, $p < .001$), colleagues' support ($r = .461$, $p < .001$), parents' support ($r = .412$, $p < .001$), community's support ($r = .328$, $p < .001$).

Table 4 Simultaneous Multiple Regression Analysis for Kindergarten Teacher's Practices towards Developmentally Appropriate Practice (N=974)

No.	Variables	B	Std. Error	Beta
1	Principal's Support (PS)	.101	.025	.129***
2	Colleagues' Support (CS)	.055	.022	.083*
3	Parents' Support (PAS)	.090	.022	.147***
4	Community's Support (COS)	.005	.018	.008
	Constant	.537	.087	
	R = .740, R² = .548; F (4, 965) = 129.75			

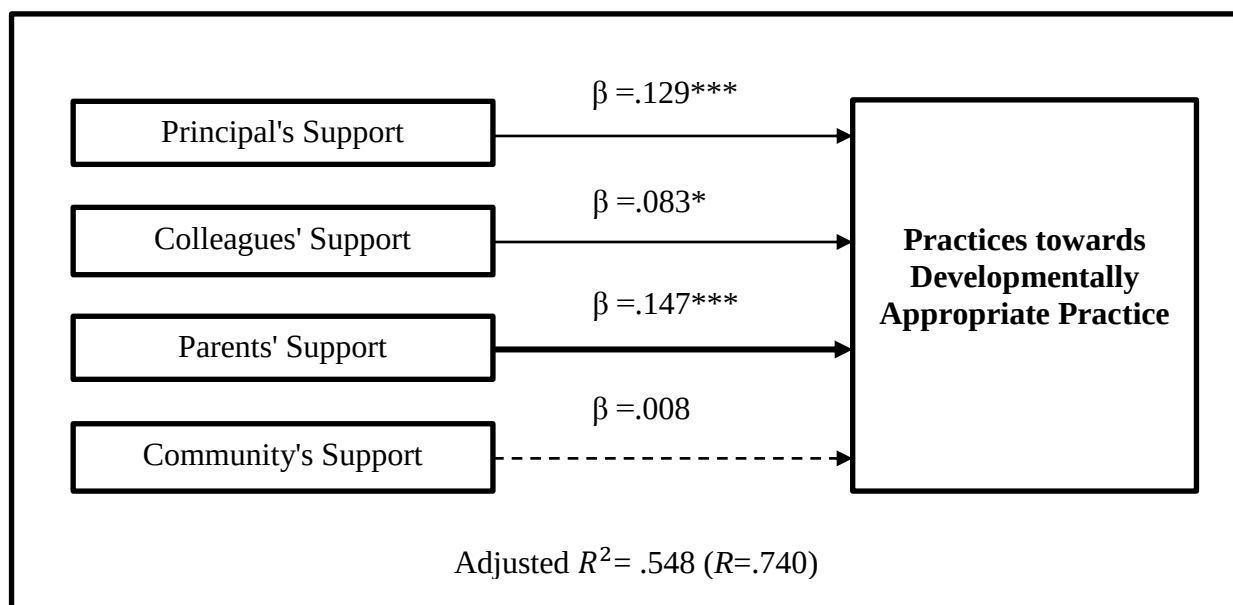
Note: * $p < .05$, ** $p < .01$, *** $p < .001$

For the model, the regression equation is:

Kindergarten Teacher's Practices towards Developmentally Appropriate Practice = .537 + .101 PS + .055 CS + .090 PAS + .005 COS

In Table 4, the adjusted R square value was .548 ($R = .740$). This indicates that 54.8% of the variance in kindergarten teachers' practices towards developmentally appropriate practice was explained.

According to the beta coefficients were presented in Table 4, parents' support ($\beta = .147$, $p < .001$) appears to be the best predictor of kindergarten teachers' practices towards developmentally appropriate practice. The second-best predictor of kindergarten teachers' practices towards developmentally appropriate practice is principal's support ($\beta = .129$, $p < .001$). The third best predictor is colleagues' support ($\beta = .083$, $p < .05$). The prominent factors affecting kindergarten teacher's practices towards developmentally appropriate practice can be seen clearly in Figure 3.



—————→ Predicting on Kindergarten Teachers' Practices towards Developmentally Appropriate Practice (Statistically Significant)

-----→ Predicting on Kindergarten Teachers' Practices towards Developmentally Appropriate Practice (Not Statistically Significant)

Figure 3 Prominent Factors Affecting Kindergarten Teacher's Practices towards Developmentally Appropriate Practice

The Results of Interview

The participants were interviewed to obtain information about receiving supports from stakeholders by using five questions. They stated as follows:

Group A

- Four kindergarten teachers in Group A (80%) answered that principal supported them by providing teaching learning materials and teaching aids, allowing teachers to make decisions independently on teaching, and taking into account and supporting when the teachers presented the difficulties in teaching.
- Two kindergarten teachers in Group A (40%) said that they were happy in this work and taught well the children because the colleagues helped them a lot. Their colleagues supported them by discussing the teaching method of the new curriculum, sharing some teaching aids, helping and assisting in some teaching learning activities.
- Three kindergarten teachers in Group A (60%) replied that most of the parents supported them by donating the toys, teaching learning materials, carpets, Bluetooth box, TV, furniture, etc. Moreover, the parents provided the financial support and donated food and nutrients for children every month.
- Two kindergarten teachers in Group A (40%) presented that community supported them by providing the necessary care for children to learn safely and happily. The community donated the school buildings and toilets. They took part and supported the necessity in the creativity and talent shows of the children."

Group B

- Four kindergarten teachers in Group B (80%) said that the principal and colleagues supported and helped them in teaching. But the schools did not have enough teachers for all grades. Teachers-student ratio were not balanced. Most of the teaching learning materials which supported by government were not received in their schools because of various conditions. Moreover, parents were not interested in their children education. The teachers did not receive any support from the community.
- One kindergarten teacher in Group B (20%) said, "*The principal support us as much as he can but it is still necessary. My principal is also my colleagues because there are only two teachers in this school. One of the family members of the child help me in some activity times such as storytelling time. Moreover, community provides support by repairing school furniture and building toilets for children*".

Discussion

In this study, it was to investigate kindergarten teachers' practices towards developmentally appropriate practice. It was found that kindergarten teachers perceived the extent of kindergarten teachers' practices towards developmentally appropriate practice with the greatest mean values were creating and caring community of the learners. It can be interpreted that kindergarten teachers practiced to a great extent developmentally appropriate practice according to overall mean value. As a result of interviews, kindergarten teachers prepared the relevant lessons and activities to develop children in line with six learning areas. For wellbeing, kindergarten teachers create indoor and outdoor learning areas and playground for children to play happy and to develop fine motor and gross motor skills. And also, teachers plan and prepare many activities such as group activities which children can cooperate and collaborate, drawing and painting activities, telling moral and civic stories, singing songs and poem, dancing, observation around the school, etc. to develop children in moral, social and emotional development, communication and appreciation of the arts and creativity, exploring mathematics and knowledge and understanding of the world.

Moreover, this study was to investigate the extent of stakeholders' support for developmentally appropriate practice of kindergarten teachers. It was found that there were significant differences between the extent of expectation and the extent of received from stakeholders' support in such supports as principal's support, colleagues' support, parents' support and community's support. It was found that the mean values of the extent of expectation were higher than the extent of received in stakeholders' support. It was also found that the more kindergarten teachers received stakeholders' support, the more they believed and practiced towards developmentally appropriate practice. Copple and Bredekamp (2009) stated that it is important for teachers and families to work together in order to support children's learning and development. Shafiquil Alam (2019) said that community plays an important role in childhood education and influences the children's learning. Local community can create a safe and supportive environment inside and outside of the classroom by supporting, engaging, and volunteering for or donating to local schools from neighborhood associations, government, and nonprofit organizations. As a result of interview, it was found that the more kindergarten teachers are supported, the more they can practice.

Conclusion

It is important that teachers can effectively well-practiced if they received enough the stakeholders' support. Furthermore, ongoing and sustainable support should be provided to kindergarten teachers from rural areas by stakeholders and education officers from Ministry, state, region and township. The researcher believes that basic research on developmentally appropriate practice (DAP) needs to go on steadily, for newer findings might indicate differing trends in appropriateness itself. Current DAP is predicated on Piaget's maturation and Vygotsky's socialization constructs. But Pavlov's non-canine research has suggested that trans marginal stimulation can and will change or even overturn existing paradigms. Dr. Khin Zaw (2001) said that if teachers wished to establish the most beneficial relationship between themselves as teachers or pedagogues and the children they teach, it is essential that they should understand, as thoroughly as possible, the nature of their children. This is more important in modern or progressive education where the main emphasis is not so much on the mere giving of knowledge as on the development along right lines of the child as a person. Thus, the need for DAP basic research has become extremely and overwhelming acute.

Acknowledgements

We would like to express special gratitude to the rector and pro-rectors of Yangon University of Education for permitting us to conduct this research. We extend our special thanks to Professor Dr. Khin Mar Ni (Head of Department of Educational Theory and Management, Yangon University of Education) for her administrative support, encouragement and valuable comments. We would like to show our real thanks to kindergarten teachers from Basic Education Schools, Mandalay Region who participated in this study for warmly paying attention by answering the questionnaires, interviews and kind support for this study. We are deeply grateful to all people who actively participated in this study.

References

- Aldridge, J., Emfinger, K., & Martin, K. (2006). *Curriculum frameworks, approaches, and models in early childhood education: What's the difference?* Focus on Teacher Education.
- Aldridge, J., & Goldman, R. (2007). *Current issues and trends in education (2nd ed.)*. Boston: Allyn and Bacon.
- Bredenkamp, S. (1987). *Developmentally appropriate practice in early childhood programs serving children from birth through age eight*. Washington, DC: National Association for the Education of Young Children.
- Bredenkamp, S., & Copple, C. (1997). *Developmentally appropriate practice in early childhood programs (Rev. Ed.)*. Washington, DC: National Association for the Education of Young Children.
- Copple, C., & Bredenkamp, S. (2009). *Developmentally appropriate practice in early childhood programs (Third edition)*. Washington, DC: National Association for the Education of Young Children.
- Copple, C., & Bredenkamp, S. (2009). *Developmentally appropriate practice in early childhood programs (Third ed.)*. Washington, DC: National Association for the Education of Young Children.
- Froebel, F. (1887). *The education of man*. Translated by W. N. Hailmann. New York: D.Appleton.
- Khin Zaw, Dr. (2001 a). *Advanced Educational Psychology. Ph.D. /M.Ed. Research Reference*. Yangon University of Education.
- Morrison., Bodrova, E., & D.J. Leong (1999). *The impact of kindergarten learning related skills on academic*
- National Association for the Education of Young Children (NAEYC). (2003). Early childhood curriculum, assessment, and program evaluation: Building an effective, accountable system in programs for children birth through age 8. <http://naecs.crc.uiuc.edu/position/pscape.html>
- Parker, A., & Neuharth-Pritchett, S. (2006). *Developmentally appropriate practice in kindergarten: Factors shaping teacher beliefs and practice*. Journal of Research in Childhood Education, September 2006.

- Shafiqul Alam (2019). The importance of community support in schools. *Journal of Research in Social Science Studies*. June 2019.
- Thein Lwin, Dr. (2016). *Pre-school and Kindergarten Teacher Manual Book*. Su Press.
- Thomsen, S., & Ackermann, E. (2015). *Whole Child Development Matters*. <https://www.edutopia.org/blog/changemakers-whole-child-sdevelopment-undervalued-bo-stjerne-thomsen-edith-ackermann>
- Wang, J. (2000). American and Chinese teachers' beliefs about early childhood curriculum. (UMI No. 3018285).
- West, L. (2001). *The influence of principals on the institutionalization of developmentally appropriate practices: A multiple case study*. Paper presented at the Annual meeting of the American Educational Research Association, 10-14 April 2001, Seattle, WA.

AN INVESTIGATION INTO TEACHERS' JOB PERFORMANCE IN BASIC EDUCATION HIGH SCHOOLS

Nan Kyu Kyu Win¹ and Phyu Zar Zar Theint²

Abstract

The main objective of this research was to investigate teachers' job performance in Basic Education High Schools. Quantitative and qualitative methods were explored in this study. Participants involved in this study were 210 teachers from Basic Education High Schools in Hlaing Bwe Township, Kayin State, using the proportional stratified sampling method. The questionnaires, including demographic data and teachers' job performance were used for a quantitative study, and interview questions were used for a qualitative study. The internal consistency of the Cronbach's alpha (α) of the questionnaire for the level of teachers' job performance was (0.96). Using SPSS (version 23), descriptive statistics, the Independent Samples *t* Test, One-way ANOVA, Games-Howell, and Tukey HSD were used to analyze the collected data. The level of teachers' job performance in this study was very high (Mean=4.37, SD=.56). There was a significant difference in counterproductive work behaviour among the teachers grouped by their current position. Significant differences were found in teachers' job performance among the teachers grouped by school location and school size.

Keyword: Job Performance

Introduction

Education is one of the most important factors in the development of a nation (Oluremi, 2013, as cited in Kanya et al., 2021). Education is the training and instruction designed to give knowledge to children and young people in schools and colleges (Cowie, 1989, as cited in Akram, 2010). The quality and products of educational society are categorically predisposed by the job performance of teachers. Ineffective teacher performance will disbalance the whole educational society. Therefore, for the development of a strong educational system, it is obligatory that teachers possess dynamic job performance; hence, effective job performance by a teacher is essential for the improvement of educational society as a whole (Yusoff et al., 2013, as cited in Bhat & Beri, 2016).

Significance of the Study

Teachers are one of the pillars that determine the success of educational activities in schools (Miranda et al., 2021). Teachers' role has evolved progressively from teacher-centered to student-centered, where teachers are required to be facilitators in the learning environment, spend more time on analyzing the learners' needs, motivating students, ensuring students' interactions, and keep checking the prerequisite knowledge (Jagtap, 2015). In a high-cost, well-equipped school, having uninspired teachers would not be beneficial to teaching and learning. Hence, undoubtedly, teachers must have a prolific skill in determining and molding the students' capabilities in the right direction. The standard of education rests on the efficiency and competency of teachers, because if teachers are not committed to their jobs and without a proper set of values, the whole edifice of the education system would be unstable (Banfield et al., 2006, as cited in Azeem & Omar, 2018).

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Research Objectives

General Objective

- To investigate teachers' job performance in Basic Education High Schools

Specific Objectives

- To investigate the level of teachers' job performance
- To study the variations in the teachers' job performance in terms of their personal factors
- To study the significant variations in the teachers' job performance in terms of their school-related factors

Limitations of the Study

This study was geographically restricted to the teachers' job performance in Basic Education High Schools in Hlaing Bwe Township, Kayin State. In this study, construct validity was not measured due to limited time and cost for a variety of participants.

Theoretical Framework

This study was guided by the following theoretical framework.

Teachers' Job Performance

Task Performance. Task performance of the teachers, regarding in-role behaviour, is the effectiveness and efficiency of the teachers in which they complete a specific or core task referred to in their duties. It describes the quality and quantity of work output and especially measures how well the teachers accomplish their duties and responsibilities in an educational setting within a given timeframe. The task performance of teachers can be evaluated based on classroom management, lesson planning and delivery, content knowledge, assessment and feedback, communication and collaboration, classroom climate, student engagement, and professionalism, etc. (Christian et al., 2011; Cohen & Liu, 2011; Johari & Yahya, 2009; Welbourne et al., 1998; Murphy, 1989; Sonnentag & Frese, 2002; Zhu, 2013). Classroom or learning climate refers to the intellectual, social, emotional, and physical environments in which the students learn (Ambrose et al., 2010). It can be used as a method to enhance students' knowledge (Sriklaub et al., 2015).

Contextual Performance. Contextual performance, also known as organisational citizenship behaviour, refers to the extra-role behaviours exhibited by employees that contribute to the overall functioning and effectiveness of an organisation. It is defined as the degree to which individuals engage in self-starting, personal initiative, a smart approach for taking on challenging work tasks, and future-oriented activity to alter their own workplace circumstances, their specific job positions, or themselves. In the case of teachers, contextual performance refers to the additional efforts and contributions they make beyond their core teaching responsibilities. These behaviours are not directly part of their job description but positively impact the school community and its functioning. Volunteering for additional duties, providing individualized support, collaboration with colleagues, engaging with parents and the community, continuous professional development, etc. are contextual performances (Borman & Motowidlo, 1993; Brief & Motowidlo, 1986; Griffin et al., 2000; Organ, 1990; Robbins & Judge, 2012; Witt et al., 2002).

Adaptive Performance. Adaptive performance is the ability to adjust when there is a change in work roles or environment. It reflects the extent to which the individuals cope with, respond to, and/or support changes that positively or negatively influence their roles as

individuals, groups, and organisations. The adaptive performance of teachers refers to their ability to adjust and thrive in the dynamic and complex educational landscape. It encompasses their capacity to respond effectively to the diverse needs of students, adapt instructional strategies, and continuously improve their teaching practices. Flexibility, problem-solving, continuous learning, collaboration and teamwork, reflective practice, cultural competence, resilience, etc. are considered adaptive performance (Griffin et al., 2007; Charbonnier-Voirin et al., 2010; Charbonnier-Voirin & Roussel, 2012; Pulakos et al., 2000; Sultana, 2020).

Counterproductive Work Behaviour. Counterproductive work behaviour refers to actions or behaviours of individuals that go against the goals and objectives of an organisation or hinder its productivity. These behaviours are typically detrimental to the work environment, the performance of individuals or teams, and the overall effectiveness of the organisation. While teachers are generally known for their dedication and commitment to their profession, there are instances where some teachers engage in counterproductive work behaviours like chronic absenteeism, lack of preparation, insubordination, lack of collaboration, neglecting students' needs, excessive use of personal technology, etc. (Ozdemir & Demircioglu, 2015; Robinson & Bennett, 1995; Rotundo & Sackett, 2002; Sultana, 2020).

Definitions of Key Terms

Job Performance

Job performance is referred to as an act of accomplishing or executing a given task (Griffin, 2012, as cited in Selamat et al., 2013).

Teachers' Job Performance

Teachers' job performance can be defined as the actions they perform in schools in order to achieve educational goals (Hwang et al., 2017, as cited in Li et al., 2018).

Operational Definition

Teachers' Job Performance

Teachers' job performance is defined as the execution of teachers to implement all educational activities related to teaching-learning. It includes task performance, contextual performance, adaptive performance, and counterproductive work behaviour. Teachers' job performance will be measured by the mean values. It was found that the higher the mean values, the higher the level of teachers' job performance.

Methodology

Research Method

To collect the required data, mix method was applied.

Sampling

A total of 210 teachers from 14 Basic Education High Schools in Hlaing Bwe Township, Kayin State were selected as participants by using proportional stratified sampling method. The response rate is 93.33%.

Instrumentation

In this study, a questionnaire survey was used to collect the required data concerning the research focus. The questionnaire includes demographic data about teachers, such as gender, age, academic qualifications, current position, and total teaching service.

The set of questionnaires for teachers' job performance was developed based on four dimensions and related literature. It consists of 33 items: 14 items for task performance, 6 items for contextual performance, 8 items for adaptive performance, and 5 items for counterproductive work behaviour. Each item is rated on a five-point Likert scale ranging from (1= never, 2=hardly, 3=sometimes, 4=often, and 5=always).

The internal consistency of the Cronbach's alpha (∞) of the questionnaire for the level of teachers' job performance was (0.96).

Procedure

First of all, the relevant literature for the research and related theories and models were thoroughly studied. Next, the instrument was constructed in order to collect the required data. Then, the instrument was delivered to all experienced teacher educators from the Department of Educational Theory and Management, Yangon University of Education, to obtain its validity. After that, the necessary corrections were made under the guidance of the supervisor in accordance with the suggestions of the teachers. The pilot study was undertaken in the second week of September, 2023.

After the pilot study, the main study was conducted in the first week of October. The questionnaires were distributed to teachers from selected 14 Basic Education High Schools in Hlaing Bwe Township, Kayin State. After three weeks, the questionnaires were recollected, and the response rate was 93.33 %.

Data Analysis

Descriptive statistics, the Independent Samples *t* Test, One-way ANOVA, Games-Howell, and Tukey HSD were used to analyze the collected data.

Research Findings

Quantitative Findings

(1) What is the level of teachers' job performance?

Table 1 Mean Values and Standard Deviations of Teachers' Job Performance in Task Performance (N=210)

No.	Items	Mean	SD
1	Preparing for teaching activities.	4.64	.79
2	Teaching every student according to his/her abilities.	4.47	.95
3	Making no injustice in marking students' answer papers/ homework.	4.69	.83
4	Teaching difficult lessons easily.	4.45	.98
5	Using different methods of teaching.	4.27	.99
6	Giving constructive feedback based on students' weakness.	4.00	.94
7	Motivating students to take part in co-curricular activities.	4.00	.87
8	Having a good sense of humor.	4.02	.93
9	Prioritizing the important tasks.	4.67	.77
10	Executing the classroom that is practical, interesting and stimulating.	4.12	.60

No.	Items	Mean	SD
11	Preventing verbal and physical harassment.	4.48	.70
12	Addressing gender, racial and other grounds.	4.59	.55
13	Sharing beliefs, customs, attitudes and expectations.	4.38	.59
14	Making the classroom as a shared learning space.	4.42	.64
Task Performance		4.37	.52

Scoring Direction: **1.00-1.80=Very Low** **1.81-2.60=Low** **2.61-3.40=Moderate**
3.41-4.20=High **4.21-5.00=Very High**

In Table 1, the mean values of items 1 to 14 were 4.64, 4.47, 4.69, 4.45, 4.27, 4.00, 4.00, 4.02, 4.67, 4.12, 4.48, 4.59, 4.38 and 4.42 respectively. Among them, the highest mean value was 4.69 (SD=.83) and its item was “Making no injustice in marking students’ answer papers/ homework”. The lowest mean values were 4.00 (SD=.94) and 4.00 (SD=.87). Their associated items were “Giving constructive feedback based on students’ weakness” and “Motivating students to take part in co-curricular activities”. The overall mean value of task performance was 4.37 (SD=.52). This indicated that the level of teachers’ task performance was found to be very high. Again, the mean values and standard deviations of teachers’ job performance in the contextual performance are presented in Table 2.

Table 2 Mean Values and Standard Deviations of Teachers’ Job Performance in Contextual Performance (N=210)

No.	Items	Mean	SD
1	Enjoying good relations with colleagues/parents.	4.47	.95
2	Maintaining discipline.	4.70	.81
3	Cooperating with others.	4.35	.90
4	Having self-improvement.	4.27	.89
5	Fulfilling other responsibilities.	3.63	.88
6	Protecting and addressing the school’ reputation.	4.36	.86
Contextual Performance		4.30	.65

Scoring Direction: **1.00-1.80=Very Low** **1.81-2.60=Low** **2.61-3.40=Moderate**
3.41-4.20=High **4.21-5.00=Very High**

According to Table 2, the mean values of items 1 to 6 were 4.47, 4.70, 4.35, 4.27, 3.63 and 4.36 respectively. Among them, the highest mean value was 4.70 (SD=.81) and its item was “Maintaining discipline”. The lowest mean value was 3.63 (SD=.88) and its item was “Fulfilling other responsibilities”. The overall mean value of contextual performance was 4.30 (SD=.65). This described that the level of teachers’ contextual performance was found to be very high. And then, the mean values and standard deviations of teachers’ job performance in adaptive performance are presented in Table 3.

Table 3 Mean Values and Standard Deviations of Teachers’ Job Performance in Adaptive Performance (N=210)

No.	Items	Mean	SD
1	Helping the head in solving problems of school.	4.36	.87

No.	Items	Mean	SD
2	Performing duties according to the requirement.	4.70	.71
3	Consulting with colleagues in solving of class problems.	4.30	.95
4	Keeping job skills up to date.	3.46	.88
5	Adjusting work goals when necessary.	4.04	.91
6	Doing relevant activities (co-curricular activities, domestic-affairs, etc.) in the period.	4.52	.85
7	Showing resiliency.	4.01	.95
8	Adjusting himself/herself if someone changes his/her responsibilities.	4.43	.92
Adaptive Performance		4.23	.60

Scoring Direction: 1.00-1.80=Very Low 1.81-2.60=Low 2.61-3.40=Moderate
 3.41-4.20=High 4.21-5.00=Very High

In Table 3, the mean values of adaptive performance in each item were 4.36, 4.70, 4.30, 3.46, 4.04, 4.52, 4.01 and 4.43 respectively. Among them, the highest mean value was 4.70 (SD=.71) and its item was “Performing duties according to the requirement”. The lowest mean value was 3.46 (SD=.88) and its item was “Keeping job skills up to date”. The overall mean value of adaptive performance was 4.23 (SD=.60). This indicated that the level of teachers’ adaptive performance was found to be very high.

Table 4 describes mean values and standard deviations of teachers’ job performance in terms of counterproductive work behaviour.

Table 4 Mean Values and Standard Deviations of Teachers’ Job Performance in Counterproductive Work Behaviour (N=210)

No.	Items	Mean	SD
1	Performing positively without displaying excessive negativity when experience with other events. (R)	4.35	.94
2	Maintaining the school’ issues secretly without telling any others. (R)	4.72	.82
3	Collaborating and adjusting the employment with co-workers or supervisor without argument. (R)	4.50	.90
4	Getting permit from school’ principal when encountering with other important matter. (R)	4.60	.89
5	Using school’ prosperity respectfully as himself/herself. (R)	4.71	.84
Counterproductive Work Behaviour		4.58	.69

Scoring Direction: 1.00-1.80=Very Low 1.81-2.60=Low 2.61-3.40=Moderate
 3.41-4.20=High 4.21-5.00=Very High

Noted: R=Reversed Item

According to Table 4, the higher the mean value is, the less counterproductive work behaviour the teachers have. The mean values of items 1 to 5 were 4.35, 4.72, 4.50, 4.60 and 4.71 respectively. Among them, the highest mean value was 4.72 (SD=.82) and its item was “Maintaining the school’ issues secretly without telling any others”. The lowest mean value was

4.35 (SD=.94) and its item was “Performing positively without displaying excessive negativity when experience with other events”. The overall mean value of counterproductive work behaviour was 4.58 (SD=.69). This indicated that the level of teachers’ counterproductive work behaviour was found to be very high.

Mean values and standard deviations of level of teachers’ job performance are presented in Table 5.

Table 5 Mean Values and Standard Deviations of Level of Teachers’ Job Performance (N=210)

No.	Dimensions	Mean	SD	Remark
1.	Task Performance	4.37	.52	Very High
2.	Contextual Performance	4.30	.65	Very High
3.	Adaptive Performance	4.23	.60	Very High
4.	Counterproductive Work Behaviour	4.58	.69	Very High
Teachers’ Job Performance		4.37	.56	Very High

Scoring Direction: 1.00-1.80=Very Low 1.81-2.60=Low 2.61-3.40=Moderate
3.41-4.20=High 4.21-5.00=Very High

According to the responses, the mean values of each of the dimensions indicate the level of teachers’ job performance. The overall mean value of teachers’ job performance was 4.37 (SD=.56). This indicated that the level of teachers’ job performance was found to be very high.

(2) Are there any variations in the teachers’ job performance in terms of their personal factors?

Table 6 The Results of Independent Samples *t* Test for Teachers’ Job Performance Grouped by Gender (N=210)

Dimensions	Gender	N	<i>t</i>	<i>df</i>	<i>p</i>
Task Performance	Male	11	-.392	208	n.s
	Female	199			
Contextual Performance	Male	11	-.922	208	n.s
	Female	199			
Adaptive Performance	Male	11	.157	208	n.s
	Female	199			
Counterproductive Work Behaviour	Male	11	.291	208	n.s
	Female	199			
Teachers’ Job Performance	Male	11	-.251	208	n.s
	Female	199			

Note: n.s=no significance

According to Table 6, there were no significant differences in all dimensions of teachers’ job performance between two groups of male and female teachers.

Table 7 One-way ANOVA Results for Teachers' Job Performance Grouped by Age (N=210)

Dimensions		Sum of Squares	df	Mean Square	F	p
Task Performance	Between Groups	.249	2	.125	.462	n.s
	Within Groups	55.871	207	.270		
	Total	56.120	209			
Contextual Performance	Between Groups	.362	2	.181	.432	n.s
	Within Groups	86.818	207	.419		
	Total	87.180	209			
Adaptive Performance	Between Groups	.126	2	.063	.172	n.s
	Within Groups	75.653	207	.365		
	Total	75.779	209			
Counterproductive Work Behaviour	Between Groups	.204	2	.102	.211	n.s
	Within Groups	100.007	207	.483		
	Total	100.210	209			
Teachers' Job Performance	Between Groups	.207	2	.103	.329	n.s
	Within Groups	65.096	207	.314		
	Total	63.303	209			

Note: n.s=no significance

As presented in Table 7, it was found that there were no significant differences in all dimensions of teachers' job performance among teachers grouped by age.

Table 8 The Results of Independent Samples t Test of Teachers' Job Performance Grouped by Their Academic Qualifications (N=210)

Dimensions	Academic Qualifications	N	t	df	p
Task Performance	Techers with Education Degree or Certificate	131	.094	208	n.s
	Teachers with no Education Degree or Certificate	79			
Contextual Performance	Techers with Education Degree or Certificate	131	-.208	208	n.s
	Teachers with no Education Degree or Certificate	79			
Adaptive Performance	Techers with Education Degree or Certificate	131	-.046	208	n.s
	Teachers with no Education Degree or Certificate	79			
Counterproductive Work Behaviour	Techers with Education Degree or Certificate	131	-.782	208	n.s
	Teachers with no Education Degree or Certificate	79			

Dimensions	Academic Qualifications	N	<i>t</i>	<i>df</i>	<i>p</i>
Teachers' Job Performance	Teachers with Education Degree or Certificate	131	-.293	208	n.s
	Teachers with no Education Degree or Certificate	79			

Note: n.s=no significance

According to Table 8, there were no significant differences in all dimensions teachers' job performance grouped by their academic qualifications.

Table 9 One-way ANOVA Results for Teachers' Job Performance Grouped by Their Current Position (N=210)

Dimensions		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Task Performance	Between Groups	.806	2	.403	1.508	n.s
	Within Groups	55.314	207	.267		
	Total	56.120	209			
Contextual Performance	Between Groups	.770	2	.385	.923	n.s
	Within Groups	86.410	207	.417		
	Total	87.180	209			
Adaptive Performance	Between Groups	.608	2	.304	1.205	n.s
	Within Groups	75.170	207	.313		
	Total	75.779	209			
Counterproductive Work Behaviour	Between Groups	3.163	2	1.581	3.373	.036*
	Within Groups	97.047	207	.469		
	Total	100.210	209			
Teachers' Job Performance	Between Groups	1.061	2	.530	1.709	n.s
	Within Groups	64.242	207	.310		
	Total	65.303	209			

Note: * $p < .05$ and n.s=no significance

Table 9 indicates that a significant difference was found in counterproductive work behaviour ($df=2$, $F=3.373$, $p < .05$). However, there were no significant differences in task performance, contextual performance, adaptive performance and overall teachers' job performance.

Table 10 One-way ANOVA Results for Teachers' Job Performance Grouped by Their Total Teaching Service (N=210)

Dimensions		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Task Performance	Between Groups	.148	2	.074	.273	n.s
	Within Groups	55.973	207	.270		
	Total	56.120	209			

Dimensions		Sum of Squares	df	Mean Square	F	p
Contextual Performance	Between Groups	.757	2	.379	.907	n.s
	Within Groups	86.423	207	.418		
	Total	87.180	209			
Adaptive Performance	Between Groups	.281	2	.141	.385	n.s
	Within Groups	75.497	207	.365		
	Total	75.779	209			
Counterproductive Work Behaviour	Between Groups	.321	2	.161	.333	n.s
	Within Groups	99.889	207	.483		
	Total	100.210	209			
Teachers' Job Performance	Between Groups	.304	2	.152	.484	n.s
	Within Groups	64.999	207	.314		
	Total	65.303	209			

Note: n.s=no significance

As presented in Table 10, it was found that there were no significant differences in all dimensions of teachers' job performance according to their total teaching service.

(3) Are there any significant variations in the teachers' job performance in terms of their school-related factors?

Table 11 One-way ANOVA Results for Teachers' Job Performance Grouped by School Location (N=210)

Dimensions		Sum of Squares	df	Mean Square	F	p
Task Performance	Between Groups	1.096	2	.548	2.061	n.s
	Within Groups	55.024	207	.266		
	Total	56.120	209			
Contextual Performance	Between Groups	4.898	2	2.499	6.161	.003**
	Within Groups	82.282	207	.397		
	Total	87.180	209			
Adaptive Performance	Between Groups	6.787	2	3.394	10.182	.000***
	Within Groups	68.991	207	.333		
	Total	75.779	209			
Counterproductive Work Behaviour	Between Groups	3.848	2	1.924	4.133	.017*
	Within Groups	96.363	207	.466		
	Total	100.210	209			
Teachers' Job Performance	Between Groups	3.798	2	1.899	6.391	.002**
	Within Groups	61.505	207	.297		
	Total	65.303	209			

Note: * $p < .05$, ** $p < .01$, *** $p < .001$ and n.s=no significance

As presented in Table 11, it was found that there was no significant difference in the dimension of task performance among teachers grouped by school location. However, there were statistically significant differences in contextual performance ($df=2$, $F=6.161$, $p<.01$), adaptive performance ($df=2$, $F=10.182$, $p<.001$), counterproductive work behaviour ($df=2$, $F=4.133$, $p<.05$), and overall teachers' job performance ($df=2$, $F=6.391$, $p<.01$).

To find out the significant differences in teachers' job performance according to school location, Games-Howell Test was conducted. The results are presented in Table 12.

Table 12 Games-Howell Results for Teachers' Job Performance Grouped by School Location (N=210)

Dependent Variables	(I) School Location	(J) School Location	Mean Difference (I-J)	P
Contextual Performance	Group A	Group B	-.281*	.034*
		Group C	-.349*	.003**
Counterproductive Work Behaviour	Group A	Group C	-.303*	.024*
Teachers' Job Performance	Group A	Group B	-.240*	.037*
		Group C	-.312*	.002**

Note: * $p<.05$, ** $p<.01$

Note: Group A= located within 15 miles from Township Education Office

Group B= located between 15 miles and 30 miles from Township Education Office

Group C= located above 30 miles from Township Education Office

In contextual performance, Group A teachers differed significantly from that of Group B teachers ($p<.05$, effect size $d= -0.41$), and Group C teachers ($p<.01$, effect size $d=-0.54$). Games-Howell results revealed that Group A teachers had less contextual performance than that of Group B and Group C teachers.

In counterproductive work behaviour, Group C teachers differed significantly from that of Group A teachers ($p<.05$, effect size $d= -0.44$). This revealed that Group C teachers had more counterproductive work behaviour than that of Group A teachers.

To sum up, Group A teachers differed significantly from that of Group B teachers ($p<.05$, effect size $d= -0.15$) and Group C teachers ($p<.01$, effect size $d= -0.56$). Games-Howell results revealed that Group B and Group C teachers performed job better than that of Group A teachers in overall teachers' job performance.

Tukey HSD results in Table 13 shows the significantly differences of teachers' job performance according to their school location.

Table 13 Tukey HSD Results for Teachers' Job Performance Grouped by School Location (N=210)

Dependent Variables	(I) School Location	(J) School Location	Mean Difference (I-J)	P
Adaptive Performance	Group A	Group B	-.283*	.008**
		Group C	-.435*	.000***

Note: ** $p<.01$, *** $p<.001$

Note: Group A= located within 15 miles from Township Education Office

Group B= located between 15 miles and 30 miles from Township Education Office

Group C= located above 30 miles from Township Education Office

According to the Table 13, there was a statistically significant difference between Group B and Group A teachers in adaptive performance ($p < .01$, effect size $d = -0.49$). It was found that Group B teachers adapted to their job performance more than that of Group A teachers. Then, Group C teachers differed significantly from Group A teachers ($p < .001$, effect size $d = -0.75$). This indicated that Group C teachers had more adaptive performance than that of Group A teachers.

Table 14 One-way ANOVA Results for Teachers' Job Performance Grouped by School Size (N=210)

Dimensions		Sum of Squares	df	Mean Square	F	p
Task Performance	Between Groups	.543	2	.272	1.012	n.s
	Within Groups	55.577	207	.268		
	Total	56.120	209			
Contextual Performance	Between Groups	5.890	2	2.945	7.500	.001**
	Within Groups	81.290	207	.393		
	Total	87.180	209			
Adaptive Performance	Between Groups	4.317	2	2.158	6.252	.002**
	Within Groups	71.462	207	.345		
	Total	75.779	209			
Counterproductive Work Behaviour	Between Groups	1.176	2	.588	1.229	n.s
	Within Groups	99.034	207	.478		
	Total	100.210	209			
Teachers' Job Performance	Between Groups	2.353	2	1.176	3.869	.022*
	Within Groups	62.950	207	.304		
	Total	65.303	209			

Note: * $p < .05$, ** $p < .01$ and n.s=no significance

As presented in Table 14, it was found that there was no significant difference in the dimension of task performance and counterproductive work behaviour among teachers grouped by school size. However, there were statistically significant differences in contextual performance ($df=2$, $F=7.500$, $p < .01$), adaptive performance ($df=2$, $F=6.252$, $p < .01$), and overall teachers' job performance ($df=2$, $F=3.869$, $p < .05$).

To find out the differences in teachers' job performance according to school size, Tukey HSD was conducted. The results are shown in Table 15.

Table 15 Tukey HSD Results for Teachers' Job Performance Grouped by School Size (N=210)

Dependent Variables	(I) School Size	(J) School Size	Mean Difference (I-J)	P
Contextual Performance	Group A	Group B	.386*	.001**
Adaptive Performance	Group A	Group B	.334*	.001**
Teachers' Job Performance	Group A	Group B	.245*	.017*

Note: * $p < .05$, ** $p < .01$

Note: Group A= below 400 students

Group B= between 400 and 600 students

Group C= above 600 students

In contextual performance, there was a statistically significant difference between Group A teachers and Group B teachers ($p < .01$, effect size $d=0.63$). Tukey HSD revealed that Group A teachers had more contextual performance than that of Group B teachers.

In adaptive performance, there was a statistically significant difference between Group A teachers and Group B teachers ($p < .01$, effect size $d=0.05$). Tukey HSD revealed that Group A teachers had more adaptive performance than that of Group B teachers.

In overall teachers' job performance, there was a statistically significant difference between Group A teachers and Group B teachers ($p < .05$, effect size $d=0.48$). Tukey HSD revealed that Group A teachers performed job more than that of Group B teachers.

Conclusion and Discussion

This study indicated that the level of teachers' job performance was found to be very high and this finding is consistent with the literature of Amin et al. (2013) and Limon and Sezgin-Nartgun (2020), who found that teachers' job performance as expressed by themselves was good and its level was high. This study also investigated that there were no significant differences in teachers' job performance in terms of their personal factors. However, statistically significant differences were found in teachers' job performance in terms of their school related factors.

There were significant differences in contextual performance ($**p < .01$), adaptive performance ($***p < .001$), counterproductive work behaviour ($*p < .05$), and overall teachers' job performance ($**p < .01$) according to their school location. This result was contrary to Ali and Haider (2017), and Akiri and Ugborugbo (2008), who described that there is no considerable difference between the locations of teachers regarding performance. In this study, it can be concluded that the teachers whose school is located far away from the Township Education Office performed their job better than the teachers whose school is nearby.

There were significant differences in contextual performance ($**p < .01$), adaptive performance ($**p < .01$), and overall teachers' job performance ($*p < .05$) according to school size. It can be concluded that teachers whose schools had minimum and maximum students performed job better than teachers whose schools had medium students.

Recommendations

In light of this conclusion, the following recommendations are at this moment suggested:

- Teachers should keep their job skills up-to-date by skillfully using modern technologies such as computers, laptops, telephones, etc.
- Principals should offer ongoing training and workshops to keep teachers updated on effective teaching methods, technologies, etc.
- It was found that the mean values of male teachers are lowest in contextual performance. Therefore, male teachers should increase their teaching skills and collaborate with students, parents, and colleagues to improve their performance.
- It was found that the mean values of female teachers are lowest in adaptive performance. So, female teachers should emphasize fostering a culture of sharing ideas and best practices and adjusting with others to achieve organisational goals.
- Principals should encourage teachers to participate in professional development activities to improve their job performance.

- It was found that the mean value of the older age group of teachers was the lowest among the three groups. Thus, the older teachers should try to cope with the new trends in education as much as possible.
- Principals should provide clear guidelines and expectations, enabling these teachers to understand their roles and responsibilities, etc.
- It was found that the mean values of teachers with an education degree or certificate are the lowest in adaptive performance. Therefore, teachers with an education degree or certificate should increase their work productivity, identify and nurture their talents, enhance their technology skills, etc.
- It was found that the mean value of teachers with no education degree or certificate is the lowest in adaptive performance. So, teachers with no education degree or certificate should increase their capacity to be persistent, flexible, and innovative in new teaching approaches, prepare in the case of failure, etc.
- Principals should create collaboration and mutual support with teachers to improve the ability of teachers to be confident and personal growth in order to achieve organisational and individual goals.
- It was found that the mean values of junior teachers are the lowest in adaptive performance. Thus, junior teachers should perform well in the overall job by carrying out tasks as expected, having the important responsibility of moderating the teaching-learning process and learning environment, consulting with primary teachers, senior teachers, and their colleagues in solving classroom problems, etc.
- Principals should encourage teachers' engagement in daily routine activities to achieve instructive objectives.
- It was found that the mean value of teachers who have more total teaching service is the lowest in teachers' job performance. So, teachers who have more total teaching service should practice their teaching by attending teaching trainings, studying online, using various teaching methods, etc.
- Principals should always make an effort to support the pedagogical content knowledge of these teachers to keep up with the current trend in education.
- It was found that the mean value of teachers whose school is located near the Township Education Office is the lowest. Therefore, these teachers should invest their time and energy in teaching, follow the school's discipline, carry out their duties to accomplish the school's objectives, etc.
- Principals should support specific instructions, set clear goals, give appropriate supervision, etc.
- It was found that the mean value of teachers who have medium school sizes is the lowest in teachers' job performance. Thus, these teachers should plan and manage their work effectively, improve their teaching methodology by consulting internet media, use new informatory literature to bring innovation to their teaching methodology, etc.
- Principals should encourage teachers to do self-study continuously and reflect on their teaching practice regularly, etc.

Need for Further Study

This study tried to investigate teachers' job performance in Basic Education High Schools, Hlaing Bwe Township, Kayin State. Therefore, the need for further research should be explored for schools in other states or regions. Moreover, future research should also be investigated in Basic Education Primary, Middle, and Branch High Schools. Since the data were collected based on the perceptions of teachers, further research should be conducted on the perceptions of both principals and students. As further researchers, qualitative research methods such as field observation and interviews should be conducted, and the data obtained will be more diversified.

Acknowledgements

We would like to offer respectful appreciation to Dr. Kay Thwe Hlaing, Rector of Yangon University of Education, Dr. Nyo Nyo Lwin, Dr. May Myat Thu and Dr. Khin Khin Oo, Pro-rectors of Yangon University of Education). We are grateful to Dr. Khin Mar Ni (Professor and Head of Department, Department of Educational Theory and Management, Yangon University of Education) and our external examiner, Dr. Zin Nwe Than (Professor and Head of Department, Department of Educational Theory and Management, Sagaing University of Education) . Finally, we would like to acknowledge all the participants for their cooperation for this study.

References

- Akiri, A. A., & Ugborugbo, N. M. (2008). An examination of gender's influence on teachers' productivity in secondary schools. *Journal of Social Science*, 17(3), 185-191.
- Akram, M. J. (2010). *Factors affecting the performance of teacher at higher secondary level in Punjab*. [Doctoral Thesis, Pir Mehr Ali Shah Arid Agriculture University]. Semantic Scholar.
- Ali, A., & Haider, S. Z. (2017). Developing a validated instrument to measure teachers' job performance: Analyzing the role of background variables. *Journal of Educational Research*, 20(1), 21-35.
- Ambrose, S. A., Bridges, M. W., DiPietero, M., & Lovett, M. C. (2010). *How learning works: Seven research-based principals for smart teaching*. San Francisco, CA: Jossey Bass.
- Amin, M., Shah, R., Ayaz, M., & Atta, M. A. (2013). Teachers' job performance at secondary level in Khyber Pakhyunkhwa, Pakistan. *Gomal University Journal of Research*, 29(2), 100-104.
- Azeem, N., & Omar, M. K. (2018). Exploring teacher performance: A review of concepts and approaches. *Graduate research in education seminar*, 108-118.
- Bhat, S. A., & Beri, A. (2016). Development and validation of teachers perceived job performance scale (TPJP) in higher education. *Man in India*. 96(4), 935-944.
- Borman, W. C., & Motowidlo, S. J. (1993). *Expanding the criterion domain to include elements of contextual performance*. In *personal selection of organisations*. San Francisco: Joddey-Bass.
- Brief, A. P., & Motowidlo, S. J. (1986). Prosocial organisational behaviours. *Academy of management Review*, 11(4), 710-725. <http://www.jstor.org/stable/258391>
- Charbonnier-Voirin, A., & Roussel, P. (2012). Adaptive performance: A new scale to measure individual performance in organisations. *Canadian Journal of Administrative Sciences*, 29, 280-293. <https://doi.org/10.1002/cjas.232>
- Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel psychology*, 64(1), 89-136. <https://www.researchgate.net/publication/211384078>
- Cohen, A., & Liu, Y. (2011). Relationships between in-role performance and individual values, commitment, and organisational citizenship behaviour among Israeli teachers. *International Journal of Psychology*, 46(4), 271-287. <https://doi.org/10.1080/00207594.2010.539613>
- Griffin, M. A., Neal, A., & Neale, M. (2000). The contribution of task performance and contextual performance to effectiveness: Investigating the role of constraints. *Applied Psychology: An International Review*, 49(3), 517-533. <https://doi.org/10.1111/1464-0597.00029>

- Griffin, M. A., Neal, A., & Parker, S. K. (2007). A new model of work role performance: Positive behaviour in uncertain and interdependent contexts. *Academy of Management Journal*, 50(2), 327-347. <https://doi.org/10.5465/amj.2007.24634438>
- Jagtap, P., (2015). Teacher role as facilitator in learning. *Scholarly Research Journal for Humanity Science and English Language*, 3(17), 3903-3905.
- Johari, J., & Yahya, K. K. (2009). Linking organisational structure, job characteristics, and job performance constructs: A proposed framework. *International Journal of Business and Management*, 4(3), 145-152. <https://doi.org/10.5539/ijbm.v4n3p145>
- Kanya, N., Fathoni, A. B., & Ramdani, Z. (2021). Factors affecting teacher performance. *International Journal of Evaluation and Research in Education*, 10(4), 1462-1468. doi:10.11591/ijere.v10i4.21693
- Li, M., Perez-Diaz, P. A., Mao, Y., & Petrides, K. V. (2018). A multilevel model of teachers' job performance: Understanding the effects of trait emotional intelligence, job satisfaction, and organisational trusts. *Frontier in Psychology*, 9, Article 2420. <https://doi.org/10.3389/fpsyg.2018.02420>
- Limon, I., & Sezgin-Nartgun, S. (2020). Development of teacher job performance scale and determining teachers' job performance level. *Journal of Theoretical Educational Science*, 13(3), 564-590.
- Miranda, M., Syahza, A., & Sumarno. (2021). Analysis of factors affecting teacher performance in state junior high school learning in Bengkalis Regency. *Journal of Educational Sciences*, 5(3), 464-478. <https://doi.org/10.31258/jes.5.3.p.464-478>
- Murphy, K. R. (1989). Is the relationship between cognitive ability and job performance stable over time? *Human performance*, 2(3), 183-200. <https://www.researchgate.net/publication/233160787>
- Organ, D. W. (1990). The motivational basis of organisational citizenship behaviour. *Research in Organisational Behaviour*, 12, 43-72.
- Ozdemir, M., & Demircioglu, E. (2015). The relationship between counterproductive work behaviours and psychological contracts in public high schools. *Faculty of Education Journal*, 44(1), 41-60.
- Pulakos, E. D., Arad, S., Donovan, M. A., & Plamondon, K. E. (2000). Adaptability in the workplace: Development of a taxonomy of adaptive performance. *Journal of Applied Psychology*, 85, 612-624.
- Robbins, S. P., & Judge, T. A. (2012). *Organisational behaviour*. Essex: Pearson.
- Robbinson, S. L., & Bennett, R. J. (1995). A typology of deviant workplace behaviours: A multidimensional scaling study. *Academy of Management Journal*, 38(2), 555-564. <http://www.jstor.org/about/terms.html>
- Rotundo, M., & Sackett, P. R. (2002). The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: A policy-capturing approach. *Journal of Applied Psychology*, 87(1), 66-80.
- Selamat, N., Samsu, N. Z., & Kamalu, N. S. M. (2013). The impact of organisational climate on teachers' job performance. *Educational Research Journal*, 2(1), 71-82.
- Sonnentag, S., & Frese, M. (2002). Performance concepts and performance theory. *Psychological Management of Individual Performance*, 23(1), 3-25. <https://www.researchgate.net/publication/291062476>
- Sriklaub, K., Wongwanich, S., & Wiratchi, N. (2015). Development of the classroom climate measurement model. *Procedia- Social and Behavioural Sciences*, 171, 1353-1359.
- Sultana, A. (2020). Multidimensionality of job performance: An empirical assessment through scale development. *Ilkogretim Online - Elementary Education Online*, 19 (4), 2467-2483
- Welbourne, T. M., Johnson, D. E., & Erez, A. (1998). The role-based performance scale: Validity analysis of a theory-based measure. *Academy of management journal*, 41(5), 540-555. <https://digitalcommons.ilr.cornell.edu/cahrswp/147>
- Witt, L., Kacmar, K. M., Carlson, D. S., & Zivnuska, S. (2002). Interactive effects of personality and organisational politics on contextual performance. *Journal of Organisational Behaviour*, 23, 911-926. <https://doi.org/10.1002/job.172>
- Zhu, Y. (2013). Individual behaviour: In-role and extra-role. *International Journal of Business Administration*, 4(1), 23-27. <https://doi.org/10.5430/ijba.v4n1p23>

RELATIONSHIP BETWEEN PRINCIPAL SUPPORT AND TEACHER ACADEMIC OPTIMISM

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Abstract

The general objective of the study is to examine the relationship between principal support and teacher academic optimism in Basic Education High Schools. In this study, both quantitative and qualitative research methods were applied. A total of 15 high school principals were selected by using the purposive sampling method and 336 teachers from these schools were selected by using the proportional stratified sampling method. There are two sets of questionnaires: the first one is the questionnaire for principals and the second one is for teachers. The reliability coefficient (Cronbach's alpha) was 0.982 for principal support and 0.925 for teacher academic optimism. Descriptive Statistics, and Pearson product-moment correlation were used for analyzing the collected data. Frequencies analysis was also used to know the number and percentage of the participants showing the level of each variable. It was found that high school principals provided support to a great extent and the level of teacher academic optimism was high. There was a positive and strong significant relationship between principal support and teacher academic optimism ($r=.687$, $p<0.001$). As the correlation between the principal support and the components of teacher academic optimism, it was found that there was a positive and moderate significant relationship between principal support and teacher sense of self-efficacy ($r=.614$, $p<0.001$), and also teacher trust in students and parents ($r=.573$, $p<0.001$). However, a positive and strong significant relationship was found between principal support and teacher academic emphasis ($r=.661$, $p<0.001$).

Keywords: Principal Support, Teacher Academic Optimism

Introduction

Education is the foundation of all nations for national development. Therefore, all people who are implementing for educational development are important. The principal, as a leader of school, has a vital role in this implementation. Bozonelos (2008) stated that the principal is essential to the school management with the provision of positive educational climates for teachers and students and the principal support is the demonstration of appreciation, the provision of adequate resources and information, the implementation of open, two-way communications, the supportive of collegial climate, offering frequent and constructive feedback, and offering appropriate professional development opportunities. There are four types of social support identified by House (1981): emotional support, instrumental support, informational support, and appraisal support. According to Perelli (2018), there is a significant relationship between principal support and teacher academic optimism. Teacher academic optimism is one of the constructs that concerns with the teacher's beliefs and efforts on improving student achievement. According to Beard et al. (2009), teacher academic optimism is the interrelationship of teacher sense of self-efficacy, teacher trust in students and parents, and teacher academic emphasis. They stated that developing and sustaining teacher academic optimism is important for supporting student achievement.

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Significance of the Study

According to Gagné and Deci (2005), the provision of social support by principals is a central aspect in satisfying the basic needs of teachers. In current education system in Myanmar, new curriculum reform has been implemented from 2016-2017 academic year to 2022-2023 academic year recently. To implement the curriculum reform successfully, the provision of principal support to teachers is important. In addition, teachers are also important in this change because they are actually implementing the curriculum. Meanwhile, they need to have the academic optimism that includes sense of self-efficacy, trust in students and parents, and academic emphasis.

In enhancing teacher academic optimism, the principals need to meet with informational support, instrumental support, professional support, emotional support, and appraisal support. Therefore, it is necessary to study teachers' academic optimism as well as whether the principals provide these supports or not for improving teacher academic optimism. Through this study, the principals may reflect on the extent of support they provided, and the participant teachers may also reflect on the level of their academic optimism. Additionally, the administrators may be aware of the current situation of teacher academic optimism and the principal support in schools. Finally, it is also beneficial for the policy makers on the knowledge and information through this study. As a result, they may think that what kinds of training program will be arranged for the principals and teachers for improving teacher academic optimism and student learning outcomes.

Research Objectives

General Objective

- To study the relationship between principal support and teacher academic optimism in Basic Education High Schools

Specific Objectives

- To investigate the extent of principal support in Basic Education High Schools
- To investigate the level of teacher academic optimism in Basic Education High Schools
- To examine the relationship between principal support and teacher academic optimism in Basic Education High Schools

Research Questions

- What is the extent of principal support in Basic Education High Schools?
- What is the level of teacher academic optimism in Basic Education High Schools?
- What is the relationship between principal support and teacher academic optimism in Basic Education High Schools?

Limitations of the Study

The scope of this study is geographically limited to Basic Education High Schools in Hinthada Township, Ayeyarwady Region.

Theoretical Framework

There are two sections: principal support and teacher academic optimism. The study of principal support will be based on House's (1981) social support theory and dimensions of principal support described by various scholars. House (1981) defined social support as the support accessible to an individual through social ties to other individuals, groups, and the larger

community. He theorized that social support can buffer the effects of work stress on health and developed a framework for social support and this framework includes four types of support: emotional support, instrumental support, informational support, and appraisal support. In this study, investigating the principal support will be conducted with the following five dimensions:

Emotional Support – Littrell et al. (1994) stated that principals show teachers that they are esteemed, trusted professionals and worthy of concern by such practices as maintaining open communication, showing appreciation, taking an interest in teachers' work and considering teachers ideas.

Instrumental Support – Principals directly help teachers with work-related tasks such as providing necessary materials, space, and resources, ensuring adequate time for teaching and non-teaching duties, and helping with managerial-type concerns (Littrell et al., 1994).

Informational Support – According to Santalia et al. (2022), informational support refers to communication that provide guidance, such as advice, recommendation to other information sources, ideas, personal experience, and opinions.

Appraisal Support – Principals are charged with providing ongoing personnel appraisal, such as frequent and constructive feedback about their work, information about what constitutes effective teaching, and clear guidelines regarding job responsibilities (Littrell et al., 1994).

Professional Support – According to DiPaola (2012), the principal gives teachers an empowerment to help themselves and to be self-sufficient beings by providing opportunities for professional growth.

The study of teacher academic optimism will be based on positive psychology and Bandura's social cognitive theory. Positive psychology is the study of human strengths and optimal functioning. Seligman (2002) stated that the aim of positive psychology is to catalyze a change in psychology from a preoccupation only with repairing the worst things in life to also building the best qualities in life. According to Bandura (1986), social cognitive theory emphasizes a dynamic interactive process among environmental, behavioral, and personal factors to explain human functioning. In 1997, he stated that the major assumptions associated with social cognitive theory are human agency and triadic reciprocal determinism.

The major premise of human agency also asserts that the human mind is generative, creative, and proactive, not just reactive. Therefore, if individuals believe they have the power to produce desired results, then they will attempt to make it happen. Human agency operates within the triadic reciprocal determinism: behavior, personal characteristics and the environment. This is a reciprocal process for understanding human behavior. The three components of teacher academic optimism also represent the three aspects of the triadic determinism; teacher sense of self-efficacy represents teacher personal factors, teacher trust in students and parents represents trusting environment, and teacher academic emphasis represents teacher behaviors that press for student achievement. (Kurz, 2006). In this study, the teacher academic optimism will be investigated as the individual teacher level and investigating the teacher academic optimism will be conducted with the following three dimensions:

Teacher Sense of Self-Efficacy – It refers to a teacher's judgement of his or her capability to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated (Tschannen-Moran et al., 1998).

Teacher Trust in Students and Parents – Tschannen-Moran (2004) stated that teachers who trust students and parents are more likely to set high academic expectations for their students.

Teacher Academic Emphasis –According to Beard et al. (2010), it is defined as the degree to which a teacher finds ways to engage students in appropriate and academic tasks.

Definitions of Key Terms

Principal Support – A principal provides the encouragement and assistance to teachers (Littrell et al.,1994).

Teacher Academic Optimism - A construct comprised of teacher sense of self-efficacy, teacher trust in students and parents, and teacher academic emphasis to create a positive and challenging learning environment for students (Woolfolk Hoy et al., 2008).

Operational Definitions

In this study, *principal support* is the extent of the provision of principal support to teachers such as emotional support, instrumental support, informational support, appraisal support and professional support. The principal support will be measured by mean values. The higher the mean values, the greater the extent of principal support.

Teacher academic optimism is a construct which is composed of teacher sense of self-efficacy, teacher trust in students and parents, and teacher academic emphasis. It will be measured by mean values. The higher the mean values, the higher the teacher academic optimism.

Methodology

In this study, both quantitative and qualitative research methods were used to collect the information about the principal support and teacher academic optimism.

In **quantitative** research method, a total of 15 high school principals was selected by using the purposive sampling method depending on having at least two years of administrative services in their current school. Furthermore, this study used the proportional stratified sampling method for selecting 336 teachers. The quantitative research study was aimed for collecting the required information by using the questionnaire survey. The two sets of questionnaires were aimed for principals and teachers. The questionnaire for principals included personal factors such as gender, age, qualification, total administrative services, administrative services in current school and also included school location. In addition, there are six open-ended questions that are concerned with principal support to teachers. The information about principal support perceived by teachers was attained through the questionnaire for teachers. The development of the principal support questionnaire was on the review of related literature and the modification of the questionnaire by DiPaola (2012). It was composed of 65 items for measuring five dimensions of principal support. These items were measured by using five-point Likert scales ranging from “never” to “always” (1=never, 2=seldom, 3=sometimes, 4=often, 5=always).

The questionnaire for teachers consists of three portions. The first one included personal factors concerning gender, age, position, qualification, total teaching services, teaching services in the current school, and teacher training courses they had taken. It also included school location. The second one was to collect the required data about the teacher academic optimism. The questionnaire for teachers was developed based on the review of related literature. It consists

of 36 items for measuring three dimensions of teacher academic optimism. Among these dimensions, the first two dimensions were measured by using five-point Likert scales ranging from “strongly disagree” to “strongly agree” (1=strongly disagree, 2=disagree, 3=slightly agree, 4=agree, 5=strongly agree). The last dimension was measured by using five-point Likert scales ranging from “never” to “always” (1=never, 2=seldom, 3=sometimes, 4=often, 5=always). Moreover, there are three open-ended questions in teachers’ questionnaires and four teacher interview questions for qualitative study. For the instrument validity, the instruments were developed under the guidance of the supervisor. Prior to the pilot study, the questionnaires were reviewed by ten experts. Then, a pilot study was conducted by the responses of 60 teachers who were not in the study area. According to the results of pilot study, the reliability coefficient (Cronbach α) was 0.979 for the whole questionnaire. In quantitative study, Descriptive Statistics, and Pearson product-moment correlation were used to analyze the data. Frequencies analysis was also used to know the number and percentage of teachers showing the extent of receiving the principal support and showing the level of teacher academic optimism.

In **qualitative** research method, it was intended for the detail information by using open-ended questions and interview questions. Responses to the open-ended questions and interview questions were analyzed and interpreted by using cyclical process.

Findings

Quantitative Research Findings

In these findings, the principal support and teacher academic optimism through analyzing the collected data were presented as follows.

Investigating the Extent of Principal Support in Basic Education High Schools

To know the extent of principal support perceived by teachers, mean values and standard deviations of the principal support were calculated as follows:

Table 1 Mean Values and Standard Deviations of Principal Support Perceived by Teachers (N=336)

No.	Variables	Mean	SD	Remark
1	Emotional Support	4.26	.79	Great extent
2	Instrumental Support	3.85	.79	Great extent
3	Informational Support	4.39	.81	Great extent
4	Appraisal Support	4.16	.82	Great extent
5	Professional Support	4.15	.80	Great extent
Principal Support		4.17	.75	Great extent

Scoring direction: 1.00-2.33=little extent 2.34-3.66=moderate extent 3.67-5.00=great extent

According to Table 1, it was found that the extent of principal support in Basic Education High Schools was great extent with the overall mean value of 4.17.

Table 2 Number and Percentage of Teachers Receiving the Extent of Principal Support Perceived by Teachers (N=336)

Variables	Number (%)		
	Little extent	Moderate extent	Great extent
Principal Support	9 (2.7%)	62 (18.5%)	265 (78.9%)

Scoring direction: 1.00-2.33=little extent 2.34-3.66=moderate extent 3.67-5.00=great extent

In this Table, 9 (2.7%) of teachers received little extent of support, 62 (18.5%) of teachers a moderate extent, and 265 (78.9%) of teachers a great extent of support. Therefore, most of the teachers in Basic Education High Schools received a great extent of support from their principals.

Investigating the Level of Teacher Academic Optimism in Basic Education High Schools

To know the level of teacher academic optimism, mean values and standard deviations of teacher academic optimism were calculated as follows:

Table 3 Mean Values and Standard Deviations of Teacher Academic Optimism (N=336)

No.	Variables	Mean	SD	Remark
1	Teacher Sense of Self-Efficacy	4.24	.53	High Level
2	Teacher Trust in Students and Parents	4.11	.58	High Level
3	Teacher Academic Emphasis	4.26	.55	High Level
Teacher Academic Optimism		4.21	.49	High Level

Scoring direction: 1.00-2.33=low level 2.34-3.66=moderate level 3.67-5.00=high level

According to Table 3, teachers had high level of teacher academic optimism with the overall mean value of 4.21.

Table 4 Number and Percentage of Teachers Showing the Level of Academic Optimism (N=336)

Variables	Number (%)		
	Low Level	Moderate Level	High Level
Teacher Academic Optimism	2 (0.6%)	35 (10.4%)	299 (89%)

Scoring direction: 1.00-2.33=low level 2.34-3.66=moderate level 3.67-5.00=high level

Table 4 indicates that 2 (0.6%) of teachers had low level of academic optimism and 35 (10.4%) of teachers had moderate level of academic optimism. Moreover, 299 (89%) of teachers had high level of teacher academic optimism among groups. Therefore, it can be concluded that most of the teachers had high level of teacher academic optimism.

Examining the relationship between principal support and teacher academic optimism in Basic Education High Schools

The Pearson-Product moment correlation coefficient was utilized to examine the relationship between principal support and teacher academic optimism.

Table 5 Correlation between Principal Support and Teacher Academic Optimism

Variables	Teacher Sense of Self-Efficacy	Teacher Trust in Students and Parents	Teacher Academic Emphasis	Teacher Academic Optimism
Principal Support	.614***	.573***	.661***	.687***

Note: ***p<0.001

As shown in Table 5, it was found that there was a positive and strong significant relationship between principal support and teacher academic optimism ($r=.687$, $p<0.001$). It was shown in figure 1 as follows.

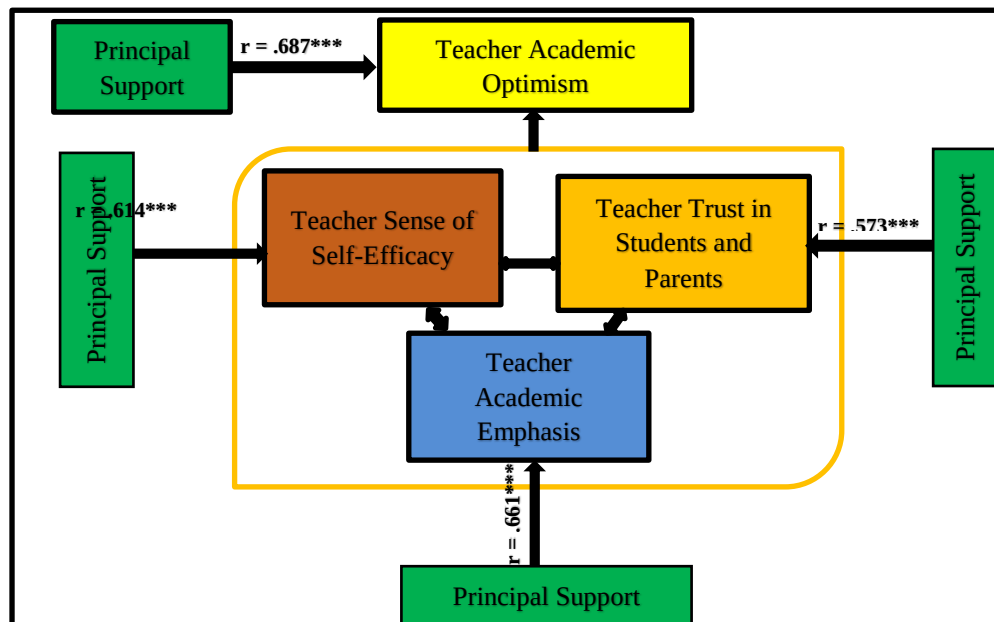


Figure 1 Relationship between Principal Support and Teacher Academic Optimism

Qualitative Research Findings

In this section, the response of open-ended questions and the result of interview were presented. Specifically, there are six open-ended questions for principals, four open-ended questions for teachers, and seven interview questions for teachers.

Responses of the principals to open-ended questions

As the first question about the provision of being good relationship and emotions to teachers, most of the principals ($n=7$, 46.67%) responded that they are familiar with their teachers like a family. Secondly, all principals ($n=15$, 100%) responded that teaching materials such as teachers' guide etc. are provided when they are asked about the provision of instrumental support. In providing informational support, in addition, all principals ($n=15$, 100%) replied that they could provide teachers and staff with the administrative information in time through Viber group and messenger group. In providing appraisal support, most of the principals ($n=8$, 53.33%) replied that they assess teachers' classroom teaching with observation and supervision appropriately, and direct if necessary. In providing professional support, most of the principals ($n=8$, 53.33%) responded that they hold the implementation of Board of Study and allow teachers to discuss mutually.

Responses of the teachers to open-ended questions

As the first question about the provision for the improvement of teaching and learning effectively, teachers replied that principals act as a good leader for helping to solve school problems and teachers' difficulties ($n=6$, 1.82%), provide teaching materials that are concerned with classroom and respective subjects such as marker pen ($n=164$, 49.85%) and give teachers up to date information ($n=6$, 1.82%). Furthermore, principals do the classroom observation, give suggestions ($n=29$, 8.81%) and allow teachers to implement the discussion held by respective subjects ($n=14$, 4.26%). As the teaching difficulties, most of the teachers ($n=325$, 96.43%) responded that they have handled those difficulties and some teachers ($n=27$, 8.31%) solved their problem by discussing with their colleagues. As teacher trust in students and parents, parents

participate to cooperate and discuss with them anytime (n=67, 20.68%) and students follow the disciplines prescribed by school and teachers (n=21, 6.48%). About teachers' academic emphasis, teachers (n=96, 29.63%) answered that they teach the lessons with teaching materials such as Bluetooth box etc.

Findings from Teachers' Interview

In order to find out the extent of providing principal support and the level of teacher academic optimism, each teacher from six selected schools took part in the interview session. Based on the teacher academic optimism, three teachers from high level are regarded as Group I, and the next three teachers are regarded as Group II.

About the principal support for teaching and learning effectively, Group I teachers (n=2, 66.67%) said that their principals observe classroom teaching and then give suggestions. One teacher from Group II (n=1, 33.33%) said that they are arranged a particular room for teaching special students, provided with laboratory equipment. In the management of distributing grade levels and subjects, teachers from Group I (n=2, 66.67%) also replied that their principal delegates subjects and grade levels equally on mastery experiences. Group II teachers (n=2, 66.67%) said that they delegate subjects to teachers on their qualification.

In the provision of professional development to teachers, one teacher from Group I (n=1, 33.33%) said that their principal encourages them to attend training courses and explain why they attend these courses, manage them to attend the courses in turn, and they implement subject group discussion leading the class dean. Moreover, one teacher from Group II (n=1, 33.33%) said that their principal allows to hold subject discussion once a month or once a week and they discuss with each other as their position. About the problem solving of teaching difficulties, Group I teachers (n=2, 66.67%) said that they are not familiar with the teaching methods about new curriculum. One teacher from Group II (n=1, 33.33%) said that she solved teaching difficulty in teaching science subjects by studying deeply even though her qualification is art.

About teacher belief on students, teachers from Group I (n=2, 66.67%) said that she can guess her students who are clever or get good grades that they must be successful with high marks in the forward grade. In addition, one teacher from Group II (n=1, 33.33%) said that most students are trustworthy as they are interested in teaching learning, and school activities. About the teacher belief on parents, Group I teachers (n=2, 66.67%) said that parents encourage and monitor their children to do homework given by teachers regularly and then they discuss with teachers about the academic achievement of children. Group II teachers (n=2, 66.67%) also said that parents provide support to a little extent (funds and others). About the teacher academic emphasis, one teacher from Group I (n=1, 33.33%) said that she uses various teaching methods in teaching mathematics, and studies the lessons through online. Group II teachers (n=2, 66.67%) said that they only emphasize students' learning achievement.

Conclusion and Discussion

The objective of this study was to study the relationship between principal support and teacher academic optimism in Basic Education High Schools. According to the finding of the extent of principal support, the participant teachers received the great extent of principal support with the overall mean value of 4.17. This contrary to Tindle's (2012) finding who described that teachers received the moderate extent of the overall principal support. In investigating the level

of teacher academic optimism, it was found that teachers had high level of teacher academic optimism with the overall mean value of 4.21. More specifically, it was found that teachers had high level in all dimensions of teacher academic optimism. This agreed with the finding of Wang (2018) who found that teachers had an overall high level of academic optimism and the three dimensions of academic optimism were also at high level.

In investigating the relationship between principal support and teacher academic optimism in Basic Education High Schools, it was found that there was a positive and strong significant relationship between principal support and teacher academic optimism. Therefore, the more the principals provide support, the higher the teacher has academic optimism. This is consistent with the finding of Perelli (2018) who found that there was a positively significant relationship between principal support and teacher academic optimism.

The investigation of the relationship between principal support and components of teacher academic optimism also found that there was a positive and moderate significant relationship between principal support and teacher sense of self-efficacy. Therefore, the more the principals provide support, the higher the teacher has sense of self-efficacy. According to the results of open-ended questions, it was found that the principals provided emotional support to teachers in such a way that they act as a good leader when teachers face teaching difficulties. Therefore, teachers can have a sense of self-confidence on their teaching. The principal support may improve teacher's sense of self-efficacy and enable teachers to devote their jobs that are most satisfying (Rosenholtz & Simpson, 1990). Moreover, it was also found that there was a positive and moderate significant relationship between principal support and teacher trust in students and parents. Therefore, the more the principals provide support, the higher the teacher has trust in students and parents. According to the open-ended results, it was found that principals give opportunity for everyone equally and act a good leader when teachers face teaching difficulties. Therefore, the principals build a trusting relationship with teachers. This sense might have an impact on building a trusting relationship with students and parents.

However, there was a positive and strong significant relationship between principal support and teacher academic emphasis. Thus, the more the principals provide support, the higher the teacher performs academic emphasis. This is inconsistent with the finding of Perelli (2018) who revealed that teacher sense of self-efficacy was the strongest relationship between principal support and components of teacher academic optimism. According to Smith et al. (2001), academic learning time for students is essential because the time students spend successfully and actively engaged in an academic task positively relates to student learning. Therefore, the principals can protect the instructional time for teachers by lessening non-teaching duties as much as possible.

Recommendations

The following recommendations were provided based on the quantitative and qualitative research findings. For increasing teacher sense of self-efficacy, the principals should appreciate teachers for making efforts, and act as a good leader when they face teaching difficulties. For increasing teacher trust in parents, the principals should arrange time for parent-teacher meeting. For increasing teacher trust in students, the principals should encourage teachers to set high expectations on students and explain students to respect on teachers. The teachers should promote students' creativity, discuss their teaching difficulties with colleagues, have high

expectations on teaching, cooperate with parents for student academic achievement. The parents should always cooperate with the school for school improvement, and discuss with teachers for their children's education. The policy makers should provide opportunities to principals and teachers for their professional development by arranging workshops, seminar, and in-service trainings.

Need for Further Study

This study is aimed for Basic Education High Schools. Therefore, it is needed to investigate this study for Elementary or Middle Schools. It is also suggested to conduct the future research of principal support variable such as the principal support for the development of teacher leaders. Furthermore, this study is aimed for teacher academic optimism at the individual level. Therefore, it is suggested to do the academic optimism at the collective school level.

Acknowledgements

We would like to express our gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector, Yangon University of Education), Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education) and Dr. Khin Mar Ni (Professor and Head of the Department of Educational Theory and Management, Yangon University of Education). Special thanks go to our teacher, Dr. Khin Tha Zin (Lecturer, Department of Educational Theory and Management, Sagaing University of Education). We also appreciate all participant principals and teachers for actively participating in this study.

References

- Bandura, A. (1986). *Social foundations of thought & action: A social cognitive theory*. Upper Saddle River, NJ: Prentice-Hall. https://doi.org/10.4135/9781_446221129.n6
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W H Freeman/Times Books/ Henry Holt & Co. <https://www.scribd.com/document/394892404/Albert-Bandura-Self-Efficacy-The-Exercise-of-Control-W-H-Freeman-Co-1997-pdf>
- Beard, K. S., Hoy, W. K., & Woolfolk Hoy, A. (2009). *Academic optimism of individual teachers: Confirming a new construct*. (Working paper). Ohio State University. 1-35. <https://waynekhoy.com/pdfs/TeacherAcademicOptimism.pdf>
- Beard, K. S., Hoy, W. K., & Woolfolk Hoy, A. (2010). Academic optimism of individual teachers: Confirming a new construct. *Teaching and Teacher Education*, 26, 1136-1144. <https://doi.org/10.1016/j.tate.2010.02.003>
- Bozonelos, J. (2008). Retention in special education: Reducing attrition through supportive administrative interventions. *The International Journal of Learning*, 15(1), 149-157. <https://doi.org/10.18848/1447-9494/CGP/v15i01/45597>
- DiPaola, M. F. (2012). Conceptualizing and validating a measure of principal support. In M. F. DiPaola & P. Forsyth (Eds.), *Contemporary challenges confronting school leaders* (pp. 111-120). Charlotte, NC: Information Age. https://www.researchgate.net/publication/325554059_CONCEPTUALIZING_AND_VALIDATING_A_MEASURE_OF_PRINCIPAL_SUPPORT
- Gagné, M., & Deci, E. L. (2005). Self-determination theory and work motivation. *Journal of Organizational Behavior*, 26(4), 331-362. <https://doi.org/10.1002/job.322>
- House, J. S. (1981). *Work stress and social support*. Reading, MA: Addison-Wesley. [https://www.scirp.org/\(i43dyn45teexjx455qlt3d2q\)/reference/referencespapers.aspx?referenceid=1088556](https://www.scirp.org/(i43dyn45teexjx455qlt3d2q)/reference/referencespapers.aspx?referenceid=1088556)
- Kurz, N. M. (2006). *The relationship between teachers' sense of academic optimism and commitment to the profession* (Unpublished Ph. D. Thesis). The Ohio State University, Columbus. From <https://www.proquest.com/docview/305294758?>

- Littrell, P. C., Billingsley, B. S., & Cross, L. H. (1994). The effects of principal support on special and general educators' stress, job satisfaction, school commitment, health, and intent to stay in teaching. *Remedial and Special Education*, 15(5), 297–310. <https://doi.org/10.1177/074193259401500505>
- Perelli, T. E. (2018). Principal support and academic optimism in urban high schools (Dissertations, Theses, and Masters Projects). Paper 1530192495. <http://dx.doi.org/10.25774/w4-vszzg-a163>
- Rosenholtz, S. J., & Simpson, C. (1990). Workplace conditions and the rise and fall of teachers' commitment. *Sociology of Education*, 63(4), 241–257. <https://doi.org/10.2307/2112873>
- Santalia, R. [F., Gunadi, W., & Setiadi, A. \(2022\).](#) The effect of emotional support and informational support on the need for relatedness and user's satisfaction with the use of social media. *The International Conference on Industrial Engineering and Operations Management* (pp. 4365-4372).
- Seligman, M. E. P. (2002). Positive psychology, positive prevention, and positive therapy. In C. Snyder & S. Lopez (Eds.), *Handbook of positive psychology* (pp. 3-9). New York: Oxford. <http://www-personal.umich.edu/~prestos/Downloads/DC/10-7Seligman2002.pdf>
- Smith, P. A., Hoy, W. K., & Sweetland, S. R. (2001). Organizational health of high schools and dimensions of faculty trust. *Journal of School Leadership*, 11(2), 135-151. <http://dx.doi.org/10.1177/105268460101100204>
- Tindle, J. A. (2012). *Dimensions of principal support behaviors and their relationship dimensions of principal support behaviors and their relationship to organizational citizenship behaviors and student achievement in High Schools* (Dissertations, Theses, and Masters Projects). Paper 1539618523. <https://dx.doi.org/doi:10.25774/w4-zp1r-z450>
- Tschannen-Moran, M., Woolfolk Hoy, A., & Hoy, W. K. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research*, 68(2), 202–248. <http://dx.doi.org/10.3102/00346543068002202>
- Tschannen-Moran, M. (2004). *Trust matters: Leadership for successful schools*. San Francisco, CA: Jossey-Bass.
- Woolfolk Hoy, A., Hoy, W. K., & Kurz, N. M. (2008). Teacher's academic optimism: The development and test of a new construct. *Teaching and Teacher Education*, 24(4), 821-835. <https://doi.org/10.1016/j.tate.2007.08.004>

A STUDY OF PRINCIPALS' LEADERSHIP STYLES AND STUDENT ACHIEVEMENTS IN PUBLIC SECONDARY SCHOOLS

Han Thu Aung¹ and CHEN Dian-bing²

Abstract

This study aimed to determine principals' leadership styles and student achievements in Matriculation Examination in public secondary schools in Bago (West) Region. Quantitative method design was used in this study. The sample of 52 principals and 1551 teachers were selected by using purposive sampling. A set of instruments for principals' leadership styles questionnaire and student achievements inventory was used to collect data. The reliability coefficients (Cronbach's alpha) were 0.73 for principals' leadership styles. The findings suggested that principals mostly practiced transactional leadership styles, followed by transformational leadership styles, and occasionally exhibited passive/avoidant leadership styles. Moreover, the findings suggested that the difference between principals' leadership types and student's achievement. The transformational leadership styles, transactional leadership styles, and passive/avoidant leadership styles are significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools.

Keywords: Leadership Styles, Transformational Leadership Styles, Transactional Leadership Styles, Passive/Avoidant Leadership Styles, Student achievements

Introduction

Education is the basic right of human beings. The National Education Strategic Plan (2016-2021) stated that "The purpose of Myanmar's national education system is to equip our students, youth and adult learners with the knowledge and skills they need to succeed in the 21st century. In the coming years we must aspire to establishing an accessible, equitable and quality national education system that helps all our students and learners to discover their talents, realize their full potential and develop a passion for learning that lasts them throughout their lives (Education, National Education Strategic Plan (2016-2021))." In the summary of the National Education Strategic Plan (2021-2030), Dr. Nyunt Phay, Union Minister, Ministry of Education, stated that "Education is a major driver of development to enhance our social and economical capital" (Education, National Education Strategic Plan (2021-2030) Summary). The main aim of education is to develop the capacities dormant in human nature and to coordinate their expression for the enhancement and development of society, by equipping children with spiritual, moral and physical knowledge (Hussain, Salfi & Virk, 2014).

Before learning knowledge from a teacher, students can learn and get knowledge from parents, family members and peer group. So, the process of education begins at home. Nonetheless, the educational concept strongly associated with formal education occurs in school. The schools have a system to run the process of education. In this system, all persons have their roles and responsibilities. They need to play an imperative role in the success of the school (Dewey, 1986).

The principal is the most important and influential individual in any school. The principals are the most important person because they can carry on effectively to successful or achieve the school goals (Grissom, 2001). Leadership is the solution to the development and endurance of any organization whether it is an enterprise or institution. School leadership is a process of encouraging and serving teachers and learners to work passionately toward realization of educational aims (Ali & Dahie, 2015). Leadership is also essential for organizational innovation, and performance (John Antonakis & Robert J. House, 2014). So, principals need to have powerful leadership abilities to successfully lead the schools of the twenty-first century and address school improvement pressures.

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According to Bello, Ibi and Bukar (2016), achievement is measured by standardized achievement test developed for school subjects to meet national or state norm and in relation to what is attained at the end of a course. Then, they continued that all students in a school take the same coursework and defined student achievements in terms of test scores, examination results, and knowledgeable abilities.

Objectives of the Study

The general objective of this study was to determine principals' leadership styles and student achievements in Matriculation Examination in public secondary schools in Bago (West) Region.

The specific objectives of this study were as follows:

- (1) To find out the mostly practiced leadership styles in public secondary schools in Bago (West) Region.
- (2) To determine the difference between principals' leadership styles and student achievements.

Theoretical Framework of the Study

This study was concerned with to examine to determine principals' leadership styles and student achievements in Matriculation Examination in public secondary schools in Bago (West) Region. The study was based on the Full Range of Model of Leadership (Avolio, B. J. & Bass, B. M., 2004) to study principals' leadership styles. The styles in the Full Range of Model of Leadership are transformational leadership styles, transactional leadership styles, and passive/avoidant leadership styles.

Transformational leadership Style is founded around the promise and ability of group members. When transformational leaders expect high levels of organizational goals, they can accomplish the great capacities of those goals and great productivity (Leithwood, Jantzi & Steinbach, 1999). In educational environments, transformational leadership styles can be categorized into four areas: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Bass & Avolio, 1994). **Idealized influence** is a leadership style in which the leader builds trust within the organization and becomes a role model (Bass & Avolio, 1994). An idealized influence leader is highly admired by followers, and is respected and so, their accomplishments were fulfilled to complete mission (John J. Sosik & Dongli Jung, 2018). **Inspirational motivation** is a conduct that maximizes the performance of their followers by nurturing a shared mission and engages the followers to convey high expectations, and demonstrate a dedication to the goals (Bass & Avolio, 1994). **Intellectual stimulation** includes challenging the assumptions of followers' beliefs, their analysis of problems they face and solutions they generate, and motivating followers to get the effective approaches to do tasks (Bass & Avolio, 1994). **Individualized consideration** signifies as a coach or mentor that help followers reflect upon their practices and foster professional development (Bass & Avolio, 1994) and addresses the individual concerns and requirements of each follower (Gupta, M. V., & Mehta, S., 2019).

Transactional leadership Style recognizes what it is they want to get from their work and enhances rewards and promises of rewards for efforts (Bass, 1985). This style has two kinds: contingent reward and active management-by-exception. **Contingent reward** signifies a linear style of management, like the waterfall model (Bernard M. Bass & Ruth Bass, 2008). This leader has a habit to be good at setting goals, expectations and standards of an organization. They tend to provide constructive feedback concerning follower performance to improve their output (Bono & Judge, 2004). **Active management-by-exception** involve the leader watches and searches actively for deviations from rules and standards in order to avoid these deviations; if necessary, corrective actions are taken (Bass, 1985).

Passive/avoidant leadership style involves two kinds of styles such as passive management-by-exception and laissez-faire (Lewin, Lippit, & White (1939), cited in Olav Kjelleveold Olsen et al., 2021). **Passive management-by-exception** means that the leader waits

until the behavior has caused problems before taking action (Judge & Piccolo, 2004) and involves situations where the leader does not systematically address situations and problems (Kalkan, Ü. et al., 2020). **Laissez-faire** encourages no code regulation or law in an organization. Okumbe stated that the leader's symbol is that there is no authority and his/her primary role is to only supply resources needed by the group (Okumbe, 1998). He also pointed out that followers' decisions are easily accepted and followers can provide their own motivation and teachers and students can work freely to achieve the educational goals.

Definitions of Key Terms

Leadership Styles. Leadership styles are defined as the actions that the leaders prepare relevance to education in management, analysis educational problems and inspires professional progress and teaching improvement (Momoh & Osagie, 2014). These cover transformational leadership styles, transactional leadership styles, and passive/avoidant leadership styles (Northouse, 2015).

Transformational Leadership Styles. Transformational leadership styles refer to the actions through which leaders motivate followers by raising their consciousness about the importance of organizational goals, by cultivating the skills and potential of followers, and by inspiring them to transcend their own self-interest for organization (Marks & Printy, 2003).

Transactional Leadership Styles. Transactional leadership styles encompass actions wherein leaders provide followers with rewards on the fulfillment of the tasks, set up constructive engagement with followers, and stay action until their performance problems have occurred (Bass & Avolio, 1994).

Passive/Avoidant Leadership Styles. Passive/avoidant leadership styles refer to situations where the leader does not intervene to generate and implement of new ideas (Avolio, B. J. & Bass, B. M., 2004).

Student Achievements. Student achievements are narrowly mentioned as grades in a standardized tests to access whether students have acquired the skills and knowledge (Hattie, 2009).

Methodology

Research Method

Quantitative research design was used.

Participants of the Study

The sample of 52 principals and 1551 teachers in public secondary schools, Bago (West) Region, were selected by using purposive sampling method. The criterion is to select all of principals and teachers served at least three years in current schools.

Instrumentation

A set of instruments was developed based on Multifactor Leadership Questionnaire (MLQ) (Bernard M. Bass & Bruce J. Avolio, 2000) to collect principals' leadership styles and student achievements inventory. It was comprised of 36 items for principals' leadership styles and 9 items for student's achievement inventory. All items used in this study were conducted in Myanmar language version. Then, expert review was conducted for validity of the instruments by the experts in the field of Educational Theory (current named as Educational Studies) from Patheingyi Education College (current named as Patheingyi Education Degree College). Next, some items were modified according to their suggestions and recommendations. After that, the pilot study was conducted with 60 teachers from two Public Secondary School in Bago (West) Region. The reliability coefficients (Cronbach's alpha) were 0.73 for principals' leadership styles.

Data Analysis

Descriptive statistics and Chi-square tests were employed in this study.

Findings

Examining Principals' Mostly Used Leadership Styles Perceived by Teachers in Public Secondary Schools in Bago (West) Region

Table 1 Mean Values and Standard Deviations of Principals' Transformational Leadership Styles Perceived by Teachers (N=1551)

No.	Transformational Leadership Styles	Mean	SD	Remark
1	Instilling pride for being associated with him/her	3.35	1.02	Moderate
2	Going beyond self-interest for the good of the group	3.80	0.64	High
3	Acting in ways that build others' respect	3.76	0.73	High
4	Displaying a sense of power and confidence	3.47	0.93	High
5	Talking about his/her most important values and beliefs	3.29	0.99	Moderate
6	Specifying the importance of having a strong sense of purpose	3.59	0.78	High
7	Considering the moral and ethical consequences of decisions	3.68	0.72	High
8	Keeping track of all mistakes	3.68	0.76	High
	Idealized Influenced	3.15	0.82	Moderate
9	Talking optimistically about the future	3.51	0.78	High
10	Talking enthusiastically about what needs to be accomplished	3.46	0.83	High
11	Articulating a compelling vision of the future	3.57	0.74	High
12	Expressing confidence that goals will be achieved	3.54	0.81	High
	Inspirational Motivation	3.52	0.79	High
13	Re-examining critical assumptions to question whether they are appropriate	3.10	0.95	Moderate
14	Seeking differing perspectives when solving problems	3.03	1.08	Moderate
15	Getting others to look at problems from many different angles	3.47	0.93	High
16	Suggesting new ways of looking at how to complete assignments	3.35	0.91	Moderate
	Intellectual Stimulation	3.24	0.97	Moderate
13	Spending time teaching and coaching	3.15	1.02	Moderate
14	Treating others as individuals rather than just as a member of a group	3.70	0.78	High
15	Considering an individual as having different needs, abilities, and aspirations from others	3.57	0.88	High
16	Helping others to develop their strengths	3.47	0.83	High
	Individualized Consideration	3.47	0.88	High
	Transformational Leadership Styles	3.34	0.87	Moderate

Scoring 1.00-1.80=Very low, 1.81- 2.61-3.40=Moderate, 4.21-5.00=Very high

Direction: 1.81-2.60 =Low, 3.41-4.20=High,

According to the data in Table 1, teachers perceived that the mean value of inspirational motivation style was high as its mean value was 3.52, while those of other styles such as individualized consideration, intellectual stimulation, and idealized influenced were rated as moderate as their mean values were 3.47, 3.24 and 3.15. Overall, teachers indicated that the transformational leadership styles of their principals were rated as Moderate (Mean=3.34).

Table 2 Mean Values and Standard Deviations of Principals' Transactional Leadership Styles Perceived by Teachers (N=1551)

No.	Transactional Leadership Styles	Mean	SD	Remark
1	Providing others with assistance in exchange for their efforts	2.77	0.90	Moderate
2	Discussing in specific terms who is responsible for achieving performance targets	3.41	0.71	High
3	Making clear what one can expect to receive when performance goals are achieved	3.47	0.87	High
4	Expressing satisfaction when others meet expectations	3.38	0.95	Moderate
	Contingent Reward	3.26	0.86	Moderate
5	Focusing attention on irregularities, mistakes, exceptions, and deviations from standards	3.40	0.91	Moderate

No.	Transactional Leadership Styles	Mean	SD	Remark
6	Concentrating full attention on dealing with mistakes, complaints, and failures	3.69	0.72	High
7	Keeping track of all mistakes	3.68	0.77	High
8	Directing attention toward failures to meet standards	3.40	1.12	Moderate
	Active Management-by-Exception	3.54	0.88	Moderate
	Transactional Leadership Styles	3.40	0.87	Moderate

Scoring 1.00-1.80=Very low, 1.81- 2.61-3.40=Moderate, 4.21-5.00=Very high
Direction: 2.60 =Low, 3.41-4.20=High,

As outlined in Table 2, teachers perceived that both contingent reward and active management-by-exception were moderate as their mean values were 3.26 and 3.54. Overall, teachers rated their principals' transactional leadership styles as moderate because its mean value was 3.40.

Table 3 Mean Values and Standard Deviations of Principals' Passive/Avoidant Leadership Styles Perceived by Teachers (N=1551)

No.	Passive/Avoidant Leadership Styles	Mean	SD	Remark
1	Failing to interfere until problems become serious	2.85	1.39	Moderate
2	Waiting for things to go wrong before taking action	1.52	1.50	Very low
3	Being a firm believer in "If it isn't broken, don't fix it."	3.60	0.81	High
4	Demonstrating that problems must become chronic before taking action	3.62	0.85	High
	Passive Management-by-Exception	2.90	1.14	Moderate
5	Avoiding getting involved when important issues arise	1.66	1.03	Very low
6	Being absent when needed	1.41	0.87	Very low
7	Avoiding making decisions	2.73	1.63	Moderate
8	Delaying responding to urgent questions	1.73	1.51	Very low
	Laissez-Faire	1.88	1.26	Low
	Passive/Avoidant Leadership Styles	2.39	1.20	Low

Scoring 1.00-1.80=Very low, 1.81- 2.61-3.40=Moderate, 4.21-5.00=Very high
Direction: 2.60 =Low, 3.41-4.20=High,

As per the data in Table 3, teachers perceived that the mean value of passive management-by-exception was moderate (Mean=2.90) and that of laissez-faire was low (Mean=1.88). Overall, teachers rated their principals' passive/avoidant leadership styles as low (Mean=2.39).

Table 4 Mean Values and Standard Deviations of Principals' Leadership Styles Perceived by Teachers (N=1551)

No.	Principals' Leadership Styles	Mean	SD	Remark
1	Transformational Leadership Styles	3.34	0.87	Moderate
2	Transactional Leadership Styles	3.40	0.87	Moderate
3	Passive/Avoidant Leadership Styles	2.39	1.20	Low

Scoring 1.00-1.80=Very low, 1.81- 2.61-3.40=Moderate, 4.21-5.00=Very high
Direction: 2.60 =Low, 3.41-4.20=High,

As indicated in Table 4, the teachers perceived that two kinds of styles out of three exhibited by principals, namely transformational and transactional leadership styles, were rated as moderate because their mean values were 3.34 and 3.40, while the remaining one, passive/avoidant leadership styles, was rated as low because its mean value was 2.39.

Examining Principals' Mostly Used Leadership Styles Perceived by Principals in Public Secondary Schools in Bago (West) Region

Table 5 Mean Values and Standard Deviations of Principals' Leadership Styles Perceived by Principals (N=1551)

No.	Principals' Leadership Styles	Mean	SD	Remark
1	Transformational Leadership Styles	3.39	0.50	Moderate
2	Transactional Leadership Styles	3.48	0.55	Moderate
3	Passive/Avoidant Leadership Styles	1.92	1.92	Low

Scoring **1.00-1.80=Very low, 1.81- 2.61-3.40=Moderate, 4.21-5.00=Very high**
Direction: **2.60 =Low, 3.41-4.20=High,**

As indicated in Table 5, the principals perceived that two kinds of styles out of three exhibited by principals, namely transformational and transactional leadership styles, were rated as moderate because their mean values were 3.39 and 3.48, while the remaining one, passive/avoidant leadership styles, was rated as low because its mean value was 1.92.

Table 6 Chi-square Analysis of Student Achievements Among Principals' Leadership Styles

Variable	n	School Types			Pearson Chi-square	p
		Low Pass Rate Schools	Average Pass Rate Schools	High Pass Rate Schools		
Transformational Leadership Styles	1551	786	248	517	37.28	<0.001
Transactional Leadership Styles	1551	786	248	517	67.05	<0.001
Passive/Avoidant Leadership Styles	1551	786	248	517	512.41	<0.001

According to the data in Table 6, transformational leadership styles, transactional leadership styles, and passive/avoidant leadership styles are significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools.

Conclusion and Discussion

According to the first specific objective, the findings showed that the mean value of principals' transformational leadership styles was moderate. The most common transformational leadership style of principals was inspirational motivation as its mean value was high. Then, the mean values of individualized consideration, intellectual stimulation, and idealized influenced were moderate. The leaders with inspirational motivation always concerned about the future and thus articulate the futuristic vision in the organization. Such leaders build strong image among their followers which is vital for the successful leadership (Bernard M. Bass & Ronald E. Riggio, 2005).

Then, the mean value for principals' transactional leadership styles was moderate. The principals performed active management-by-exception more than contingent rewards. This finding showed that the leaders recognize as a way to motivate followers and constantly monitor followers by rewards when they meet their goals. The leaders monitor followers to try to spot areas where they are performing tasks incorrectly, or where they are failing to meet performance standards (Joyce E. Bono & Timothy A. Judge, 2004).

According to the findings, the mean value for principals' passive/avoidant leadership styles was low. The principals performed passive management-by-exception more than laissez-faire. Laissez-faire style was the least common leadership style as compared to others. The leaders avoid changes and taking any initiative, and do not try to make improvements. The leaders steer away, avoid making decisions and getting involved, and are absent when needed (Olav Kjelleve Olsen et al., 2001).

Based on these above findings, it was found that principals mostly practiced transactional leadership styles, followed by transformational leadership styles, and occasionally exhibited passive/avoidant leadership styles.

For the second specific objective, the transformational leadership styles, transactional leadership styles, and passive/avoidant leadership styles are significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools. The transformational leadership styles significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools, and the transactional leadership styles significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools, while the passive/avoidant leadership styles significantly different on student achievements as low pass rate schools, average pass rate schools and high pass rate schools.

According to the first specific objective, the findings showed that the mean value of principals' transactional leadership styles perceived by teachers and by principals was higher than other two styles. The mostly practiced transactional leadership styles focus on processes, control, and a strict management structure. The transactional leadership styles ensure that the goals and vision of the organization are achieved by giving the followers the rewards and punishments, and rely on established process and rules to ensure consistency and predictability in the organization (Bass, B. M., Avolio, B.J., Jung D. I. & Berson, Y., 2003). The principals who practiced transactional leadership styles emphasize the relationship with the follower, and focus on planning and execution (Timothy R Hinkin & Chester A Schriesheim, 2008).

In this leadership styles, every follower knows their roles and tasks. All facets of the departments are clearly defined from top to bottom for systematic performance. The transactional leadership treat the followers fairly and there is no favoritism. The system for giving rewards and punishments is clearly defined, and everyone knows what to expect. This creates a sense of fairness and helps to maintain a positive environment. This system also motivates the followers to perform at their best and maximize productivity (Liu, P., LuiL, L., Bo YL & Yang, H., 2023).

The transactional leaders provide immediate feedback and guidance on performance. This helps the followers stay on track and identify areas for improvement. Moreover, it any confusion and the followers know what action to take (John J Hater & Bernard M Bass, 1988). As the transactional leaders clearly define expectations and there are incentives for good performance, the followers are more satisfied and less likely to leave their jobs. The principals who practiced transactional leadership styles create a sense of fairness, easy-to-understand system, let the followers see their impact on the work (Bruce J Avolio, Bernard M Bass & Dong I Jung, 1999). The most common transactional leadership style of principals was active management-by-exception as its mean value was higher than contingent reward. Therefore, transactional leadership styles were the mostly used leadership style in public secondary schools in Bago (West) Region.

For the second specific objective, numerous factors that related to student achievements (Shoukat Ali et al., 2013). Student achievements are related to the parental role, the role of teacher, learning facilities, and school culture (Rahmat Fadhli et al., 2002). Student achievements are also related to the economic conditions, their habits for doing homework and for studying, their time management skills, their relationship within the family and their health conditions, and depend on the development of society and the increase of level of welfare (Munoz, M. A. cited in Mehmet Ozcan, 2021). The family has an impact on the students' way of thinking, belief, viewpoint and achievements and the family participation in students' activities which carried out at home also has that (Dil, S. & Bulantekin, O. cited in Mehmet Ozcan, 2011).

Moreover, student achievements are mostly depended on teaching methods of their teachers (Dr. Isa, S. G., Dr. Mammam, M. A., Badar, Y. and Bala, T., 2020). Effective classroom managements also relate the student achievements (Jere Brophy, 1986). Then, student achievements are related to the school's physical conditions and infrastructure, practicability, favorable hygiene conditions, library, and science laboratories (Peter Barrett et al., 2019). The leadership styes relate to the result of teachers on student achievements. According to (Heck & Hallinger, 2014), the leadership styes actually relate in student achievements by making circumstances in the school that permit for better constancy and association of teachers.

Limitations of the Study

1. The scope of this study is limited to public secondary schools in Bago (West) Region because the study was based on the available time and resources of the researcher.

2. The selected schools are only public secondary schools but no private schools, alternative schools, monastic schools and charter schools.
3. The selected principals and teachers have at least three years of experience at the current schools.
4. The instrument used can determine three leadership styles. But, the principals may practice other leadership styles.
5. A qualitative research design or mixed method research design was not used for this study due to financial and time limitations.

Suggestions for Further Study

1. A similar study needs to be undertaken in private secondary schools to allow for generalizations of the study findings.
2. A study needs to be undertaken on the correlation between principals' leadership styles in other school levels and student achievements.
3. A similar study needs to be undertaken on the effects of school environment on the student achievement.
4. A study needs to be undertaken on the other Regions or States in Myanmar.
5. A mixed method or qualitative method should be used in next study.

Recommendations

The following recommendations were suggested on the analysis of the research findings.

Educational authorities should

- provide enough school facilities, infrastructure and fund.
- train enough to qualified principals for effective administration.
- provide the training teachers for effective teaching.
- implement the recommendations that are needed to be carried out in the educational sectors presented by educational researchers

All principals should

- keep on practicing transactional leadership styles.
- study and decide which leadership styles are appropriate to the current situation.
- attend workshops and trainings arranged by educational authorities and by other educators for upgrading leadership capacity.
- encourage teachers' commitment.
- consider individual's needs and concerns.
- press academic emphasis
- try to involve the parents and state holders voluntary in the school organization.

All teachers should

- be responsible for duties as a teacher towards students, colleagues, school, and educational departments.
- attend trainings and workshops to develop professional.

All students should

- obey school rules.
- Persist, strive to achieve, and are respected by each other and teachers and others for their academic success.

All parents should

- try to know and practice the factors effected on their children's achievement.
- emphasize their children's achievement.

Acknowledgements

We would like to offer our respectful gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-rector, Yangon University of Education) and Dr. Nyo Nyo Lwin (Pro-rector, Yangon University of Education) for allowing us to do this study. And we would like to express our honorable gratitude to Dr. Khin Mar Ni (Professor and Head, Department of Educational Theory and Educational Management, Yangon University of Education) for her great support and expert guidance for this study. I would like to express my deep gratitude to my supervisor, Dr. CHEN Dian-bing (Associate Professor, College of Teacher Education, Zhejiang Normal University, China) and my teacher educator, Dr. Ei Phyu Chaw (Lecturer, Department of Educational Theory and Educational Management, Yangon University of Education) for their kindly support, deeply patient, precious guidance, and valuable and timely advice to complete this study. Then, we would like to special thanks to all participants of this study.

References

- Ali & Dahie. (2015). Leadership Style and Teacher Job Satisfaction: Empirical Survey from Secondary Schools in Somalia. *Research on Humanities and Social Sciences*, 6(9), 84-96.
- Avolio, B. J. & Bass, B. M. (2004). *Multifactor Leadership Questionnaire. Manual and sampler set. (3rd ed.)*. Redwood City, CA: Mind Garden.
- Bass & Avolio. (1994). *Improving Organizational Effectiveness Through Transformational Leadership*. London: Thousand Oaks: Sage Publishers.
- Bass, B. M. (1985). *Leadership and Performance Beyond Expectations*. New York: Free Press.
- Bass, B. M., Avolio, B.J., Jung D. I. & Berson, Y. (2003). Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology*, 88(2), 207-232.
- Bello, Ibi & Bukar. (2016). Principals' Administrative Styles and Students' Academic Performance in Taraba State Secondary Schools, Nigeria. *Journal of Education and Practice*, 7 (18), 62-69.
- Bernard M. Bass & Bruce J. Avolio. (2000). *Multifactor Leadership Questionnaire (MLQ)*. Redwood City: Mind Garden.
- Bernard M. Bass & Ronald E. Riggio. (2005). *Transformational Leadership (2nd Edition)*. New York: Psychology Press. doi:http://doi.org/10.4324/9781410617095
- Bernard M. Bass & Ruth Bass. (2008). *The Bass handbook of Leadership Theory, Research, & Managerial Applications (4th ed.)*. Free Press.
- Bono & Judge. (2004). Personality and Transformational and Transactional Leadership: A Meta-Analysis. *Journal of Applied Psychology*, 89 (5), 901-910.
- Bruce J Avolio, Bernard M Bass & Dong I Jung. (1999). Re-examing the components of transformational and transactional leadership using the Multifactor Leadership. *Journal of occupational and organizational psychology*, 72(4), 441-462.
- Dewey, J. (1986). Experience and Education. *The Education Forum*, 50(3), 241-252. doi:10.1080/00131728609335764
- Dil, S. & Bulantekin, O. cited in Mehmet Ozcan. (2011). Determination of the relationship between family functionality and locus of control and levels of academic success among nursing students. *Journal of Psychiatric Nursing*, 2(1), 17-24.
- Dr. Isa, S. G., Dr. Mammam, M. A., Badar, Y. and Bala, T. (2020). The impact of teaching methods on academic performance of secondary school students in Nigeria. *International Journal of Development Research*, 10(06), 37382-37385.
- Education, M. o. (n.d.). *National Education Strategic Plan (2016-2021)*. Nay Pyi Taw, Myanmar: The Government of the Republic of the Union Of Myanmar.
- Education, M. o. (n.d.). *National Education Strategic Plan (2021-2030) Summary*. Nay Pyi Taw, Myanmar: The Government of the Republic of the Union Of Myanmar.
- Grissom, J. A. (2001). *How Principals Affect Students and School*. New York: The Wallace.
- Gupta, M. V., & Mehta, S. (2019). Transformational Leadership Among Academicians: Model, Measures and Relationship with Other Constructs. Gupta, M. V., & Mehta, S. (2019). *Transformational Leadership Among Academicians: Model, Measures and Relationship with Other Constructs*. *International Journal of 360 Management Review*, 7(1), Gupta, M. V., & Mehta, S. (2019). Transformational Leadership Among Academicians: Model,856-874.
- Hattie, J. A. (2009). *Visible Learning: A synthesis of over 800 meta-analysis relating to achievement*. Abingdon: Routledge.
- Heck & Hallinger. (2014). Modeling the longitudinal effects of school leadership on teaching and learning. *Journal of Educational Administration*, 52 (5), 653-681.
- Heck & Hallinger. (2014). Modeling the longitudinal effects of school leadership on teaching and learning. *Journal of Educational Administration*, 52(2), 653-681.

- Hussain, Salfi & Virk. (2014). Leadership Strategies for School Improvement: A Qualitative Approach. *Journal of Social Science for Policy Implications*, 2(2), 67-81.
- Jere Brophy. (1986). Classroom management techniques. *Education and urban society*, 18(2), 182-194.
- John Antonakis & Robert J. House. (2014). Instrumental leadership: Measurement and extension of transformational-transactional leadership theory. *The Leadership Quarterly*, 25(4), 746-771. Retrieved from <http://dx.doi.org/10.1016/j.leaqua.2014.04.005>
- John J. Hater & Bernard M. Bass. (1988). Superiors' evaluations and subordinates' perceptions of transformational and transactional leadership. *Journal of Applied Psychology*, 73(4), 695-711.
- John J. Sosik & Dongli Jung. (2018). *Full Range Leadership Development: Pathways for People, Profit, and Planet (2nd ed.)*. Routledge. Retrieved from Sosik, J.J., & Jung, D. (2018). Full Range Leadership Development. <https://doi.org/10.4324/9781315167206>
- Joyce E. Bono & Timothy A. Judge. (2004). Personality and Transformational and Transactional Leadership: A Meta-Analysis. *Journal of Applied Psychology*, 89(5), 901-910. doi:10.1037/0021-9010.89.5.901
- Judge & Piccolo. (2004). Transformational and Transactional Leadership: A Meta-Analytic Test of Their Relative Validity. *Journal of Applied Psychology*, 85(9), 755-768.
- Kalkan, Ü. et al. (2020). The Relationship Between School Administrators' Leadership Styles, School Culture, and Organizational Image. *SAGE Open*, 10(1), 1-15. Retrieved from Kalkan, Ü., Altınay Aksal, F., Altınay Gazi, Z., Atasoy, R., & Dağlı, G. (2020). The Relationship Between School Administrators' Leadership Styles. <https://doi.org/10.1177/2158244020902081>
- Leithwood, Jantzi & Steinbach. (1999). *Changing Leadership for Changing Times*. Buckingham: Open University Press.
- Lewin, Lippitt, & White (1939), cited in Olav Kjellevold Olsen et al. (2021). Passive avoidant leadership and safety non-compliance: A 30days diary study among naval cadets. *Safety Science*, 105-110.
- Liu, P., Liu, L., Bo, Y.L. & Yang, H. (2023). Exploring the relationships between perceived transformational leadership and transactional leadership and teachers' intellectual style. *Journal of Educational Leadership and Policy Studies*, 7(1), 1-19.
- Marks & Printy. (2003). Principal Leadership and School Performance: An Integration of Transformational and Instructional Leadership. *Educational Administration Quarterly*, 39(3), 370-397.
- Momoh & Osagie. (2014). Principals' Leadership and Student Performance in Senior Secondary Schools in Edo State, Nigeria. *Educational Planning*, 23(3), 17-28.
- Munoz, M. A. cited in Mehmet Ozcan. (2021). Factors Affecting Students' Academic Achievement according to the Teachers' Opinion. *Education Reform Journal*, 6(1), 1-18.
- Northouse, P. G. (2015). *Leadership: theory and practice (Seventh Edition)*. California: SAGE Publication, Inc.
- Okumbe. (1998). *Educational Management. Theory and Practice*. Nairobi: Nairobi University Press.
- Olav Kjellevold Olsen et al. (2001). Passive Avoidant Leadership and Safety Non-compliance: A 30days diary study among naval cadets. *Safety Science*, 105-110.
- Peter Barrett et al. (2019). *The impact of school infrastructure on learning: A synthesis of the evidence*. Washington: World Bank Group.
- Rahmat Fadhli et al., (2002). Factors that influence student's achievement. *Journal of Positive School Psychology*, 6(4), 5931-5944. Retrieved from <http://journalppw.com>
- Shoukat Ali et al. (2013). Factors Contributing to the Students Academic Performance: A Case Study of Islamia University Sub-Campus. *American Journal of Educational Research*, 1(18), 283-289. doi:10.12691/education-1-8-3
- Timothy R. Hinkin & Chester A. Schriesheim. (2008). A theoretical and empirical examination of the transactional and non-transactional dimensions of the Multifactor Leadership Questionnaire (MLQ). *The leadership quarterly*, 19(5), 501-513.

RELATIONSHIP BETWEEN PRINCIPALS' LEADERSHIP BEHAVIOURS AND TEACHERS' ORGANIZATIONAL CITIZENSHIP BEHAVIOURS

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Abstract

This study aimed to find out the relationship between principals' leadership behaviours and teachers' organizational citizenship behaviours in Basic Education Schools in Kyaukphyu Township, Rakhine State. The research was conducted with an explanatory sequential mixed methods design. The sample of 464 teachers was selected using simple random sampling. A set of questionnaires for principals' leadership behaviours and teachers' organizational citizenship behaviours with high content validation index (CVI) values of 0.98 for leadership behaviours and 0.97 for organizational citizenship behaviours was used. The reliability coefficients (Cronbach's alpha) were 0.86 for principals' leadership behaviours and 0.94 for teachers' organizational citizenship behaviours. Then, open-ended questions for principals' leadership behaviours and interview questions for teachers' organizational citizenship behaviours were employed as a qualitative study. The findings suggested that principals commonly practiced transformational leadership behaviours, followed by transactional leadership behaviours, and occasionally exhibited passive/avoidant leadership behaviours. Moreover, the findings suggested that teachers exhibited high level of organizational citizenship behaviours. Then, there were positively moderate relationships between principals' transformational and transactional leadership behaviours and teachers' organizational citizenship behaviours. According to qualitative results, most principals responded that they prioritized the school's welfare over personal gain, they acknowledged teachers in various settings, and actively engaged in all relevant responsibilities and duties. Regarding with teachers' organizational citizenship behaviours, most teachers provided mentorship and guidance to newer colleague.

Keywords: Leadership Behaviours, Transformational Leadership Behaviours, Transactional Leadership Behaviours, Passive/Avoidant Leadership Behaviours, Organizational Citizenship Behaviours

Introduction

The complexity of today's world calls for more advanced leadership (Fullan, 2001). Qualified, motivated, and empowered teachers play a central role in educating children and adults in their respective countries with the needed knowledge, skills, and values to enjoy healthy and fulfilling lives (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). Since official job descriptions cannot encompass every possible behaviour required to achieve corporate goals, organizational citizenship behaviour is extremely important (Moe Moe Aye, 2019). Given that teachers' organizational citizenship behaviours are influenced by principals' leadership behaviours either directly or indirectly (Podsakoff et al., 2000), it is critical to look into the various leadership behaviours of school principals.

School leaders are responsible for implementation of school reform and restructuring initiatives that are increasingly complex and varied. Research has provided evidence that leadership is critical to promoting organizational conditions (Hallinger & Heck, 1996; Newman & Wehlage, 1995). Transformational leaders who inspire and motivate teachers were associated with a higher level of discretionary efforts beyond their formal role requirements (Yuwono et al., 2023). Transactional leadership, characterized by contingent rewards and active management-by-

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exception, is examined for its influence on the discretionary efforts of teachers within educational settings (Hamdi et al., 2021). Passive/avoidant leadership, characterized by a lack of involvement and indecisiveness, influences on teachers' willingness to engage in discretionary, extra-role behaviours that contribute positively to the school organization (Frooman et al., 2012).

Objectives of the Study

The general objective of this study was to study the relationship between the principals' leadership behaviours and teachers' organizational citizenship behaviours.

The specific objectives of this study were as follows:

- (1) To examine principals' commonly practiced leadership behaviours perceived by teachers in Basic Education Schools in Kyaukphyu Township
- (2) To examine the levels of teachers' organizational citizenship behaviours in Basic Education Schools in Kyaukphyu Township
- (3) To find out the relationships between principals' leadership behaviours and teachers' organizational citizenship behaviours

Theoretical Framework of the Study

This study was concerned with principals' leadership behaviours and teachers' organizational citizenship behaviours. The study was based on the Full Range of Leadership Development Model (Bass & Avolio, 1994; Sosik & Jung, 2018) to study principals' leadership behaviours. The behaviours in the Full Range Leadership Model are transformational leadership behaviours, transactional leadership behaviours, and passive/avoidant leadership behaviours.

Transformational leadership behaviours involve inspiring followers to surpass anticipated performance levels and prioritize the greater interests of the group over their individual interests (Bass, 1985; Hoque & Raya, 2023). Transformational leaders have the ability to change the lives of their followers by modifying their perspectives, ambitions, anticipations, values, and other aspects (Gupta & Mehta, 2019). In educational environments, transformational leadership behaviours can be categorized into four areas: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration (Balyer, 2012). **Idealized influence** is a leadership behaviour in which the leader inspires and gains the respect of subordinates who view them as a role model (Ihsani et al., 2020). An idealized influence leader is highly esteemed and admired by followers, instilling a sense of pride and respect due to their accomplishments in fulfilling the collective mission and embodying values and beliefs (Sosik & Jung, 2018). **Inspirational motivation** is a conduct that propels and uplifts those around the leader by exhibiting enthusiasm and optimism (Ihsani et al., 2020). It involves engaging followers in envisioning future scenarios, conveying high expectations, and demonstrating a dedication to the goals (Balyer, 2012; Northouse, 2001). **Intellectual stimulation** pertains to the actions of leaders that improve followers' understanding of the problems and challenges they encounter (Ihsani et al., 2020). It signifies how a leader motivates followers to discover novel and more effective approaches to accomplish tasks (Jameel & Ahmad, 2019). **Individualized consideration** signifies the leader's endeavour to treat individuals as unique entities, taking on the role of a coach or mentor to nurture the potential of their followers (Balyer, 2012; Ihsani et al., 2020). It also involves the extent to which the leader addresses the individual concerns and requirements of each follower (Gupta & Mehta, 2019; Northouse, 2007).

Transactional leadership behaviours incentivize followers through a system of rewards (Bass, 1985). The behaviours and actions of individuals are shaped by the expected rewards (Avolio and Bass, 2004; Hyseni & Hoxha, 2021). These behaviours involve two kinds of behaviours: contingent reward and active management-by-exception. **Contingent reward** signifies a reciprocal arrangement between the leader and followers (Hyseni & Hoxha, 2021). The leader establishes goals, defines roles, and outlines performance expectations for the follower. In return, followers commit to meeting the performance standards set by the leader (Sosik & Jung, 2018). **Active management-by-exception** involves the leader consistently monitoring followers' performance to detect any decline, intervening when performance decreases, and taking corrective action to improve overall effectiveness before issues arise (Nguni et al., 2006; Hyseni & Hoxha, 2021).

Passive/avoidant leadership behaviours involve situations where the leader does not systematically address situations and problems (Kalkan et al., 2020). A leader displaying passive or avoidant tendencies fails to address situations and problems in a systematic manner (Avolio and Bass, 2004). It involves two kinds of behaviours such as passive management-by-exception and laissez-faire. **Passive management-by-exception** means that the leader will refrain from taking action until a problem arises and will not offer subordinates advice on mission accomplishment (Sosik & Jung, 2018). **Laissez-faire** encompasses avoiding expressing opinions or addressing crucial matters, refraining from decision-making or significantly delaying decisions, neglecting responsibilities, withholding feedback, and letting authority remain inactive (Bass, 1998; Hoque & Raya, 2023). Essentially, it signifies the avoidance or lack of leadership (Hoy et al., 2013).

Additionally, Organ's five dimensions of organizational citizenship behaviours served as a metric for assessing teachers' organizational citizenship behaviours (Shrestha & Subedi, 2020). Organ (1988) outlined these behaviours as altruism, conscientiousness, sportsmanship, courtesy, and civic virtue (as cited in Randy-Cofie, 2018; Taseer et al., 2020).

Altruism involves aiding fellow members of the organization in their duties (Bogler & Somech, 2021; Organ, 1997). As defined by Podsakoff et al. (1990), altruism encompasses all voluntary behaviours that contribute to assisting others with tasks and problems relevant to the organization.

Conscientiousness represents discretionary behaviour that exceeds the minimal organizational role requirements, including adherence to rules and regulations, refraining from taking unnecessary breaks, and working extended hours (MacKenzie et al., 1993; Podsakoff & MacKenzie, 2014).

Sportsmanship is characterized as a willingness to tolerate the inevitable inconveniences and impositions of work without complaining (Organ, 1990; Shrestha & Subedi, 2020). Sportsmanship in teaching is defined as the capacity of a teacher to adjust to the challenges of the work environment without objection or expressing dissatisfaction (Kernodel, 2007).

Courtesy involves actions that assist in averting interpersonal issues, such as providing advance notice of work schedules to those in need or consulting with others before taking actions that might impact them (Organ, 1990).

Civic virtue involves actively participating in the organizational political process and contributing to it by openly expressing opinions, and attending meetings (Asgari et al., 2020; Podsakoff et al., 1990).

Definitions of Key Terms

Leadership Behaviors. Leadership behaviours are defined as the actions displayed by leaders in diverse situations based on the readiness of followers. These encompass transformational leadership behaviours, transactional leadership behaviours, and passive/avoidant leadership behaviours (Hoy et al., 2013; Northouse, 2015).

Transformational Leadership Behaviours. Transformational leadership behaviours refer to the actions through which leaders inspire others to perceive their work from fresh viewpoints, raise awareness of the organization's mission or vision, cultivate the skills and potential of colleagues and followers, and encourage them to prioritize collective interests over their own for the benefit of the group (Bass, 1998; Bass & Riggio, 2006).

Transactional Leadership Behaviours. Transactional leadership behaviours encompass actions wherein leaders incentivize followers through a reward-based exchange for services rendered, actively oversee performance, implement corrective measures when issues arise, and delay action until mistakes or other performance problems have occurred (Bass, 1998; Bass & Riggio, 2006).

Passive/Avoidant Leadership Behaviours. Passive/avoidant leadership behaviours refer to situations where the leader does not systematically address situations and problems (Avolio et al., 1999; Kalkan et al., 2020).

Organizational citizenship behaviors. Organizational citizenship behaviours are described as discretionary individual behaviours that are not explicitly acknowledged by the formal reward system yet, when considered collectively, contribute to the efficient functioning of the organization (Goess & Smith, 2018; Organ, 1988; Organ et al., 2006).

Methodology

Research Method

Explanatory sequential mixed methods design was used.

Participants of the Study

The quantitative sample of 464 teachers from Basic Education Schools in Kyaukphyu Township was selected using simple random sampling method. 30 principals for open-ended questions and four principals and eight teachers for interviews were selected.

Instrumentation

A set of questionnaires was developed based on Multifactor Leadership Questionnaire (MLQ) (Bass & Avolio, 1995), Organizational Citizenship Behaviours (OCB) instrument (Habeed, 2019) and related literature. It was comprised of 32 items for principals' leadership behaviours and 30 items for teachers' organizational citizenship behaviours. All items used in this study were conducted in Myanmar language version. Then, expert review was conducted for validity of the instruments by the experts in the field of educational Theory and Management from Yangon University of Education. Next, some items were modified according to their suggestions and recommendations. Content validation index (CVI) values were 0.98 for

leadership behaviours and 0.97 for organizational citizenship behaviours. After that, pilot study was conducted with 63 teachers from two basic education high schools in Hmawbi Township, Yangon Region. The reliability coefficients (Cronbach's alpha) were 0.86 for principals' leadership behaviours and 0.94 for teachers' organizational citizenship behaviours. The open-ended questionnaire consisted of 8 open-ended questions about principals' leadership behaviours. A set of interview questions included 5 questions for teachers' organizational citizenship behaviors.

Data Analysis

Descriptive statistics and Pearson product moment correlation were employed in this study.

Findings

Quantitative Findings

Examining Principals' Commonly Practiced Leadership Behaviours Perceived by Teachers in Basic Education Schools in Kyaukphyu Township

Table 1 Mean Values and Standard Deviations of Principals' Transformational Leadership Behaviours Perceived by Teachers (N=464)

No.	Transformational Leadership Behaviours	Mean	SD	Remark
1	Going beyond self-interest for the good of the group	4.09	0.75	High
2	Acting in ways that build others' respect	4.13	0.65	High
3	Talking about most important values and beliefs	4.27	0.89	Very high
4	Considering the moral and ethical consequences of decisions	4.12	0.71	High
	Idealized Influenced	4.15	0.72	High
5	Talking optimistically about the future	4.33	0.67	Very high
6	Talking enthusiastically about what needs to be accomplished	4.33	0.73	Very high
7	Articulating a compelling vision of the future	4.33	0.80	Very high
8	Expressing confidence that goals will be achieved	4.10	0.92	High
	Inspirational Motivation	4.27	0.82	Very high
9	Re-examining critical assumptions to question whether they are appropriate	3.91	0.81	High
10	Seeking differing perspectives when solving problems	3.92	0.77	High
11	Getting others to look at problems from many different angles	3.94	0.72	High
12	Suggesting new ways of looking at how to complete assignments	3.87	0.85	High
	Intellectual Stimulation	3.91	0.76	High
13	Spending time teaching and coaching	3.79	0.76	High
14	Treating others as individuals rather than just as a member of a group	4.04	0.84	High
15	Considering an individual as having different needs,	3.69	0.79	High

No.	Transformational Leadership Behaviours	Mean	SD	Remark
	abilities, and aspirations from others			
16	Helping others to develop their strengths	3.87	0.87	High
	Individualized Consideration	3.84	0.75	High
	Transformational Leadership Behaviours	4.04	0.69	High

Scoring Direction: 1.00-1.80=Very low, 2.61-3.40=Moderate, 4.21-5.00=Very high
1.81-2.60 =Low, 2.61-3.40=Moderate,

According to the data in Table 1, teachers perceived that the mean value of inspirational motivation behaviours was very high as its mean value was 4.27, while those of other behaviours such as idealized influence, intellectual stimulation, and individualized consideration were rated as high as their mean values were 4.15, 3.91 and 3.84. Overall, teachers indicated that the transformational leadership behaviours of their principals were rated as high (Mean=4.04).

Table 2 Mean Values and Standard Deviations of Principals' Transactional Leadership Behaviours Perceived by Teachers (N=464)

No.	Transactional Leadership Behaviours	Mean	SD	Remark
1	Providing others with assistance in exchange for their efforts	3.40	0.88	Moderate
2	Discussing in specific terms who is responsible for achieving performance targets	3.99	0.75	High
3	Making clear what one can expect to receive when performance goals are achieved	3.33	0.92	Moderate
4	Expressing satisfaction when others meet expectations	4.16	0.83	High
	Contingent Reward	3.71	0.88	High
5	Focusing attention on irregularities, mistakes, exceptions, and deviations from standards	3.65	0.82	High
6	Concentrating full attention on dealing with mistakes, complaints, and failures	3.86	0.93	High
7	Keeping track of all mistakes	4.20	0.79	High
8	Directing attention toward failures to meet standards	3.95	0.87	High
	Active Management-by-Exception	3.91	0.80	High
	Transactional Leadership Behaviours	3.81	0.76	High

Scoring Direction: 1.00-1.80=Very low, 2.61-3.40=Moderate, 4.21-5.00=Very high
1.81-2.60 =Low, 2.61-3.40=Moderate,

As outlined in Table 2, teachers perceived that both contingent reward and active management-by-exception were high as their mean values were 3.71 and 3.91. Overall, teachers rated their principals' transactional leadership behaviours as high because its mean value was 3.81.

Table 3 Mean Values and Standard Deviations of Principals' Passive/Avoidant Leadership Behaviours Perceived by Teachers (N=464)

No.	Passive/Avoidant Leadership Behaviours	Mean	SD	Remark
1	Failing to interfere until problems become serious	2.50	0.77	Low
2	Waiting for things to go wrong before taking action	2.96	0.86	Moderate
3	Being a firm believer in "If it isn't broken, don't fix it."	3.43	0.82	High
4	Demonstrating that problems must become chronic before taking action	2.87	0.91	Moderate
	Passive Management-by-Exception	2.94	0.83	Moderate
5	Avoiding getting involved when important issues arise	2.58	0.94	Low
6	Being absent when needed	2.14	0.87	Low
7	Avoiding making decisions	2.65	0.76	Moderate
8	Delaying responding to urgent questions	2.27	0.83	Low
	Laissez-Faire	2.40	0.86	Low
	Passive/Avoidant Leadership Behaviours	2.67	0.84	Moderate

Scoring Direction: 1.00-1.80=Very low, 2.61-3.40=Moderate, 4.21-5.00=Very high
 1.81-2.60 =Low, 2.61-3.40=Moderate,

As per the data in Table 3, teachers perceived that the mean value of passive management-by-exception was moderate (Mean=2.94) and that of laissez-faire was low (Mean=2.40). Overall, teachers rated their principals' passive/avoidant leadership behaviours as moderate (Mean=2.67).

Table 4 Mean Values and Standard Deviations of Principals' Leadership Behaviours Perceived by Teachers (N=464)

No.	Principals' Leadership Behaviours	Mean	SD	Remark
1	Transformational Leadership Behaviours	4.04	0.69	High
2	Transactional Leadership Behaviours	3.81	0.76	High
3	Passive/Avoidant Leadership Behaviours	2.67	0.84	Moderate

Scoring Direction: 1.00-1.80=Very low, 2.61-3.40=Moderate, 4.21-5.00=Very high
 1.81-2.60 =Low, 2.61-3.40=Moderate,

As indicated in Table 4, the teachers perceived that two kinds of behaviours out of three exhibited by principals, namely transformational and transactional leadership behaviours, were rated as high because their mean values were 4.04 and 3.81, while the remaining one, passive/avoidant leadership behaviours, was rated as moderate because its mean value was 2.67.

Examining the Levels of Teachers' Organizational Citizenship Behaviours in Basic Education Schools in Kyaukphyu Township

Table 5 Mean Values and Standard Deviations of Teachers' Organizational Citizenship Behaviours

No.	Teachers' Organizational Citizenship Behaviours	Mean	SD	Remark
1	Helping colleagues who have heavy workloads	4.24	0.61	Very high
2	Guiding new teachers even though it is not required	4.26	0.62	Very high
3	Helping willingly colleagues who have work related problems	4.29	0.65	Very high
4	Giving a helping hand to those around them	4.19	0.72	High
5	Helping to cover work assignment for colleagues when needed	4.20	0.64	High
6	Helping colleagues who have absent	4.32	0.68	Very high
	Altruism	4.25	0.48	Very high
7	Obeying the school's rules and regulations even when no one is watching	4.42	0.62	Very high
8	Not taking extra breaks	4.22	0.94	Very high
9	Being above the norm of attendance at work	3.78	0.85	High
10	Showing high working conscientiousness even in the state of illness and inability	3.72	0.91	High
11	Believing in giving an honest day's work for an honest day's pay	4.11	0.91	High
12	Being one of the school's most conscientious teachers	4.19	0.77	High
	Conscientiousness	4.07	0.51	High
13	Consuming a lot of time complaining about trivial matters ®	4.42	0.95	Very high
14	Always focusing on what's wrong, rather than the positive side of situation ®	4.22	1.12	Very high
15	Tolerating the inevitable inconveniences and impositions of work without complaining	4.11	0.75	High
16	Adapting themselves to difficulties of the working environment without objection	4.01	0.82	High
17	Not getting angry with the other people who have a different idea	3.44	1.21	High
18	Responding in a good way during stress of work	3.84	0.91	High
	Sportsmanship	4.00	0.55	High
19	Being mindful of how their behaviour affects other people's jobs	4.24	0.65	Very high
20	Not abusing the rights of others	4.57	0.91	Very high
21	Trying to avoid creating problems for colleagues	4.28	0.78	Very high
22	Taking steps to try to prevent problems with other people	4.11	0.68	High
23	Consulting others before taking any actions that would affect them	4.16	0.67	High
24	Trying to prevent tensions and working problems with others	4.28	0.62	Very high
	Courtesy	4.27	0.47	Very high

No.	Teachers' Organizational Citizenship Behaviours	Mean	SD	Remark
25	Attending meetings, that are not mandatory, but considered important	4.24	0.65	Very high
26	Keeping abreast of changes in the school	4.57	0.91	Very high
27	Expressing their opinions freely and frankly in order to contribute to their school	4.28	0.78	Very high
28	Discussing with colleagues the issues concerning the school	4.11	0.68	High
29	Reading and keeping up with school communications such as mails, announcements and so on for the well-being of the school	4.16	0.67	High
30	Taking part in extracurricular and additional activities even if such presence is not necessary	4.28	0.62	Very high
	Civil Virtue	4.18	0.50	High
	Organizational Citizenship Behaviours	4.15	0.39	High

Scoring Direction: 1.00-1.80=Very low, 2.61-3.40=Moderate, 4.21-5.00=Very high
1.81-2.60 =Low, 2.61-3.40=Moderate,

As outlined in Table 5, altruism and courtesy were very high as their mean values were 4.25 and 4.27. Subsequently, conscientiousness, sportsmanship, and civil virtue were high as their mean values were 4.07, 4.00 and 4.18 respectively. In general, their organizational citizenship behaviours were high as its mean value was 4.15.

Finding out the Relationships Between Principals' Leadership Behaviours and Teachers' Organizational Citizenship Behaviours

Table 6 Pearson Correlation Matrix among Principals' Leadership Behaviours and Teachers' Organizational Citizenship Behaviours (N=464)

Variables	Organizational Citizenship Behaviours
Transformational Leadership Behaviours	0.415***
Transactional Leadership Behaviours	0.378***
Passive/Avoidant Leadership Behaviours	-0.021

* $p < 0.05$, *** $p < 0.001$

As shown in Table 6, there were significantly moderate and positive correlations between two dimensions of principals' leadership behaviours (transformational and transactional leadership behaviours) and teachers' organizational citizenship behaviours (OCB) at $r = 0.415$ and $r = 0.378$. Nonetheless, there was a negative and weak correlation between principals' passive/avoidant leadership behaviours and teachers' organizational citizenship behaviours at $r = -0.021$.

Qualitative Findings

Responses to open-ended questions from principals as a qualitative study were described as follow.

Regarding with **idealized influence**, some principals responded that they adhered to impartiality, and to rules and regulations, and they demonstrated respect for followers, and

avoidance of corruption. Some said that they acted in the best interest of the school rather than personal gain.

Regarding with **inspirational motivation**, some principals responded that they planned school activities through collaborative decision-making and discussed the achievements of students. Some said that they motivated teachers to emphasize the importance of duty and the value of pupils.

Regarding with **intellectual stimulation**, some principals responded that they permitted teachers to devise teaching aids in their unique ways rather than following traditional methods. Then, some said that they encourage the use of diverse teaching methods and assessments tailored to changing age groups.

Regarding with **individualized consideration**, some principals responded that they assisted them to the fullest extent by addressing their health and social concerns through attentive listening. Then, some answered that they provided needed support akin to that of a family member.

Regarding with **contingent reward**, most of principals responded that they commended and/or recognized them during school meetings, assemblies, or ceremonies and they acknowledge their contributions in the annual parent-teacher association meeting and monthly meetings.

Regarding with **active management-by-exception**, some principals responded that they endeavored to mitigate significant problems and address minor ones. Some answered that they resolved issues through discussions with the school discipline committee and the parent-teacher association.

Regarding with **passive management-by-exception**, some principals responded that they avoided immediate resolutions and instead address cases after thorough examination and they sought guidance from experienced teachers.

Regarding with **laissez-faire**, most of principals responded that they engaged actively in all responsibilities and duties. Some answered that they refrained from involvement in the daily classroom routines.

The results of interviews from teachers and principals as a qualitative study for teachers' organizational citizenship behaviours were described below.

Concerning with **altruism**, the teachers answered that experienced teachers often provided mentorship and guidance to newer colleagues, sharing their knowledge and helping them navigate challenges in the profession. Some principals answered that a majority of the teachers actively assisted each other in various tasks, such as covering for colleagues during leaves or addressing health-related issues. However, some noted a scarcity of altruistic behaviours among the teachers concerning professional practices.

Concerning with **conscientiousness**, the teachers answered that they actively participated in collaborative efforts with colleagues to achieve common goals and they were punctual, reliable, and dependable in fulfilling professional responsibilities. Some principals perceived that the majority of the teachers were dutiful for their designated tasks. Some noticed a lack of consistent conscientious behaviour among the teachers, prompting him to issue directives for tasks such as school grounds cleaning, as they were not proactively undertaken by the staff.

Concerning with **sportsmanship**, the teachers responded that they handled conflicts in a constructive and respectful manner, focusing on finding solutions rather than assigning blame. Some perceived that while facing misunderstandings, certain teachers engaged in negotiations, while others sought perspectives when conflicts arose. However, some specifically mentioned that some teachers displayed a less positive attitude towards their profession and colleagues.

Concerning with **courtesy**, the teachers answered that they actively listened to understand the perspectives and needs of fellow teachers. They valued and respected the diverse perspectives, backgrounds, and teaching styles of colleagues. The principals noted that teachers also acknowledged and celebrated the achievements and milestones of their colleagues, with some actively avoiding negative gossip or undermining behaviours.

Concerning with **civil virtue**, the teachers answered that they performed school cleaning activities by collaborating with students for the welfare of the school. The principals responded that the teachers were willing to share successful strategies for adapting to changes in the educational landscape.

Conclusion and Discussion

According to the first specific objective, the quantitative findings showed that the mean value of principals' transformational leadership behaviours was high. The most common transformational leadership behaviour of principals was inspirational motivation as its mean value was very high. Then, the mean values of idealized influence, intellectual stimulation and individualized consideration were high. The qualitative findings also suggested that most principals prioritized the school's welfare over personal gain, engaged in collaborative decision-making for school activities, allowed teachers autonomy in creating teaching aids, promoted diverse teaching methods and assessments, and offered familial support. These findings were in line with previous research indicating that leaders tended to display more transformational than transactional leadership behaviours (Druskat, 1994). The key success factors for transformational leadership were identified as intellectual stimulation and inspirational motivation (Tahir, 2015). Hence, it could be inferred that most principals commonly engaged in the practice of transformational leadership behaviours. However, they encountered challenges in implementing intellectual stimulation and individualized consideration, despite demonstrating a higher frequency of idealized influence and inspirational motivation.

According to quantitative findings, the mean value for principals' transactional leadership behaviours was high. The principals performed active management-by-exception more than contingent rewards. The qualitative findings recommended that most principals acknowledged teachers in various settings, offering rewards for accomplishments such as full attendance and subject expertise, and addressed both major and minor issues, adhering to directives from higher authorities. These findings aligned with prior studies indicating that transactional leadership plays a crucial role in ensuring adherence to rules and regulations (Clarke, 2013). As a result, it could be inferred that principals occasionally exhibited transactional leadership behaviours in specific contexts. Although principals actively monitored teachers' mistakes, they had some weakness in contingent reward behaviours.

According to quantitative findings, the mean value for principals' passive/avoidant leadership behaviours was moderate. The principals performed passive management-by-

exception more than laissez-faire. Laissez-faire behaviour was the least common leadership behaviours as compared to others. The qualitative findings suggested that most principals sought guidance from experienced teachers for solving problems, and actively engaged in all relevant responsibilities and duties. These findings aligned with previous research, indicating that passive-avoidant leadership showed a positive correlation with subordinates' insecure attachment to their leader (Molero et al., 2013). Hence, it could be inferred that principals exhibited passive/avoidant leadership behaviours to a lesser extent. However, it was not entirely avoidable, and there were instances when they engaged in such behaviours due to inadequate staffing in their schools.

Based on these findings, it was found that principals commonly practiced transformational leadership behaviours, followed by transactional leadership behaviours, and occasionally exhibited passive/avoidant leadership behaviours. These results were consistent with previous research indicating that transformational leadership took precedence, followed by transactional leadership, and then passive/avoidant leadership (Lokko et al., 2016).

In accordance with the second specific objective, the quantitative results indicated that the mean value of teachers' organizational citizenship behaviours was high. Furthermore, the mean values for altruism and courtesy were very high, while those for conscientiousness, sportsmanship, and civil virtue were high. According to qualitative findings, most teachers responded that they provided mentorship and guidance to newer colleagues, shared teaching materials, resources, and tools with their colleagues, and offered support to colleagues facing challenges or difficulties, whether it's personal or professional. Most principals answered that most teachers actively supported each other in various tasks, but some faced constraints in assuming complete responsibilities due to heavy workloads caused by inadequate staffing. Prior research indicated that teachers engaged in organizational citizenship behaviour within the school to bring about positive changes beyond their job descriptions (Shabbir et al., 2021). Organizational citizenship behaviour involves efforts to assist others in improving their project contributions, sharing time and resources, and collaborating with colleagues (Somech & Oplatka, 2014). Although teachers responded that they showed high altruistic behaviours in both quantitative and qualitative results, the principals suggested that some teachers had a scarcity of altruistic behaviours. Some teachers had less conscientious behaviours.

According to the third specific objective, the quantitative findings expressed that there was a significantly positive and moderate relationship between principals' transformational leadership behaviours and teachers' organizational citizenship behaviours. This finding was in line with the earlier finding by Oğuz (2010), which identified a positive and significant relationship between administrators' transformational leadership and teachers' organizational citizenship behaviours. Transformational leadership was shown to foster organizational citizenship behaviours (Jiao, Richards, & Hackett, 2013). Quantitative findings suggested that most principals performed inspirational motivation such as talking optimistically about the future and talking about most important values and beliefs. Moreover, qualitative findings also indicated that some principals acted in the best interest of the school rather than personal gain, planned school activities through collaborative decision-making, permitted teachers to devise teaching aids in their unique ways and assisted them to the fullest extent by addressing their health and social concerns. On the other hand, most teachers actively engaged in organizational

citizenship behaviours according to the quantitative findings. The qualitative results suggested that some teachers had a scarcity of altruistic behaviours and inconsistent conscientious behaviours by principals' responses although most teachers answered that they engaged in such kinds of behaviours. Therefore, although quantitative findings showed a positive relationship between transformational leadership behaviours and teachers' organizational citizenship behaviors, qualitative results that less organizational citizenship behaviours were found in some teachers.

Next, there was a significantly positive and moderated relationship between principals' transactional leadership behaviours and teachers' organizational citizenship behaviours. This result aligned with earlier studies, indicating that transactional leadership had a notable impact on employees' organizational citizenship behaviours (Suliman & Al Obaidli, 2013). A positive moderate relationship was observed between organizational citizenship behaviour and transactional leadership (Zabihi & Hashemzahi, 2012). The quantitative findings found that most principals performed active management such as keeping track of all mistakes rather than contingent reward. However, the qualitative results suggested that most principals acknowledged teachers' contributions in the monthly meetings. Most teachers actively engaged in organizational citizenship behaviours such as obeying the school's rules and regulations, not abusing the rights of others and keeping abreast of changes in the school. However, in qualitative results, some principals answered that some teachers had less altruistic and conscientious behaviours. Therefore, it could be found that some teachers showed a scarcity of organizational citizenship behaviours although principals who engaged in transactional leadership behaviours played a role in promoting teachers' organizational citizenship behaviours.

Furthermore, there was an insignificantly negative and weak relationship between principals' passive/avoidant leadership behaviours and teachers' organizational citizenship behaviours. This result aligned with the discovery that laissez-faire leadership had a negative correlation with organizational citizenship behaviours (Humphrey, 2012). Passive/avoidant leadership did not contribute statistically to the relationship with organizational citizenship behaviours (Al Obaidli, 2010; Suliman, & Al Obaidli, 2013). The quantitative findings found that most principals moderately performed passive/avoidant leadership behaviours such as being a firm believer in "if it isn't broken, don't fix it." and delaying responding to urgent questions. The qualitative results suggested that most principals engaged actively in all responsibilities and duties, but some refrained from involvement in certain tasks due to inadequate staff. Although most teachers showed high organizational citizenship behaviours according to quantitative findings, the qualitative results suggested that some teachers had low organizational citizenship behaviours such as altruism and conscientiousness. Therefore, it could be found that most teachers performed organizational citizenship behaviours though their principals showed moderate passive/avoidant behaviours, but it might result in some teachers leading to less altruism and conscientiousness.

Therefore, it could be found that although there were positive relationships between principals' transformational and transactional leadership behaviours and teachers' organizational citizenship behaviours and there was a negative relationship between principals' passive/avoidant leadership behaviours and teachers' organizational citizenship behaviours, some absences in

teachers' organizational citizenship behaviours were found in qualitative results. So, other factors were likely to influence on teachers' organizational citizenship behaviours.

Recommendations

The following recommendations were suggested on the analysis of quantitative and qualitative research findings.

Educational authorities should

- provide enough school facilities, enough qualified principals for effective administration and enough qualified teachers for effective teaching.
- implement the recommendations that are needed to be carried out in the educational sectors presented by educational researchers
- design joint training programs with education universities and education degree colleges that target school administrators with the aim of producing transformational and transactional leaders.

All principals should

- reflect their leadership behaviours and need to practice the leadership behaviours which encourage teachers' organizational citizenship behaviours.
- keep on practicing transformational leadership behaviours together with transactional leadership behaviours.
- encourage teachers' creativity and innovation
- consider individual's needs and concerns
- attend workshops and trainings arranged by educational authorities and by other educators for upgrading leadership capacity.
- award and appreciate the teachers who take part in teachers' organizational citizenship behaviour in schools.
- reduce using passive/avoidant leadership behaviours as much as possible.
- not refrain from decision-making or not significantly delay decisions and not neglect responsibilities

All teachers should

- be responsible for duties as a teacher towards students, colleagues, school, and educational departments.
- promote sportsmanship behaviours
- exhibit more altruistic and conscientious behaviours
- actively participate in collaborative activities in schools
- attend workshops and trainings arranged by educational authorities and by other educators for awareness of organizational citizenship behaviours.

Acknowledgements

We would like to offer our respectful gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-rector, Yangon University of Education) and Dr. Nyo Nyo Lwin (Pro-rector, Yangon University of Education) for allowing us to do this study. And we would like to express our honorable gratitude to Dr. Khin Mar Ni (Professor and Head, Department of Educational Theory and Management, Yangon University of Education) for her great support and expert guidance for this study. I would like to express my deep gratitude to my supervisor, Dr. Theingi Aung (Lecturer, Department of Educational Theory and Management, Yangon University of Education) for her kindly

support, deeply patient, precious guidance, and valuable and timely advice to complete this study. Then, we would like to special thanks to all participants of this study.

References

- Al Obaidli, H. (2010). *Leadership and organizational citizenship behaviour in islamic banks: the case of the UAE* (Doctoral dissertation, British University in Dubai).
- Asgari, A., Mezginjad, S., & Taherpour, F. (2020). The role of leadership styles in organizational citizenship behaviour through the mediation of perceived organizational support and job satisfaction. *Innovar*, 30(75), 87-98.
- Avolio, B. J., & Bass, B. M. (2004). *Multifactor leadership questionnaire: manual and sampler set*. Mind Garden, Incorporated.
- Avolio, B. J., Bass, B. M., & Jung, D. I. (1999). Re-examining the components of transformational and transactional leadership using the Multifactor Leadership. *Journal of occupational and organizational psychology*, 72(4), 441-462.
- Balyer, A. (2012). Transformational leadership behaviours of school principals: A qualitative research based on teachers' perceptions. *International Online Journal of Educational Sciences*, 4(3), 581-591.
- Bass, B. M. (1985). Leadership: Good, better, best. *Organizational dynamics*, 13(3), 26-40.
- Bass, B. M. (1998). The Ethics of Transformational Leadership. In J. B. Ciulla (Ed.), *Ethics, the Heart of Leadership* (pp. 169-192). Westport (CN): Praeger.
- Bass, B. M., & Avolio, B. J. (Eds.). (1994). *Improving organizational effectiveness through transformational leadership*. sage.
- Bass, B., & Avolio, B. (1995). *MLQ multifactor leadership questionnaire*. Mind Garden.
- Bass, B. M., & Riggio, R. E. (2006). *Transformational leadership*. Psychology Press.
- Bogler, R., & Somech, A. (2021). *Psychological capital, team resources and organizational citizenship behaviour*. Routledge. <https://doi: 10.1080/00223980.2019.1614515>.
- Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. *Journal of occupational and organizational psychology*, 86(1), 22-49.
- Druskat, V. U. (1994). Gender and leadership style: Transformational and transactional leadership in the Roman Catholic Church. *The leadership quarterly*, 5(2), 99-119.
- Frooman, J., Mendelson, M. B., & Kevin Murphy, J. (2012). Transformational and passive avoidant leadership as determinants of absenteeism. *Leadership & Organization Development Journal*, 33(5), 447-463.
- Fullan, M. (2001). *Leading in a Culture of Change* Jossey-Bass. San Francisco.
- Goess, D. E., & Smith, P. A. (2018). Crossing boundaries: Organizational citizenship behaviour and protecting students from bullying. *The Elementary School Journal*, 119(1), 52-72.
- Gupta, M. V., & Mehta, S. (2019). Transformational Leadership Among Academicians: Model, Measures and Relationship with Other Constructs. *International Journal of 360 Management Review*, 7(1), 856-874.
- Habeeb, S. (2019). A proposed instrument for assessing organizational citizenship behaviour in BFSI companies in India. *Cogent Business & Management*, 6(1), 1-20. <https://doi:10.1080/23311975.2019.1625702>
- Hallinger, P., & Heck, R. H. (1996). Reassessing the principal's role in school effectiveness: A review of empirical research, 1980-1995. *Educational Administration Quarterly*, 32(1), 5-45.
- Hamdi, S. S., Jameel, A. S., Massoudi, A. H., & Ahmad, A. R. (2021). Leadership Style and Organizational Citizenship Behaviour in Secondary Schools. In *3rd International Conference on Administrative & Financial Sciences (ICAFS 2021)*.
- Hoque, K. E., & Raya, Z. T. (2023). Relationship between principals' leadership styles and teachers' behaviour. *Behavioural Sciences*, 13(2), 111.
- Hoy W. K. Miskel C. G. & Tarter C. J. (2013). *Educational administration: theory research and practice* (9th ed.). McGraw-Hill.
- Humphrey, A. (2012). Transformational leadership and organizational citizenship behaviours: The role of organizational identification. *The Psychologist-Manager Journal*, 15(4), 247-268.

- Hyseni Duraku, Z., & Hoxha, L. (2021). *Impact of transformational and transactional attributes of school principal leadership on teachers' motivation for work*. Frontiers Media SA.
- Ihsani, S., Inderawati, R., & Vianty, M. (2020). The Transformational Leadership Behaviours of School Principals of Vocational High School in Palembang. *Tadbir: Jurnal Studi Manajemen Pendidikan*, 4(1), 117.
- Jameel, A. S., & Ahmad, A. R. (2019). The effect of transformational leadership on job satisfaction among academic staff. In *the 34th International Business Information Management Association (IBIMA) Conference* (pp. 13-14).
- Jiao, C., Richards, D. A., & Hackett, R. D. (2013). Organizational citizenship behaviour and role breadth: A meta-analytic and cross-cultural analysis. *Human Resource Management*, 52(5), 697-714.
- Kalkan, Ü., Altınay Aksal, F., Altınay Gazi, Z., Atasoy, R., & Dağlı, G. (2020). The Relationship Between School Administrators' Leadership Styles, School Culture, and Organizational Image. *SAGE Open*, 10(1), 1-15. <https://doi.org/10.1177/2158244020902081>
- Kernodle, T. A. (2007). *Antecedents and consequences of organizational citizenship behaviour: A hierarchical linear modeling study* (Doctoral dissertation, ProQuest Information & Learning).
- Lokko, F. O., Min, D., & Lokko, C. N. M. (2016). Leadership Styles Among Head Teachers as Predicted by Head Teachers and Teachers. *BEST: International Journal of Humanities, Arts, Medicine and Sciences (BEST: IJHAMS)*, 4(6), 29-40.
- MacKenzie, S. B., Podsakoff, P. M., & Fetter, R. (1993). The impact of organizational citizenship behavior on evaluations of salesperson performance. *Journal of Marketing*, 57(1), 70-80. <https://doi.org/10.2307/1252058>
- Moe Moe Aye. (2019). *An Analytical Study on Individual-Level Determinants of Teachers' Organizational Citizenship Behaviour*, Unpublished doctoral dissertation, Yangon: Yangon University of Education.
- Molero, F., Moriano, J. A., & Shaver, P. R. (2013). The influence of leadership style on subordinates' attachment to the leader. *The Spanish journal of psychology*, 16, E62. [Hhttps://doi.org/10.1017/sjp.2013.67](https://doi.org/10.1017/sjp.2013.67)
- Newman, F., & Wehlage, G.G. (1995). *Successful school restructuring*. Alexandria, VA: ASCD.
- Newstrom, J. W., & Davis, K. (2002). *Organizational Behaviour* (11th Edition).
- Nguni, S., Slegers, P., & Denessen, E. (2006). Transformational and transactional leadership effects on teachers' job satisfaction, organizational commitment, and organizational citizenship behaviour in primary schools: The Tanzanian case. *School effectiveness and school improvement*, 17(2), 145-177.
- Northouse, P.G. (2001) *Leadership: Theory and Practice*. Sage Publication, Inc., London.
- Northouse, P.G. (2007) *Leadership: Theory and Practice* (4th Edition). Sage, Thousand Oaks.
- Northouse, P. G. (2015). *Leadership: theory and practice*. Seventh Edition.
- Oğuz, E. (2010). The relationship between the leadership styles of the school administrators and the organizational citizenship behaviours of teachers. *Procedia-Social and Behavioural Sciences*, 9(1), 1188-1193.
- Organ, D. W. (1988). *Organizational citizenship behaviour: The good soldier syndrome*. Lexington books/DC heath and com.
- Organ, D. W. (1990). The subtle significance of job satisfaction. *Clinical laboratory management review*, 4(1), 94-98.
- Organ, D. W. (1997). Organizational citizenship behaviour: It's construct cleanup time. *Human Performance* 10(2), 85-97. <https://doi.org/10.1207/s15327043hup10022>
- Organ, D. W., Podsakoff, P. M., & MacKenzie, S. B. (2006). *Organizational Citizenship Behaviour. Its Nature, Antecedents, and Consequences*. Sage Publication: Thousands Oaks.
- Podsakoff, P. M., & MacKenzie, S. B. (2014). Impact of organizational citizenship behaviour on organizational performance: A review and suggestions for future research. *Organizational Citizenship Behaviour and Contextual Performance*, 133-151.
- Podsakoff, P. M., MacKenzie, S. B., Moorman, R. H., & Fetter, R. (1990). Transformational leader behaviours and their effects on followers' trust in leader, satisfaction, and organizational citizenship behaviours. *The leadership quarterly*, 1(2), 107-142.
- Podsakoff, P. M., MacKenzie, S. B., Paine, J. B., & Bachrach, D. G. (2000). Organizational citizenship behaviours: A critical review of the theoretical and empirical literature and suggestions for future research. *Journal of management*, 26(3), 513-563.

- Randy-Cofie, A. (2018). *Relationships Between Transformational Leadership and Organizational Citizenship Behaviour in Ghanaian Organizations* (Doctoral dissertation, Walden University).
- Shabbir, T., Naz, K., & Trivedi, S. D. (2021). Perceived organizational support and employee performance. *International Journal of Educational Administration, Management, and Leadership*, 35-44.
- Shrestha, M., & Subedi, D. (2020). Organizational Citizenship Behaviour among Teachers of Nepal: Did Locale Contribute it's in School Settings?. *American Journal of Economics and Business Management*, 3(1), 1-23.
- Somech, A., & Oplatka, I. (2014). *Organizational citizenship behaviour in schools: Examining the impact and opportunities within educational systems*. Routledge.
- Sosik, J.J., & Jung, D. (2018). *Full Range Leadership Development: Pathways for People, Profit, and Planet (2nd ed.)*. Routledge. <https://doi.org/10.4324/9781315167206>
- Suliman, A., & Al Obaidli, H. (2013). Leadership and organizational citizenship behaviour (OCB) in the financial service sector: The case of the UAE. *Asia-Pacific Journal of Business Administration*, 5(2), 115-134.
- Tahir, H. (2015). Leadership style and organizational performance: A comparative study between transformational and transactional leadership styles. *IBT Journal of Business Studies (JBS)*, 2(2), 34-60.
- Taseer, N. A., Siddique, A., Sattar, A., & Imran, M. (2020). Exploring Secondary School Teachers'organizational Citizenship Behaviour In Pakistani Context. *PalArch's Journal of Archaeology of Egypt/Egyptology*, 17(12), 1851-1861.
- UNESCO, I. (2021). Supporting teachers in back-to-school efforts. Guidance for policy-makers. International task force on teachers for education 2030.
- Yuwono, H., Eliyana, A., Buchdadi, A. D., Hamidah, & Jalil, N. I. A. (2023). Triple mediation of attitude to bridge transformational leadership on organizational citizenship behaviour. *PloS One*, 18(2), e0281220. <https://doi:10.1371/journal.pone.0281220>
- Zabihi, M., & Hashemzehi, R. (2012). The relationship between leadership styles and organizational citizenship behaviour. *African Journal of Business Management*, 6(9), 3310-3319.

EXAMINING THE FACTORS AFFECTING STUDENT TEACHERS' ATTITUDES TOWARD LEARNING PHYSICAL EDUCATION

Aye San¹, Khin Myat Noe Oo²

Abstract

The purpose of the study was to examine the factors affecting student teachers' attitudes toward learning physical education. A mixed research method was applied. 184 student teachers from eight Education Degree Colleges participated in the quantitative study. In the qualitative study, twenty-four student teachers and four physical education teachers from three Education Degree Colleges participated. Interview questions were developed based on the results of the quantitative study. Descriptive statistics, independent samples *t* test, one-way ANOVA, and multiple comparison analyses were used to analyze the data. The quantitative results indicated that student teachers' personal factors and teacher-related factors highly affected and school-related factors moderately affected student teachers' attitudes toward learning physical education. Volleyball players' perceptions of school-related factors were higher than football players ($t = -2.30, p < .05$). Significant differences were found in student teachers' perceptions of school-related factors ($p < .001$), and teacher-related factors ($p < .001$) in terms of their education degree colleges. In qualitative results, there were inadequate qualified and experienced physical education teachers, facilities, and sports equipment. The results of the study recommended that sufficient skilled and experienced physical education teachers, facilities, and sports equipment improve student teachers' attitudes toward learning physical education.

Keywords: attitudes, factors, physical education.

Introduction

Physical education is an educational process through the assistance of learning experiences for learners in the form of physical activities, games, and sports that are consistently prepared to encourage the improvement of physical, organic, motor skills, thinking skills, emotional, social, and moral (Yoda et al., 2021). Attitudes toward physical education are crucial variables that play a major part in learning (Sedai, 2012).

Besides, the student teachers' attitudes can be affected by many factors such as family, teachers, schools, and community (Yimer, 2014). Moreover, the physical facilities and sports equipment of the school have a variety of effects on teachers, students, and the teaching-learning process of physical education subject. Then, time has a diverse effect on the extent of participation by student teachers in the type of activities that can be offered and the student teachers' outcomes that can be experienced (Mossisa, 2021). Therefore, factors affecting student teachers' attitudes toward learning physical education were needed to examine in the learning physical education.

Significance of the Study

In recent years, the educational process has been reformed to create a better image and to achieve more effective education at the Department of Teacher Education in Myanmar. Physical education subject is included as a compulsory subject in the two-year course (Diploma in Teacher Education) as well as a core curriculum in the four-year teacher education of Education Degree College. Student teachers have to study academic standards equivalent to primary and secondary school levels to ensure a strong subject proficiency foundation for being effective teachers of the basic education sector.

According to the new curriculum of physical education, student teachers require the knowledge and skills of physical education subject thoroughly and they also need to develop positive attitudes toward learning physical education. In this way, they can teach physical education subject by modeling the values and attitudes. Student teachers desire to understand the concept, theory, and practice of physical education and how to apply them in the teaching and learning process and real-life situations.

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Currently, there are a large number of student teachers from the first year to the fourth year in Education Degree Colleges and inadequate physical education teachers for some Education Degree Colleges. Some physical education teachers who teach physical education do not match the subject they are assigned. So, they cannot apply new techniques and strategies for theory and practice. Moreover, some physical education teachers are facing such difficulties as shortage of time, insufficient facilities and equipment, large class sizes, and heavy teaching loads in achieving physical education objectives.

Due to determinant factors that might contribute to student teachers' attitudes toward learning physical education, the research is going to examine the factors affecting student teachers' attitudes toward learning physical education at Education Degree Colleges.

Research Objectives

The general objective of the study is to examine the factors affecting student teachers' attitudes toward learning physical education.

Specific Objectives

- To find out the major factors that affect student teachers' attitudes toward learning physical education,
- To examine the variation of factors affecting student teachers' attitudes toward learning physical education according to their participation in sports,
- To analyze the variation of factors affecting student teachers' attitudes toward learning physical education in terms of their Education Degree Colleges.

Research Questions

- (1) What are the major factors that affect student teachers' attitudes toward learning physical education?
- (2) Are there any variations of the factors affecting attitudes toward learning physical education according to their participation in sports?
- (3) Are there any variations of the factors affecting attitudes toward learning physical education in terms of their Education Degree Colleges?

Conceptual Framework of the Study

Student teachers' attitudes toward learning physical education may be affected by many factors (Yimer, 2014). In this study, Bayu (2019) "factors affecting students' toward learning physical education were used to examine the factors affecting student teachers' attitudes toward learning physical education. Student teachers' personal factors, school-related factors, and teacher-related factors were measured in student teachers' attitudes toward learning physical education in Education Degree Colleges.

The conceptual framework or theory of action guiding this study is summarized in Figure 1. With the help of this conceptual framework, the researcher attempted to answer the research questions. To achieve this, the researcher collected empirical evidence from selected eight Education Degree Colleges in Upper Myanmar, and then, analyzed the quantitative and qualitative data.

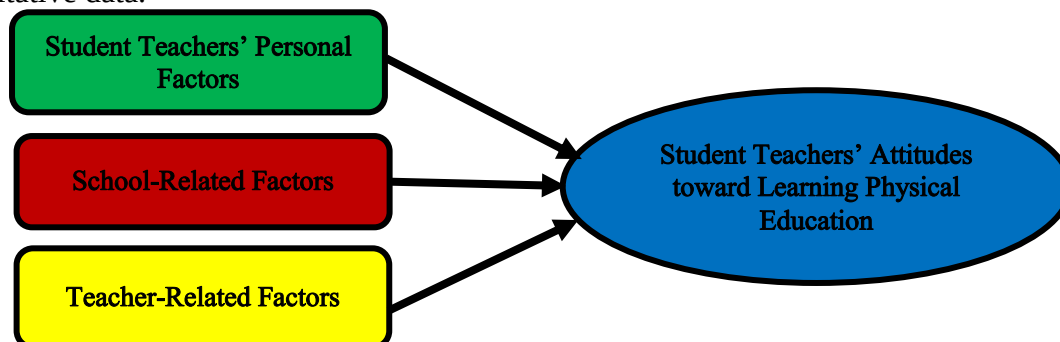


Figure 1. Conceptual Framework for Examining the Factors Affecting Student Teachers' Attitudes toward Learning Physical Education at Selected Education Degree Colleges

Definition of Key Terms

Attitudes: Attitudes are someone's positive or negative evaluation of, or feelings toward something (Eagly & Chaiken, 1995, as cited in Bayu, 2019).

Factor: A factor is one of the elements that contribute to a particular result or situation (Mossisa, 2021).

Physical Education: Physical education is an educational process that uses physical activity as a means to help individuals acquire skills, fitness, knowledge, and attitudes that contribute to their optimal development and well-being (Walton-Fisette & Wuest, 2018).

Operational Definition

Factors Affecting Student Teachers' Attitudes towards Learning Physical Education

Student teachers' attitudes toward learning physical education may be affected by many factors. In this study, factors affecting student teachers' attitudes toward learning will be measured through three factors: student teachers' personal factors, school-related factors, and teacher-related factors.

Review of Related Literature

There are many factors affecting students' attitudes toward learning physical education. In this study, student teachers' personal factors, school-related factors, and teacher-related factors are applied to explore student teachers' attitudes toward learning physical education at Education Degree Colleges.

Student Teachers' Personal Factors

Various factors can have an impact on student teachers' attitudes such as playgrounds, open spaces, recess, and standardized physical education curricula as a function of a curriculum that consists of repetitive activities or a lack of challenge leading to a boring physical education experience and teacher behavior (Subramaniam & Silverman 2007, as cited in Marttinen, 2018).

School-Related Factors

School is a whole learning environment formed by physical, psychological, and social elements (MOE, 2019). Various variables of the school hinder the successful taking of its activities and as result problems with the student teachers' attitudes toward physical education. The following school-related problems influence student teachers' attitudes toward physical education in the school (Bayu, 2019).

- (1) **The School Sites.** The school site should have proper drainage and surfacing to avoid mud and dust, removal of stumps and rocks, facing to prevent student teachers from running into the street, ensure the safety of student teachers by arranging and supervising the use of the playground, provision for frequent checking of apparatus for safety. The best use of available facilities by the school staff is most important (Bayu, 2019).
- (2) **The Factors of Facilities and Equipment.** The physical facilities of the school have a variety of effects on teachers, students, and the teaching and learning process of physical education subject. They include; administration attitude, gymnasium and textbook, classroom, guidance, examination, time allotments, and school grounds (Duressa, 2017).

Teacher-Related Factors

Teachers are the most important professionals in any nation's future. The teachers play a crucial role in determining the success or failure of curriculum implementation and teaching effectiveness. Thus, the teachers with their attitudes, skills, and experiences are the most important of all in determining the success or failure of the process of curriculum implementation (Posner, 1992).

- (1) **Teacher Attitudes.** Teacher attitudes are very important dimensions in the teaching process. Successful innovation depends substantially on the teacher's attitudes toward proposed curriculum alterations. Student teachers with teachers of positive attitudes

toward teaching and the curriculum are found to have high-level achieves in learning (Waritu, 2021).

- (2) **Teacher Skills.** One of the skills required by teachers to resolve challenges effectively to promote an effective teaching-learning environment of physical education is their pedagogical belief. Physical education teachers must be full of their professional obligations. Another important skill required by teachers is the skill of lesson planning and presentation which means the ability to transfer knowledge effectively to the learner good questioners, and demonstrators, and good skills full of classroom management (Bayu, 2019).
- (3) **Teacher Experiences.** Experienced teachers support greater student learning for their colleagues and their school as well as for their students. As teachers gain experience, their students not only learn more, as measured by standardized tests they are also more likely to do better on other measures of success (Simonton et al., 2022).

Methods

Research Method

Both quantitative and qualitative research methods were employed.

Population and Sample

184 student teachers (eighty-eight football selection players, forty-eight male volleyball selection players, and forty-eight female volleyball selection players) at selected eight Education Degree Colleges participated in Upper Myanmar by using simple random sampling. In qualitative study, twenty-four student teachers and four physical education teachers at selected three Education Degree Colleges participated.

Research Instruments

Bayu's (2019) "Factors Affecting Students' Attitudes toward Learning Physical Education" was used to examine the factors affecting student teachers' attitudes toward learning physical education. The questionnaire consisted of 12 items related to factors affecting student teacher attitudes toward learning physical education: 5 items for student teachers' personal factors, 4 items for school-related factors, and 3 items for teacher-related factors were involved. A five-point Likert scale was used for the student teachers' responses such as 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree. For the qualitative analysis, seven interview questions for student teachers and five interview questions for physical education teachers were employed to record information concerning specific outcomes.

Procedures

Questionnaires were distributed to 184 student teachers in eight selected Education Degree Colleges in Upper Myanmar on 17th November 2023 and collected after lasting two weeks. Interviews were conducted with twenty-four student teachers and four physical education teachers in three selected Education Degree Colleges in Upper Myanmar on 1st February 2024.

Data Analysis

The data obtained from student teachers' questionnaires were analyzed using frequency, percentages, mean values, and standard deviations. Regarding these items, a five-point Likert scale, from strongly disagree (1) to strongly agree (5) was employed, meaning, the range, means from 1.00 - 2.49 was taken as low level, 2.50 - 3.49 was taken as moderate level and 3.50 - 5.00 was considered as high level of participation. In addition, descriptive statistics, independent samples *t* test, one-way ANOVA, and post hoc multiple comparison tests (Games-Howell) were applied. Data collected from the qualitative analysis were categorized and analyzed to complete quantitative findings on factors affecting student teachers' attitudes toward learning physical education.

Findings

Quantitative Findings

Quantitative data analyses were presented through the interpretation of the results.

(1) Exploring the major Factors Affecting Student Teachers' Attitudes toward Learning Physical Education

Table 1. Frequency, Percentages, Mean Values, and Standard Deviations of Student Teachers' Perceptions of their Personal Factors Affecting toward Learning Physical Education (N = 184)

Items	Number of Student Teachers (%)					Mean	SD	Remark
	1	2	3	4	5			
I believe that physical education subject provides learning opportunities.	-	4 (2.2%)	29 (15.8%)	139 (75.5%)	12 (6.5%)	3.86	.54	high
I like physical education because it helps develop personal discipline.	-	1 (.5%)	5 (2.7%)	132 (71.8%)	46 (25.0%)	4.12	.51	high
I am getting appropriate advice and support from my teacher and colleagues regarding learning physical education.	-	5 (2.7%)	19 (10.3%)	142 (77.2%)	18 (9.8%)	3.94	.56	high
I have a good relationship with my physical education teacher.	-	1 (.5%)	6 (3.3%)	130 (70.3%)	47 (25.5%)	4.21	.52	high
I am satisfied with learning physical education class because it is given as a national exam.	4 (2.2%)	14 (7.6%)	22 (12.0%)	114 (61.9%)	30 (16.3%)	3.83	.87	high
Student Teachers' Personal Factors	1 (.5%)	5 (2.7%)	16 (8.8%)	131 (71.4%)	31 (16.6%)	4.01	.39	high

Note: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

Scoring direction: 1.00 -2.50 = low level, 2.50 -3.49 = moderate level, 3.50 -5.00 = high level

Table 1, the frequency and percentages of student teachers' personal factors affecting attitudes toward learning physical education are 31 (16.6%) *strongly agree*, 131 (71.4%) *agree*, 16 (8.8%) *undecided*, 5 (2.7%) *disagree* and 1 (.5%) *strongly disagree*. Most of the student teachers *agree* that their personal factors affecting attitude towards learning physical education. Student teachers' personal factors were *high level* because the mean value was 4.01. Therefore, student teachers' personal factors *highly affected* their attitudes toward learning physical education.

Table 2. Frequency, Percentages, Mean Values, and Standard Deviations of Student Teachers' Perceptions of School-Related Factors Affecting Their Attitudes toward Learning Physical Education (N = 184)

Items	Number of Student Teachers (%)					Mean	SD	Remark
	1	2	3	4	5			
A suitable practical field is available in our Education Degree College.	15 (8.2%)	36 (19.5%)	6 (3.3%)	98 (53.3%)	29 (15.7%)	3.47	1.21	moderate
There are enough facilities and equipment for learning physical education in my Education Degree College.	30 (16.3%)	93 (50.5%)	16 (8.7%)	38 (20.7%)	7 (3.8%)	2.45	1.11	low

Items	Number of Student Teachers (%)					Mean	SD	Remark
	1	2	3	4	5			
Physical education makes important contributions to mental health.	-	2 (1.1%)	5 (2.7%)	121 (65.8%)	56 (30.4%)	4.26	.56	high
The length of time allotment per week for physical education is enough.	16 (8.7%)	85 (46.3%)	49 (26.6%)	33 (17.9%)	1 (.5%)	2.55	.90	moderate
School-Related Factors	15 (8.2%)	54 (29.3%)	19 (10.3%)	73 (39.6%)	23 (12.6%)	3.19	.55	moderate

Note: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

Scoring direction: 1.00 -2.50 = low level, 2.50 -3.49 = moderate level, 3.50 -5.00 = high level

Table 2, the frequency and percentages of school-related factors affecting attitudes toward learning physical education are 23 (12.6%) *strongly agree*, 73 (39.6%) *agree*, 19 (10.3%) *undecided*, 54 (29.3%) *disagree* and 15 (8.2%) *strongly disagree*. Most of the student teachers *agree* that school-related factors affect their attitudes toward learning physical education. The mean value for school-related factors affecting attitudes toward learning physical education was 3.19. Therefore, school-related factors *moderately affected* student teachers' attitudes toward learning physical education.

Table 3. Frequency, Percentages, Mean Values, and Standard Deviations of Student Teachers' Perceptions of Teacher-Related Factors Affecting Their Attitudes toward Learning Physical Education (N = 184)

Items	Number of Student Teachers (%)					Mean	SD	Remark
	1	2	3	4	5			
My physical education teacher manages the class properly.	2 (1.1%)	27 (14.7%)	25 (13.5%)	112 (60.9%)	18 (9.8%)	3.84	.89	high
My physical education teacher encourages me to learn physical education.	-	19 (10.3%)	10 (5.4%)	114 (62.0%)	41 (22.3%)	3.96	.83	high
Physical education teachers teach us various sports and games.	1 (.5%)	18 (9.8%)	9 (4.9%)	125 (67.9%)	31 (16.9%)	3.91	.81	high
Teacher-Related Factors	1 (.5%)	21 (11.5%)	15 (8.2%)	117 (63.5%)	30 (16.3%)	3.84	.70	high

Note: 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree

Scoring direction: 1.00 -2.50 = low level, 2.50 -3.49 = moderate level, 3.50 -5.00 = high level

Table 3, frequency and percentages of teacher-related factors affecting attitudes toward learning physical education are 30(16.3%) *strongly agree*, 117 (63.5%) *agree*, 15 (8.2%) *undecided*, 21 (11.5%) *disagree* and 1 (.5%) *strongly disagree*. Most of the student teachers *agree* that teacher-related factors affect their attitudes toward learning physical education. The mean value for teacher-related factors affecting student teachers' attitudes toward learning physical education was 3.84. Therefore, teacher-related factors *highly affected* student teachers' attitudes toward learning physical education.

(2) Examining the Variations of the Factors Affecting Student Teachers' Attitudes toward Learning Physical Education according to their Participation in Sports

Table 4. Mean Values and Independent Samples *t* Test Results Showing the Factors Affecting Student Teachers' Attitudes toward Learning Physical Education according to their Participation in Sports (N = 184)

Variables	Sports	N	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Student Teachers' Personal Factors	football	88	3.97	.36	-1.60	182	.112
	volleyball	96	4.05	.33			
School-Related Factors	football	88	3.09	.53	-2.30	182	.022*
	volleyball	96	3.28	.56			
Teacher-Related Factors	football	88	3.80	.70	-.67	182	.507
	volleyball	96	3.87	.70			

Note. * $p < .05$

Table 4, there was no significant difference in student teachers' personal factors and teacher-related factors affecting attitudes toward learning physical education in terms of their participation in sports. However, there was a significant difference in school-related factors according to their participation in sports ($t = -2.30$, $p < .05$). The mean value for the perception of volleyball players was 3.28 and the mean value for the perception of football players was 3.09. Therefore, it can be noted that volleyball players were higher than football players in school-related factors affecting attitudes toward learning physical education.

(3) Analyzing the Factors Affecting Student Teacher's Attitudes toward Learning Physical Education in terms of their Education Degree Colleges

To analyze the factors affecting student teachers' attitudes toward learning physical education in terms of their Education Degree Colleges, descriptive statistics and one-way ANOVA were conducted. The mean values and standard deviations of student teachers' personal factors, school-related factors, and teacher-related factors are shown in Table 5.

Table 5. Mean Values and Standard Deviations of Factors Affecting Student Teachers' Attitudes toward Learning Physical Education in terms of their Education Degree Colleges (N= 184)

Education Degree Colleges	Student Teachers' Personal Factors		School-Related Factors		Teacher-Related Factors	
	Mean	SD	Mean	SD	Mean	SD
EDC 1	3.97	.30	3.34	.45	4.14	.39
EDC 2	4.08	.37	3.51	.58	3.70	.72
EDC 3	3.87	.36	2.84	.57	3.84	.70
EDC 4	3.99	.43	3.10	.31	3.77	.62
EDC 5	4.03	.34	3.21	.53	4.26	.50
EDC 6	4.15	.30	3.30	.53	4.13	.39
EDC 7	4.03	.33	2.90	.58	3.12	.87
EDC 8	3.97	.32	3.30	.54	3.72	.63
Total	4.01	.35	3.19	.55	3.84	.70

Scoring direction: 1.00-2.50 = low level, 2.50 -3.49 = moderate level, 3.50 -5.00 = high level

Table 5, the mean value for student teachers' personal factors was 4.01. It had *high level* of student teachers' attitudes toward learning physical education and the mean value for school-related factors was 3.19. It had *moderate level* of attitudes toward learning physical education and the mean value for teacher-related factors was 3.84. It had *high level* of student teachers' attitudes toward learning physical education at Education Degree Colleges.

To ensure the differences in the factors affecting student teachers' attitudes toward learning in terms of their education Degree Colleges, one-way ANOVA was conducted. The results are shown in Table 6.

Table 6. ANOVA Results for Factors Affecting Student Teachers' Attitudes toward Learning Physical Education in terms of their Education Degree Colleges (N = 184)

Variables		Sum of Squares	df	Mean Square	F	p
Student Teachers' Personal Factors	Between Groups	1.126	7	.161	1.342	.233
	Within Groups	21.092	176	.120		
	Total	22.218	183			
School-Related Factors	Between Groups	8.439	7	1.206	4.506	.000***
	Within Groups	47.092	176	.268		
	Total	55.531	183			
Teacher-Related Factors	Between Groups	21.111	7	3.016	7.755	.000 ***
	Within Groups	68.444	176	.389		
	Total	89.555	183			

Note. *** $p < .001$

According to the results of Table 6, there was a significant difference in two related factors affecting student teachers' attitudes toward learning physical education such as school-related factors ($p < .001$), and teacher-related factors ($p < .001$).

Moreover, to find out which of the Education Degree Colleges had the greatest differences in factors affecting student teachers' attitudes toward learning physical education in Education Degree College, Post Hoc Multiple Comparison Tests (Games-Howell) were conducted among the sample Education Degree Colleges.

Table 7. The Results of Multiple Comparisons for Factors Affecting Student Teachers' Attitudes toward Learning Physical Education in terms of their Education Degree Colleges (N = 184)

Variables	(I) EDC	(J) EDC	Mean Differences (I-J)	p
School-Related Factors	EDC 1	EDC 3	.500	.037*
	EDC 2	EDC 3	.674	.006**
		EDC 7	.609	.019*
Teacher-Related Factors	EDC 1	EDC 7	1.029	.000***
	EDC 5	EDC 7	1.145	.000***
	EDC 6	EDC 7	1.014	.000***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7, there were statistically significant differences in school-related factors and teacher-related factors. For school-related factors affecting student teachers' attitudes toward learning physical education in Education Degree College, EDC 1 was higher than those rated by student teachers in EDC 3 ($p < .05$), and EDC 2 was higher than those rated by student teachers in EDC 3 ($p < .01$) and EDC 7 ($p < .05$). Then, for teacher-related factors affecting student teachers' attitudes toward learning physical education in Education Degree Colleges, EDC 1, EDC 5, and EDC 6 were higher than those rated by student teachers in EDC 7 ($p < .001$).

Qualitative Findings

Interview Responses

Based on the questionnaire survey instrument, interview forms were developed with seven items for student teachers to investigate student teachers' attitudes toward learning physical education and three related factors that affect student teachers' attitudes toward learning physical education. Twenty-four student teachers from three selected Education Degree Colleges in Upper Myanmar participated in this interview.

The Education Degree Colleges were selected according to the results of factors affecting the level of the student teachers. Eight student teachers (four football players and four volleyball players) were selected from one Education Degree College with the highest mean values of related three factors among selected Education Degree Colleges, and those student teachers were labeled as Group A. The other sixteen student teachers (eight football players and eight volleyball players) were also selected from two Education Degree Colleges with the lowest mean values of school-related factors but the high mean values in the other two factors among selected Education Degree Colleges, and they were labeled as Group B.

Interview Responses of Student Teachers

In the first question, student teachers were asked to describe how their perceptions on attitudes toward learning physical education. The responses of student teachers were as follows:

- All Group A student teachers (n = 8) expressed that they were satisfied with learning physical education because physical education helped them to develop physically fit, healthily, happily, mentally, emotionally, socially, and morally.
- All Group B student teachers (n = 16) responded that they were interested in learning physical education because physical education activities made them happy, healthy, refreshed, united, and systematic student teachers.

For the second question, student teachers were asked whether importance of the learning physical education compared with other academic subjects. The responses of student teachers were as follows:

- All Group A student teachers (n = 8) reported that physical education was recognized as one of the most important subjects in Education Degree Colleges because physical education played a significant role in the all-round development of the student teachers and it made possible to develop leadership quality, discipline, and decision-making ability in the individual.
- All Group B student teachers (n = 16) responded that physical education was the most important part of general education in today's educational system because it gave them improved healthy attitudes and team spirit, teamwork, cooperation, patience, honesty, and respect by participating in sports and games.

For the third question, student teachers were asked to describe how the teaching-learning process took place in the practical classes. The responses of student teachers were as follows:

- All Group A and Group B student teachers (n = 24) expressed that they were enjoyable and more interested in learning physical education through both theories and practices in practical sessions. Their teachers explained some lessons step by step by using new teaching methods, techniques, or strategies. If their teachers gave discussion and group work lessons, they hoped that communication skills and mutual respect would be improved. Their teachers practiced repetitive activities to be more effective and systematic in sports and games lessons.

In the fourth question, student teachers were asked to express the benefits obtained by learning physical education. The responses of student teachers were as follows:

- All Group A student teachers (n = 8) replied that learning physical education led to physical well-being, adhered strictly to the rules of sports and games, and made good communication skills, team spirit and unity, and friendliness by playing games and doing aerobic exercises and physical fitness dances. Therefore, they said that they practiced when they had an opportunity to practice.
- All Group B student teachers (n = 16) expressed that learning physical education not only strengthened their physical well-being but also made them feel good about themselves and it also contributed to improving health knowledge, mutual respect, and developed intelligence.

In the fifth question, student teachers were asked about the influence of facilities and equipment in physical education. The responses of student teachers were as follows:

- All Group A student teachers (n = 8) reported that there were insufficient facilities and equipment in physical education at their education degree colleges. There were some problems among student teachers in practical classes and also delayed in their training such as competitive games and cooperative games.
- All Group B student teachers (n = 16) responded that there were inadequate facilities and equipment for physical education. Because of inadequate facilities and equipment for physical education, student teachers shared the materials they had. Therefore, it could not be convenient in systematic sports techniques and strategies because of a waste of time and little exposure to using equipment. Additionally, the number of students was large and the provided equipment was not small.

For the sixth question, student teachers were asked whether time allotment of physical activity or practical class was adequate or not in Education Degree Colleges. The responses of student teachers were as follows:

- All Group A and Group B student teachers (n = 24) responded that there was not enough time for physical education because it was only once a week for both theories and practice. Student teachers were not trained well in both theories and practice such as competitive and cooperative games.

In the seventh question, student teachers were asked about the influence of the teacher-student ratio in practical physical education classes. The responses of student teachers are as follows:

- All Group A and B student teachers (n = 24) responded that there were insufficient physical education teachers, large class size, and large population of student teachers at Education Degree College. Requirement of physical education teachers couldn't make innovative and creative activities in the teaching-learning process. Large class sizes not only made it difficult for learners to concentrate but also limited by the amount of time. Physical education teachers were not even able to move freely to monitor the student teachers' work such as collective physical fitness exercise programs and physical fitness dances. Moreover, there could be time-consuming and delay in accomplishing the target lesson.

Interview Responses of Physical Education Teachers

Based on the questionnaire survey instrument, interview forms were developed with five items for physical education teachers to investigate student teachers' attitudes toward learning physical education and three related factors that affect student teachers' attitudes toward learning physical education.

In the first question, physical education teachers were asked to describe how their perceptions on attitudes toward learning physical education.

- All physical education teachers had optimum attitudes to physical education subjects.

The second question, physical education teachers was asked about difficulties in the teaching-learning process in the practical classes.

- All physical education teachers had a bit of difficulty in the teaching-learning process because there was shortage of facilities and equipment and requirement of physical teachers in their Education Degree Colleges.

In the third question, physical education teachers were asked to describe how principal support of teaching aids, facilities, and sports equipment for practical sessions.

- The principal was weak at support such as teaching materials, facilities, and sports equipment in teaching the learning process of physical education.

In the fourth question, physical education teachers were asked to describe how perceptions of student teachers were interested in learning physical education practical sessions.

- All student teachers were more interested in playing football game than volleyball. They were also interested in doing aerobic exercises, collective physical fitness exercise programs, and fitness dances.

In the fifth question, physical education teachers were asked to describe how the principal's attitudes toward physical education.

- The principal had positive attitude toward physical education.

Results and Discussion

Research question one was to explore the major factors affecting student teachers' attitudes toward learning physical education. In quantitative results, student teachers' personal factors were a major factor and *highly affected* student teachers' attitudes toward learning physical education. In the qualitative results, student teachers expressed that they were very happy and active in the practical classes. They participated in the individual and group sport events. They also played sports activities in their free time.

In quantitative results, teacher-related factors appeared as a second major factor and had *highly affected* student teachers' attitudes toward learning physical education at Education Degree Colleges. In the qualitative results, all student teachers said that they needed a great number of physical education teachers. Moreover, they had a bit of difficulty in the teaching-learning process both theoretical and practical sessions.

According to quantitative results concerning the school-related factors, it was seen as the third major factor that it *moderately affected* the student teachers' attitudes toward learning physical education. In the qualitative results, there was a shortage of facilities and equipment in their education degree colleges. They also described that the principals had less support the teaching materials, facilities, and sports equipment in the teaching-learning process of physical education.

Research question two was to examine the variations of factors affecting student teachers' attitudes toward learning physical education according to their participation in sports. In quantitative results, volleyball players' perceptions of school-related factors were higher than football players. In qualitative results, most Education Degree Colleges had no comfortable volleyball court as it was sandy, and dusty, and its floor was made of cement volleyball court. Additionally, there was insufficient volleyball equipment

Research question three was to analyze the variations of factors affecting student teachers' attitudes toward learning physical education in terms of their Education Degree Colleges. In quantitative results, there were significant differences in school-related factors and teacher-related factors affecting student teachers' attitudes toward learning physical education according to their Education Degree Colleges.

In the qualitative results, student teachers' interview results for teacher-related factors, one of the Education Degree Colleges said that they had qualified and experienced physical education teachers who could handle their practical classes. Their teachers gave instructions step by step and shared systematically about competition and cooperation games but there were not enough physical education teachers. The other Education Degree College which had the lowest mean value had less experience and no specialist physical education teacher who had a bit of difficulty in teaching not only theoretical classes but also morning physical training classes and spent more time in practical sessions.

In the 21st century knowledge-driven economies, rapid information exchange, and fast-moving communication technologies have created new demands on education systems. To meet the demands of today's world, education must focus on nurturing the whole student teachers morally intellectually, physically, socially, and aesthetically. Although the student teachers from education degree colleges had positive attitudes toward learning physical education, they were weak in practices of physical education because of insufficient facilities and equipment, a shortage of time allotment per week, and the required physical education teachers.

Therefore, the educational policy-makers, principals and physical education teachers should provide to improve student teacher's positive attitudes toward learning physical education. They should contribute to developing teacher-related factors such as qualified and experienced physical education teachers or specialized sports teachers, and school-related factors such as enough length of time allotment per week for teaching in physical education, comfortable football field, indoor volleyball court, track and field, sports hall, sufficient sports equipment and enough material in the teaching-learning process in theories and practices. Thus, this study highlights that student teachers not only improve positive attitudes toward physical education but also implement physical education programs effectively as all-round development student teachers themselves. And then they will be good teachers in the future.

Acknowledgements

I would like to offer my respectful gratitude to Daw Moe Moe Kyi (Principal of Mandalay Education Degree College), Dr. Tin May Htwe (Vice-Principal of Mandalay Education Degree College), Dr. Zin Nwe Than (Professor and Head of Department, Department of Educational Theory and Management, Sagaing University of Education), Dr. Khin Myat Noe Oo (Lecturer, Department of Educational Theory and Management, Sagaing University of Education), Dr. Si Si San (Associate Professor and Head of Department, Department of Physical Education and School Health, Sagaing University of Education).

References

- Bayu, F. (2019). *Factors affecting students' attitude towards learning physical education: In the case of Tulu Chukala Secondary School, Adulala Town, East Shewa Zone, Oromia Regional State* [Unpublished master's thesis]. Haramaya University. <http://ir.haramaya.edu.et/hru/bitstream/handle/123456789/1666/Feyissa%20Bayu.pdf>
- Duressa, F. S. (2017). *Factors affecting physical education teaching and learning process, concerning the selected high school of Shashamene Town, Ethiopia* [Unpublished master's thesis]. Jimma University. <http://10.140.5162//handle/123456789/3294>
- Marttinen, R. (2018) Changes in student attitude toward physical education across a unit of instruction. *Journal of Physical Education and Sport (IPES)*, 18(1), Art 8, pp. 62-70. DOI:10.7752 /jpeg.2018 .01008
- Ministry of Education, (2019). *Year 1 Semester 1 Teacher Educators Training Manual*. Naypyidaw. The Government of the Republic of the Union of Myanmar.
- Mossisa, A. A. (2021). Factors that affect students' attitude towards learning health and physical education theoretical class in Mandura Woreda Gilgel Beles Primary School Grade (8), Section 'B' Students. *Global scientific journal*,9(5). [https:// www.globalscientificjournal.com](https://www.globalscientificjournal.com).
- Posner, C. J. (1992). *Analyzing the curriculum*. New York: McGraw Hill Inc.
- Sedai, S. P. (2012). *The attitude of physical education college students and their parents towards physical education as a profession* [Unpublished doctoral dissertation]. Techno Global University Shillong. <http://archive.nnl.gov.np:8080/bitstream/123456789/6211/>
- Simonton, K., Laune, T., Brown, B., & Loupe, K. (2022). Physical education teacher experiences through the lens of a pandemic: putting a spotlight on teacher beliefs, practices, emotional fragility, and well-being. *Journal of teaching in physical education, (Ahead of Print)*. <https://doi.org/10.1123/jtpe.2021-2026>
- Walton-Fisette, J. L., & Wuest, D. A. (2018). *Foundations of physical education, exercise science, and sport* (19th ed). New York: McGraw-Hill.
- Waritu, H. E. (2021). *Practice and challenge of physical education teachers in the teaching-learning process: The case of some selected Kofale Woreda Secondary School, West Arsi Zone, Oromia Regional State, Ethiopia* [Unpublished master's thesis]. Haramaya University. <http://ir.haramaya.edu.et/her/handle/123456789/4651>
- Yimer, E. (2014). *The attitude of students toward learning physical education in some selected secondary schools of Addis Ababa* [Unpublished master's thesis]. Addis Ababa University. <http://213.55.95.56/handle/123456789/1582>
- Yoda, K., Wibowo, A., Rusiawati, H. D., & Kusuma, A. (2021). Analysis of needs for the development of physical education learning model in elementary school based on traditional game. *Advances in Social Science, Education, and Humanities Research*,1 (613).

AN INVESTIGATION INTO PARTICIPATION IN PHYSICAL ACTIVITY AMONG STUDENT TEACHERS AT EDUCATION DEGREE COLLEGES IN UPPER MYANMAR

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Abstract

The purpose of this study is to investigate the participation in physical activities among student teachers at Education Degree Colleges in Upper Myanmar. In this study, five hundred student teachers participated. "International Physical Activity Questionnaire (IPAQ)" developed by Craig et al., (2003) was modified. For the reliabilities of questionnaires, the Kuder-Richardson coefficient (KR-20) was 0.912 for "International Physical Activity Questionnaire (IPAQ)". In data analysis, Descriptive Statistics, One-Way Analysis of Variance (ANOVA), Independent Samples *t* Test were conducted. According to data analysis, it was found that the mean value for "Participation in Physical Activities" was at moderate level. The finding of this study indicated that there were statistically significant differences in student teachers' in physical activities according to gender, grade and specialization. Moreover, qualitative findings support the results of quantitative study. It was hoped that the findings of this study will be helpful to student teachers in reflecting upon their participation in physical activities.

Keywords: light physical activity, moderate physical activity, vigorous physical activity

Introduction

Physical activity is defined as "any bodily movement produced by skeletal muscles that requires energy expenditure" (Caspersen et al., 1985). This means that physical activity can be undertaken in many different ways, such as organized physical activities (e.g., handball and football), but also as transport (e.g., cycling and walking) and part of domestic tasks (e.g., cleaning and carrying). Exercise and/or training refers to a subset of physical activity that is planned and structured to maintain or improve physical fitness (Caspersen et al., 1985).

Lack of physical activity in the community has caused a wide range of health problems, including obesity, heart disease, eating disorders, and depression (Magdaleno, 2009). The decrease in movement behavior commonly occurs to university students since there is no physical education subject except for students in the physical education major. The physical activity study by Young et al. (2015, as cited in Suherman 2019), showed that the majority of the students did not participate in regular physical activity. This condition should be a warning since this period should be a productive period for the students to do various activities and fulfill task demands. This condition is influenced by a lack of knowledge about health-related fitness (Sultoni et al., 2017 as cited in Suherman, 2019) and other barriers to physical activity (Jajat et al., 2017, as cited in Suherman, 2019). Participation in physical activity can improve psychological health and help prevent mental health disorders. Mental health is not only related to mental disorders but also to psychological well-being conditions where individuals are aware of their own abilities and potentials (Babic et al., 2014, as cited in Suherman, 2019). Physical activity (PA) has a very important meaning for everyone; it is one of the ways to health, and there are a lot of different activities for us to choose from. It can be costly or it can be free of charge. If everyone is involved in physical activity, the problem of overweight and obesity may be avoided. Physical activity is important for health and longevity (Ali, 2018).

General Objective

To investigate the participation in physical activities among student teachers at Education Degree Colleges in Upper Myanmar.

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Specific Objectives

1. To find out the levels of student teachers' participation in physical activities at selected Education Degree Colleges in Upper Myanmar;
2. To analyze the differences in student teachers' participation in physical activities according to their gender
3. To investigate the differences in student teachers' participation in physical activities according to their grade, and
4. To analyze the differences in student teachers' participation in physical activities according to their specialization.

Research Questions

1. What are the levels of student teachers' participation in physical activities at selected Education Degree Colleges in Upper Myanmar?
2. Are there any differences in student teachers' participation in physical activities according to their gender?
3. Are there any differences in student teachers' participation in physical activities according to their grade?
4. Are there any differences in student teachers' participation in physical activities according to their specialization?

Theoretical Framework

According to South Dakota State University Extension Health & Physical Activity Field Specialist (SDSU, 2022), physical activity of all kinds can be performed in a variety of intensities, ranging between light, moderate, and vigorous (high) intensity.

According to (South Dakota State University Extension Health & Physical Activity Field Specialist (SDSU), 2022), low-intensity activities require the least amount of effort compared to moderate and high-intensity activities. METS are a convenient and standard method for describing the absolute intensity of physical activities. One MET, or metabolic equivalent, is the amount of oxygen consumed while sitting at rest. Thus, an activity classified as 2 METS would be equal to 2 times the amount of oxygen consumed while sitting at rest (1 MET). The definition of low-intensity activity is an activity that is classified as < 3 METS. Some examples of low-physical activities include walking slowly (i.e., shopping, walking around the office), sitting at computer, making the bed, eating, preparing food, and washing dishes.

Moderate intensity activities are defined as activities ranging between 3 and < 6 METS. These activities require more oxygen consumption than light activities. Some examples of moderate physical activities include sweeping the floor, walking briskly, slow dancing, vacuuming, washing windows, and shooting a basketball (South Dakota State University Extension Health & Physical Activity Field Specialist SDSU, 2022). In accordance with Centers for Disease Control (CDC, 1999) guidelines- Moderate activity includes walking at a moderate or brisk pace of 3 to 4.5 mph on a level surface inside or outside, walking downstairs or down a hill, racewalking—less than 5 mph, bicycling 5 to 9 mph, level terrain, or with few hills, stationary bicycling—using moderate effort, aerobic dancing—high impact, yoga, gymnastics, getting up and down from the floor, jumping on a trampoline, weight training and bodybuilding using free weights, disco dance, table tennis—competitive, tennis—doubles, basketball—shooting baskets, volleyball—competitive, playing frisbee, badminton, playing on school playground equipment, moving about, swinging, or climbing, playing hopscotch, singing while actively moving about—as on stage or in church, gardening and yard work: raking the lawn, bagging grass or leaves, digging, hoeing, light shoveling (less than 10 lbs per minute), or weeding while standing or bending, planting trees, trimming shrubs and trees, hauling branches, stacking wood, moderate housework: scrubbing the floor or heavy housework: moving or pushing heavy bathtub while on

hands and knees, hanging laundry on a clothesline, sweeping an outdoor area, cleaning out the garage, washing windows, moving light furniture, packing or household items away, actively playing with children—walking, running, or climbing while playing with children, etc.

High-intensity activities are defined (South Dakota State University Extension Health & Physical Activity Field Specialist SDSU, 2022) as activities ≥ 6 METS. Vigorous activities require the highest amount of oxygen consumption to complete the activity. Examples of vigorous physical activities include running (5 mph), swimming, shoveling, soccer, jumping rope, and carrying heavy loads (i.e., bricks). According to Centers for Disease Control (CDC, 1999) guidelines, vigorous physical activity involves racewalking and aerobic walking—5 mph or faster, jogging or running, bicycling more than 10 mph, aerobic dancing—high impact, step aerobics, teaching an aerobic dance class, jumping rope, performing jumping jack, tennis—singles, football game, basketball game, etc.

Definition of Key Term

- Physical activity: physical activity is generally defined as "any bodily movement produced by skeletal muscles that results in energy expenditure" (Caspersen, Powell, & Christenson, 1985).
- Light physical activity: an activity that is classified as < 3 METS. Some examples of light physical activities include walking slowly (i.e., shopping, walking around the office), sitting at computer, making the bed, eating, preparing food, and washing dishes (SDSU, 2022).
- Moderate physical activity: an activity that is defined as activity ranging between 3 and < 6 METS. These activities require more oxygen consumption than light activities. Some examples of moderate physical activities include sweeping the floor, walking briskly, slow dancing, vacuuming, washing windows, and shooting a basketball (SDSU, 2022).
- Vigorous physical activity: an activity that is defined as activity ≥ 6 METS. Vigorous activities require the highest amount of oxygen consumption to complete the activity. Examples of vigorous physical activities include running (5 mph), soccer, jumping rope, racewalking and aerobic walking—5 mph or faster, jogging or running, bicycling more than 10 mph, aerobic dancing—high impact, step aerobics, teaching an aerobic dance class, performing jumping jack, tennis—singles, football game, basketball game, etc. (Centers for Disease Control CDC, 1999).

Methodology

Population and Sample: Out of 13 education colleges, 5 education colleges from Upper Myanmar were randomly selected in order to obtain the representative sample. Although there were 4721 student teachers at 13 Education Degree Colleges in Upper Myanmar, 500 student teachers were selected using a simple random sampling method. In qualitative study, interview checklists and interview questions were conducted. Out of 500, 30 student teachers were selected as participants in qualitative study.

Instruments: In order to investigate student teachers' participation in physical activities, the "International Physical Activity Questionnaire (IPAQ)" includes 3 dimensions, such as (1) light physical activities, (2) moderate physical activities, and (3) vigorous physical activities. This questionnaire consists of 22 items: 5 items for light physical activities, 9 items for moderate physical activities, and 8 items for vigorous physical activities. In this questionnaire Yes/No questions were also used. This questionnaire also included demographic data which were composed of gender, age, and specialization. 22 interview checklists were investigated and three

interview questions were also included in qualitative study. After the main study was conducted, the Kuder-Richardson coefficient (KR- 20) was 0.912 for the “International Physical Activity Questionnaire (IPAQ)”.

Findings

Quantitative Findings

Research Question (1): What are the levels of student teachers’ participation in physical activities at selected Education Degree Colleges in Upper Myanmar?

Table 1. Mean Values and Standard Deviations of Student Teachers’ Participation in Physical Activities at Selected Education Degree Colleges (N=500)

Variable	N	Mean	SD	Remark
Student Teachers’ Participation in Physical Activities	500	6.65	4.239	Moderate

Note: <2.41 = low level 2.41-10.89 = moderate level >10.89 = high level

According to Table 1, the mean value of physical activity was 6.65 and the standard deviation was 4.239. Based on the results, the values above 10.89 (mean + SD) are defined as high level, the values between 2.41 (mean - SD) and 10.89 (mean + SD) are defined as moderate level, and the values below 2.41 (mean - SD) are defined as low level. According to these levels, it can be found that the mean values of student teachers’ participation in physical activities at selected Education Degree Colleges were at a moderate level.

Table 2. Number and Percentage of Student Teachers’ Participation Levels of Physical Activities at Selected Education Degree Colleges

Variable	Education Degree Colleges (EDCs)	Participation Levels of Physical Activities			
		Low	Moderate	High	Total
Participation Levels of Physical Activities	EDC 1	13 (24.1%)	72 (19.8%)	15 (18.3%)	100 (20%)
	EDC 2	6 (11.1%)	82 (22.5%)	12 (14.6%)	100 (20%)
	EDC 3	3 (5.6%)	47 (12.9%)	50 (61%)	100 (20%)
Participation Levels of Physical Activities	EDC 4	13 (24.1%)	83 (22.8%)	4 (4.9%)	100 (20%)
	EDC 5	19 (35.2%)	80 (22%)	1 (1.2%)	100 (20%)
	Overall Education Degree Colleges	54 (10.8%)	364 (72.8%)	82 (16.4%)	500 (100%)

Table 2 indicates the number and percentage of student teachers’ participation levels of physical activities. It can be noted that 13 (24.1%) student teachers were at a low level, 72 (19.8%) student teachers were at a moderate level, and 15 (18.3%) student teachers were at a high level in participation levels of physical activities at EDC 1. And then, 6 (11.1%) student teachers were at a low level, 82 (22.5%) student teachers were at a moderate level, and 12 (14.6%) student teachers were at a high level in participation levels of physical activities at EDC 2. And then, 3 (5.6%) student teachers were at a low level, 47 (12.9%) student teachers were at a moderate level, and 50 (61%) student teachers were at a high level in participation levels of physical activities at EDC 3.

Table 2 indicates the number and percentage of student teachers’ participation levels of physical activities. It can be noted that 13 (24.1%) student teachers were at a low level, 72 (19.8%) student teachers were at a moderate level, and 15 (18.3%) student teachers were at a high level in participation levels of physical activities at EDC 1. And then, 6 (11.1%) student teachers were at a low level, 82 (22.5%) student teachers were at a moderate level, and 12 (14.6%) student teachers were at a high level in participation levels of physical activities at EDC 2. And then, 3 (5.6%) student teachers were at a low level, 47 (12.9%) student teachers were at a moderate level, and 50 (61%) student teachers were at a high level in participation levels of physical activities at EDC 3.

teachers were at a low level, 82 (22.5%) student teachers were at a moderate level, and 12 (14.6%) student teachers were at a high level in participation levels of physical activities at EDC 2. In addition, 3 (5.6%) student teachers were at a low level, 47 (12.9%) student teachers were at a moderate level, and 50 (61%) student teachers were at a high level in participation levels of physical activities at EDC 3. Moreover, 13 (24.1%) student teachers were at a low level, 83 (22.8%) student teachers were at a moderate level, and 4 (4.9%) student teachers were at a high level in participation levels of physical activities at EDC 4. Furthermore, 19 (35.2%) student teachers were at a low level, 80 (22%) student teachers were at a moderate level, and 1 (1.2%) student teachers were at a high level in participation levels of physical activities at EDC 5. Finally, it could be found that 54 (10.8%) student teachers were at a low level, 364 (72.8%) student teachers were at a moderate level, and 82 (16.4%) student teachers were at a high level in participation levels of physical activities at “Overall Education Degree Colleges.”

Research Question (2): Are there any differences in student teachers’ participation in physical activities according to their gender?

Table 3. Mean Values and Standard Deviations of Student Teachers’ Participation in Physical Activities according to their Gender

Variable	Gender	N	Mean	SD
Participation in Physical Activities	Male	250	7.46	4.241
	Female	250	5.85	4.090

Note: <2.41 = low level 2.41-10.89 = moderate level >10.89 = high level

According to Table 3, it could find that both male and female student teachers were at moderate level of participation in physical activities.

Table 4. Independent Samples *t* Test Result of Student Teachers’ Participation in Physical Activities according to their Gender

Variable	Gender	<i>t</i>	<i>df</i>	<i>p</i>
Participation in Physical Activities	Male	4.315	497.353	0.000***
	Female			

Note: ****p*<0.001

From Table 4, it could be seen that there were significance differences between male and female student teachers at the *p*<0.001. This meant that male student teachers more participated in physical activities than female student teachers.

Research Question (3): Are there any differences in student teachers’ participation in physical activities according to their grade?

Table 5. Mean Values and Standard Deviations of Student Teachers’ Participation in Physical Activities According to their Grade

Variable	Grade	N	Mean	SD
Participation in Physical Activities	Second Year (First Semester)	250	6.11	3.038
	Second Year (Second Semester)	250	7.19	5.118

Note: <2.41 = low level 2.41-10.89 = moderate level >10.89 = high level

Based on findings shown in Table 5, it could find that second year (first semester) and second year (second semester) student teachers were at moderate level of participation in physical activities.

Table 6. Independent Samples *t* Test Result of Student Teachers' Participation in Physical Activities according to their Grade

Variable	Grade	<i>t</i>	<i>df</i>	<i>p</i>
Participation in Physical Activities	Second Year (First Semester)	-2.869	405.121	0.004**
	Second Year (Second Semester)			

Note: ** $p < 0.01$

From Table 6, it could be seen that there were significant differences between second-year (first semester) and second-year (second semester) student teachers' participation in physical activities. This meant that second-year (second semester) student teachers more participated in physical activities than second-year (first semester) student teachers.

Research Question (4): Are there any differences in student teachers' participation in physical activities according to their specialization?

Table 7. Mean Values and Standard Deviations of Student Teachers' Participation in Physical Activities according to their Specialization

Variable	Specialization	N	Mean	SD
Participation in Physical Activities	Science	159	5.05	2.671
	Art	108	6.18	3.599
	Art and Science	233	7.97	4.922

Note: <2.41 = low level $2.41-10.89$ = moderate level >10.89 = high level

According to Table 7, it could be found that all specialization student teachers were at moderate level of participation in physical activities.

Table 8. Mean Values and Standard Deviations of Student Teachers' Participation in Physical Activities according to their Specialization

Variable	Specialization	N	Mean	SD
Participation in Physical Activities	Science	159	5.05	2.671
	Art	108	6.18	3.599
	Art and Science	233	7.97	4.922

Note: <2.41 = low level $2.41-10.89$ = moderate level >10.89 = high level

According to Table 8, it could be found that all specialization student teachers were at moderate level of participation in physical activities.

Table 9. ANOVA Results for Student Teachers' Participation in Physical Activities according to their Specialization

Variable		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Participation in Physical Activities	Between Groups	834.468	2	417.234	25.497	.000***
	Within Groups	8132.980	497	16.364		
	Total	8967.448	499			

Note: *** $p < 0.001$

As shown in Table 9, a one-way ANOVA result indicated that there were statistically significant differences in “Participation in Physical Activities” ($df = 2$, $F = 25.497$, $p < 0.001$) according to their specialization.

Moreover, in order to find out which particular group had statistically significant differences in student teachers’ participation in physical activities according to their specialization, the Post Hoc Multiple Comparison Test (Games-Howell) was also calculated. (See Table 10)

Table 10. Results of Multiple Comparison for Student Teachers’ Participation in Physical Activities according to their Specialization

Variable	Specialization (I)	Specialization (J)	Mean Difference (I-J)	<i>p</i>
Participation in Physical Activities	Art	Science	1.126*	.017*
	Art and Science	Science	2.915*	.000***
		Art	1.790*	.001**

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

According to Table 10, it was found that there were statistically significant differences of student teachers’ participation in physical activities according to their specialization between art and science student teachers at the $p < 0.05$ level. Similarly, there were statistically significant differences in student teachers’ participation in physical activities between art and science, and science student teachers at the $p < 0.001$ level. Moreover, there were statistically significant differences in student teachers’ participation in physical activities between art and science, and art student teachers at the $p < 0.01$ level.

Qualitative Findings

Thirty student teachers who participated in a qualitative study were asked to complete interview checklists in order to determine their participation levels of physical activities. The results of the analysis are listed below.

Ten student teachers of EDC 2 responded as follows.

- Three student teachers (30%) at low participation levels of physical activities reported that they did light physical activities such as “walking around the hostel,” “studying on the desk,” “making the bed,” “preparing for eating,” and “washing dishes,” and moderate physical activities such as “exercising in a stadium or playground,” “sweeping the floor around the hostel,” “fitness dancing,” and “getting up and down from the floor.” In addition, they did vigorous physical activities such as “jumping rope,” “aerobic dancing,” “playing football,” and “performing jumping jack.” They did not do moderate physical activities such as “walking briskly 3 to 4.5 mph,” “playing table tennis,” “playing badminton (doubles),” “playing volleyball,” and “bicycling 5 to 9 mph.” Furthermore, they did not do vigorous physical activities such as “running (5 mph >),” “bicycling more than 10mph,” “playing badminton—singles,” and “playing basketball.”
- Six student teachers (60%) at moderate participation levels of physical activities reported that they did light physical activities such as “walking around the hostel,” “studying on the desk,” “making the bed,” “preparing for eating,” and “washing dishes,” and moderate physical activities such as “exercising in a stadium or playground,” “walking briskly 3 to 4.5 mph,” “sweeping the floor around the hostel,” “fitness dance,” and “Getting up and down from the floor”. In addition, they did vigorous physical activities such as “jumping rope,” “aerobic dancing,” “playing football,” and “performing jumping jack.” They did not do moderate physical activities such as “playing table tennis,” “playing badminton

(doubles)," "playing volleyball," and "bicycling 5 to 9 mph." Furthermore, they did not do vigorous physical activities such as "running (5 mph >)," "bicycling more than 10mph," "playing badminton—singles," and "playing basketball."

- One student teacher (10%) at high participation levels of physical activities reported that they did light physical activities such as "walking around the hostel," "studying on the desk," "making the bed," "preparing for eating," and "washing dishes," and moderate physical activities such as "walking briskly 3 to 4.5mph," "exercising in a stadium or playground," "playing volleyball," "Sweeping the floor around the hostel," "Bicycling 5 to 9 mph," and "getting up and down from the floor." In addition, they did vigorous physical activities such as "bicycling more than 10 mph," "playing football," "aerobic dancing," and "performing jumping jack." They did not do moderate physical activities such as "playing table tennis" and "playing badminton (doubles)". Furthermore, they did not do vigorous physical activities such as "running (5 mph >)," "jumping rope," "playing badminton—singles," and "playing basketball."

Finally, it could be found that three student teachers who were at low participation levels of physical activities from EDC 2 did 13 out of 22 physical activities. Moreover, six student teachers who were at moderate participation levels of physical activities from EDC 2 did 14 out of 22. Furthermore, one student teacher who was at high participation levels of physical activities from EDC 2 did 15 out of 22.

Ten student teachers of EDC 3 responded as follows.

- Nine student teachers (90%) at moderate participation levels of physical activities reported that they did light physical activities such as "walking around the hostel," "studying on the desk," "making the bed," "preparing for eating," and "washing dishes," and moderate physical activities such as "exercising in a stadium or playground," "playing badminton (doubles)," "playing volleyball," "sweeping the floor around the hostel," "fitness dancing," and "getting up and down from the floor." In addition, they did vigorous physical activities such as "aerobic dancing," "playing badminton (single)," "playing football," and "performing jumping jack." They did not do moderate physical activities such as "walking briskly 3 to 4.5 mph," "playing table tennis," "playing badminton (doubles)," "playing volleyball," and "bicycling 5 to 9 mph." Furthermore, they did not do vigorous physical activities such as "running (5 mph >)," "bicycling more than 10 mph," and "playing basketball."
- One student teacher (10%) at high participation levels of physical activities reported that he did light physical activities such as "walking around the hostel," "studying on the desk," "making the bed," "preparing for eating," and "washing dishes," and moderate physical activities such as "walking briskly 3 to 4.5 mph," "exercising in a stadium or playground," "sweeping the floor around the hostel," "fitness dancing," "bicycling at 5 to 9 mph," and "getting up and down from the floor." In addition, they did vigorous physical activities such as "jumping rope," "aerobic dancing," "playing football," "running (5 mph >)," and "performing jumping jack." They did not do moderate physical activities such as "playing table tennis," "playing badminton (doubles)," and "playing volleyball." Furthermore, they did not do vigorous physical activities such as "bicycling more than 10 mph," "playing badminton (single)," and "playing basketball."

As a summary, it could be found that nine student teachers who were at moderate participation levels of physical activities from EDC 3 did 15 out of 22 physical activities. Furthermore, one student teacher who was at high participation levels of physical activities from EDC 3 does 16 out of 22.

Ten student teachers of EDC 5 responded as follows.

- One student teacher (10%) at low participation levels of physical activities reported that she did light physical activities such as “walking around the hostel,” “studying on the desk,” “making the bed,” “preparing for eating,” and “washing dishes,” and moderate physical activities such as “exercising in the stadium or playground” and “sweeping the floor around the hostel.” In addition, they did vigorous physical activity such as “aerobic dancing.” They did not do moderate physical activities such as “fitness dance,” “bicycling at 5 to 9 mph” and “getting up and down from the floor,” “table tennis,” “badminton (doubles),” and “volleyball.” Furthermore, they did not do vigorous physical activities such as “jumping rope,” “running (5 mph >),” “playing football,” “performing jumping jack,” “bicycling more than 10 mph,” “playing badminton (single),” and “playing basketball.”
- Seven student teachers (70%) at moderate participation levels of physical activities reported that they did light physical activities such as “walking around the hostel,” “studying on the desk,” “making the bed,” “preparing for eating,” and “washing dishes,” and moderate physical activities such as “exercising in a stadium or playground,” “playing badminton (doubles),” “playing volleyball,” “sweeping the floor around the hostel,” and “getting up and down from the floor.” In addition, they did vigorous physical activities such as “playing badminton (single),” “playing football,” and “performing jumping jack.” They did not do moderate physical activities such as “walking briskly, 3 to 4.5 mph,” “playing table tennis,” “fitness dancing,” and “bicycling, 5 to 9 mph.” Furthermore, they did not do vigorous physical activities such as “running (5 mph >),” “jumping rope,” “bicycling more than 10 mph,” “aerobic dancing,” and “playing basketball.”
- Two student teachers (20%) at high participation levels of physical activities reported that they did light physical activities such as “walking around the hostel,” “studying on the desk,” “making the bed,” “preparing for eating,” and “washing dishes,” and moderate physical activities such as “walking briskly 3 to 4.5 mph,” “exercising in a stadium or playground,” “playing badminton (doubles),” “playing volleyball,” “sweeping the floor around the hostel,” “fitness dance,” and “Getting up and down from the floor.” In addition, they did vigorous physical activities such as “running (5 mph >),” “jumping rope,” “aerobic dancing,” “playing badminton—singles,” “playing football,” and “performing jumping jack.” They did not do moderate physical activities such as “playing table tennis” or “bicycling 5 to 9 mph.” Furthermore, they did not do vigorous physical activities such as “bicycling more than 10mph” and “playing basketball.”

As a summary, it could be found that one student teacher who was at low participation levels of physical activities from EDC 5 did eight out of 22 physical activities. Moreover, seven student teachers who were at moderate participation levels of physical activities from EDC 5 did 13 out of 22 physical activities. Furthermore, two student teachers who were at high participation levels of physical activities from EDC 5 did 18 out of 22.

In addition to interview checklists, three interview questions were asked of student teachers to find out how many days per week and hours per day they did physical activities.

Interview Responses for Participation in Physical Activities

The first question is, “How many days per week and how much time per day do you do light physical activities?”

Ten student teachers from EDC 2 responded as follows:

- Three student teachers (30%) at low participation levels of physical activities reported that they did light physical activities two days per week and half an hour per day.

- Six student teachers (60%) at moderate participation levels of physical activities reported that they did light physical activities five days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did light physical activities all day per week and one hour per day.

Ten student teachers in EDC 3 responded as follows:

- Nine student teachers (90%) at moderate participation levels of physical activities reported that they did light physical activities five days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did light physical activities all day per week and one hour per day.

Ten student teachers from EDC 5 responded as follows:

- One student teacher (10%) at low participation levels of physical activities reported that she did light physical activities two days per week and half an hour per day.
- Seven student teachers (70%) at moderate participation levels of physical activities reported that they did light physical activities five days per week and one hour per day.
- Two student teachers (20%) at high participation levels of physical activities reported that they did light physical activities all day per week and one hour per day.

As a summary, it could be found that four student teachers who were at low participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did light physical activities two days per week and half an hour per day. Moreover, 22 student teachers who were at moderate participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did light physical activities five days per week and one hour per day. Furthermore, four student teachers who were at high participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did light physical activities all day per week and one hour per day.

The second question is, “How many days a week and how much time a day do you do moderate physical activities?”

Ten student teachers from EDC 2 responded as follows:

- Three student teachers (30%) at low participation levels of physical activities reported that they did moderate physical activities two days per week and one hour per day.
- Six student teachers (60%) at moderate participation levels of physical activities reported that they did moderate physical activities five days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did moderate physical activities all day per week and one hour per day.

Ten student teachers in EDC 3 responded as follows:

- Nine student teachers (90%) at moderate participation levels of physical activities reported that they did moderate physical activities five days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did moderate physical activities all day per week and one hour per day.

Ten student teachers from EDC 5 responded as follows:

- One student teacher (10%) at low participation levels of physical activities reported that she did moderate physical activity two days per week and half an hour per day.

- Seven student teachers (70%) at moderate participation levels of physical activities reported that they did moderate physical activities three days per week and one hour per day.
- Two student teachers (20%) at high participation levels of physical activities reported that they did moderate physical activities five days per week and one hour per day.

As a summary, it could be found that four student teachers who were at low participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did moderate physical activities two days per week and one hour per day. Moreover, 22 student teachers who were at moderate participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did moderate physical activities three to five days per week and one hour per day. Furthermore, four student teachers who were at high participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did moderate physical activities five to all days per week and one hour per day.

The third question is, “How many days per week and how much time per day do you do vigorous physical activities?”

Ten student teachers from EDC 2 responded as follows:

- Three student teachers (30%) at low participation levels of physical activities reported that they did vigorous physical activities two days per week and half an hour per day.
- Six student teachers (60%) at moderate participation levels of physical activities reported that they did vigorous physical activities three days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did vigorous physical activities five days per week and one hour per day.

Ten student teachers in EDC 3 responded as follows:

- Nine student teachers (90%) at moderate participation levels of physical activities reported that they did vigorous physical activities three days per week and one hour per day.
- One student teacher (10%) at high participation levels of physical activities reported that he did vigorous physical activities five days and two hours per day.

Ten student teachers from EDC 5 responded as follows:

- One student teacher (10%) at low participation level of physical activities reported that she did vigorous physical activities one day per week and half an hour per day.
- Seven student teachers (70%) at moderate participation levels of physical activities reported that they did vigorous physical activities three days per week and one hour per day.
- Two student teachers (20%) at high participation levels of physical activities reported that they did vigorous physical activities three days per week and one hour per day.

As a summary, it could be found that four student teachers who were at low participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did vigorous physical activities one to two days per week and half an hour per day. Moreover, 22 student teachers who were at moderate participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did vigorous physical activities two to three days per week and one hour per day. Furthermore, four student teachers who were at high participation levels of physical activities from EDC 2, EDC 3 and EDC 5 reported that they did vigorous physical activities three to five days per week and one hour per day.

Conclusion

Discussion

Findings from investigating student teachers' participation in physical activities at selected Education Degree Colleges in Upper Myanmar indicated that, student teachers' participation in physical activities was generally at moderate level. Specifically, the findings of this study revealed that out of 500 student teachers, 54 (10.8%) were at low participation levels of physical activities, 364 (72.8%) were at moderate participation levels of physical activities, and 82 (16.4%) were at high participation levels of physical activities. The qualitative result of this study was also consistent with the quantitative findings in that, out of 30 student teachers in qualitative study, 4 (13.33%) were at low participation levels of physical activities, 22 (73.33%) were at moderate participation levels of physical activities, and 4 (13.33%) were at high participation levels of physical activities. This result was consistent with the findings of Bansie and Sarpong (2022), Kim (2011), and Oncen and Tanyeri (2020) because it could be found that there were participants who were at three participation levels of physical activities such as low, moderate and high in their studies.

In investigating whether there were significant differences in physical activity participated by student teachers according to their demographic data, there were significant differences in physical activity participated by student teachers in terms of gender, grade, and specialization.

According to gender, it was found that male student teachers more participated in physical activities than female student teachers in quantitative study. According to the results of qualitative findings, male student teachers more participated in moderate and vigorous physical activities such as running, football, volleyball and badminton than female student teachers. The result of this study was similar with the findings of Maqbool et al. (2021) and Babic et al. (2014).

According to grade, it was found that student teachers who attended in the second year (second semester) were greater than those who attended in the second year (first semester) in their participation in physical activities in quantitative study. According to the results of qualitative findings, student teachers who attended in the second year (second semester) more participated in moderate and vigorous physical activities such as running, football, volleyball and badminton than those who attended in the second year (first semester).

According to specialization, it was found that student teachers who specialized art and science had the highest participation in physical activities, and those who specialized in science had the lowest participation in physical activities in quantitative study. According to the results of qualitative findings, student teachers who specialized art and science more participated in moderate and vigorous physical activities such as running, football, volleyball and badminton than those who specialized in science subject and art subject.

Recommendations

- Student teachers should participate more in physical activities than at present.
- Student teachers in all Education Degree Colleges should also be encouraged to participate more in physical activities.
- Student teachers should participate in physical activities for at least 60 minutes daily.
- Both male and female student teachers should participate equally in physical activities.
- Both second-year (first semester) and second-year (second semester) student teachers should participate equally in physical activities.
- Student teachers of all specializations, such as art and science, science, and art, should participate equally in physical activities.

Need for Further Research

- Further study is needed to examine participation in physical activities among student teachers according to their age which are not included in this study.
- Further research is studied to explore the relationship between participation in physical activities and student engagement.
- As this study is conducted at selected Education Degree Colleges in Upper Myanmar, further study is needed to conduct at other Education Degree Colleges in Lower Myanmar.

Acknowledgements

We would like to tender our note of respectful appreciation to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), and Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) for their kind permission to carry out the study. We would like to thank our professor Dr. Zin Nwe Than (Professor and Head of Department of Educational Theory and Management, Sagaing University of Education). We would like to express our appreciation to our examiner, Dr. Phyu Zar Zar Theint (Lecturer, Department of Educational Theory, Yangon University of Education) who rendered advice and intellectual help and positive criticism for our work, spending her precious time to read this thesis. We would like to offer our respectful gratitude to Daw Than Than Aye (Associate Professor and Head, Department of English, Sagaing University of Education) for valuable comments and necessary editing toward this paper. Most importantly, we wish to extend a special thanks to student teachers from Education Degree Colleges in Upper Myanmar for their time, cooperation, and willingness to participate in this study.

References

- Ali, S. K. S. (2018). The important of physical activities in our life. *International Physical Medicine & Rehabilitation Journal*, 3(4):308-310. DOI: 10.15406/ipmrj. 2018. 03. 00 121. <https://medcraveonline.com/IPMRJ/IPMRJ-03-00121.pdf>
- Babic, M. J., Morgan, P. J., Ronald, C. Plotnikoff, Chris Lonsdale, Rhiannon, L. White & David, R. Lubans. (2014). Physical activity and physical self-concept in youth: systematic review and meta-analysis. *Sports Medicine* volume 44, pages1589–1601. <https://link.springer.com/article/10.1007/s40279-014-0229-z>
- Bansie, A. & Sarpong, E. O. (2022). Assessment Of Physical Activity Participation Levels Among Workers in Financial Institutions. *Research journal of public health*. 8 (2). https://www.researchgate.net/publication/360312221_Assessment_Of_Physical_Activity_Participation_Levels_Among_Workers_In_Financial_Institutions
- Caspersen, C. J., Powell, K. E., Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: definitions and distinctions for health-related research. *Public Health Rep*. 100(2):126–131. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1424733/pdf/pubhealthrep001000016.pdf>
- Centers for Disease Control (CDC). (1999). Promoting physical activity: a guide for community action. Champaign, IL: Human Kinetics. https://www.cdc.gov/nccdphp/dnpa/physical/pdf/pa_intensity_table_2_1pdf
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B.E., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine Science Sports Exercise*, 35(8), 1381-1395. Doi: 10.1249/01.MSS.0000078924.61453.FB.
- Kim, J. (2011). Effects of physical activity on physical self-concept among college students. California State University, San Bernardino. <https://scholarworks.lib.csusb.edu/cgi/viewcontent.cgi?article=3758&context=etd-project>
- Magdaleno, L. R. (2009). Effects of physical activity on physical self-perception among middle school students. California State University. <https://scholarworks.lib.csusb.edu/cgi/viewcontent.cgi?Article=4743&context=etd-project>
- Maqbool1, F., Arif1, M., Kashif1, M., & Asghar1, R. (2021). Physical Activity Levels and Suggestions for Its Promotion Among University Students. *Rehman Journal of Health Sciences*. 03 (01). https://www.researchgate.net/publication/353683720_Physical_activity_levels_and_suggestions_for_its_promotion_among_university_students
- Oncen, S. & Tanyeri, L. (2020). Evaluation of the Physical Activity Levels of the Students in a Physical Education and Sports Science Department Before and During the Coronavirus Pandemic. *International Education Studies*; 13(10); doi:10.5539/ies.v13n10p148. <https://files.eric.ed.gov/fulltext/EJ1272831.pdf>

- South Dakota State University Extension Health & Physical Activity Field Specialist (SDSU). (2022). Light, Moderate, And Vigorous Activity. South Dakota State University Brookings, SD 57007. <https://extension.sdstate.edu/light-moderate-and-vigorous-activity>
- Suherman, A. Sulthoni, K. Jajat, Risma, & Agust, K. (2019). Physical self-concept and physical activity among university students. *Advances in Social Science, Education and Humanities Research*, 335. <http://creativecommons.org/licenses/by-nc/4.0/>

AN EXPLORATION OF TEACHERS' CHALLENGES TOWARDS NEW CURRICULUM IMPLEMENTATION

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Abstract

The research intended to explore challenges faced by teachers in implementing new curriculum, to examine the differences in challenges of teachers in implementing new curriculum in terms of their personal factors and school related factors. As the sample, 639 teachers from 21 Basic Education Schools in Myitkyina Township, Kachin State were randomly selected for this study according to equal-size stratified sampling method. Quantitative and qualitative methods were used in this study. Descriptive statistics, frequency analysis and exploratory factor analysis were used to analyze the data. From the results of the findings, inadequate supervision, inadequate training and inadequate teachers' knowledge on teaching and assessment, large class size and over-workload, low level of students' readiness and motivation, inadequate participation and support from parents and community, fast transition process and time mismatch with teacher guide, teachers' negative attitude teachers' challenges related to infrastructures and resources, teachers' challenges related to information, communication and technology and teachers' challenges related to inadequate teachers and lack of coordination among teachers were the challenges that the teachers faced in new curriculum implementation.

Keywords: teachers' challenges, new curriculum implementation

Introduction

The primary goal of basic education curriculum reform in Myanmar is to implement a new curriculum that addresses current knowledge and skills for 21st century and addresses the deficiencies and weakness of the previous basic education curriculum. Teachers are essential to the successful implementation of any educational reform. The teachers can instinctively reject the introduction of the new reform and it is a natural reaction to the changes (Berkovich, 2011, cited in Knecht et al., 2019). Therefore, implementing the new curriculum presents numerous challenges. Teachers need to be supported in order for curriculum implementation to be successful. Our society benefits from better curriculum implementation by teachers.

Significance of the Study

In Myanmar, the Ministry of Education has transformed a new KG+12 system since 2016-17 Academic year. Youths need 21st century skills to adapt and adjust our complex world. However, change is complex and unpredictable process. Any changes that lead to increased teachers' competencies and higher quality student learning can increase workload on teachers. Thus, teachers are confronting challenges. Additionally, studying the challenges in curriculum implementation helps policymakers and schools identify systemic issues that impact teaching practices. It can inform decision-making processes, leading to curriculum reforms, adjustments, and improvements. It fosters a better understanding of the complex dynamics between curriculum, instruction, and students' outcomes, ultimately benefiting both teachers and students. Thus, this study will provide the relevant information to policies makers, principals and teachers to implement successfully.

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General Objective

- To study teachers' challenges towards new curriculum implementation

Specific Objectives

- To explore challenges faced by teachers in implementing new curriculum
- To identify the challenges mostly encountered by teachers in implementing new curriculum

Research Questions

- What are the teachers' challenges towards new curriculum implementation?
- What are the challenges mostly encountered by teachers in implementing new curriculum?

Limitations of the Study

This study will be restricted to the teachers from Basic Education Schools in Myitkyina Township, Kachin State.

Theoretical Framework

Teachers are the most important persons in changing the curriculum. In our country, Myanmar, curriculum reform is still in progress. Rogan and Grayson (2003) argued that if curriculum implementation focuses on the 'what' of desired educational change, neglects the 'how', and do not have clearly thought-out implementation strategies, failures of well-intentioned, well-designed curriculum reform programs have been brought out. Therefore, it is necessarily to investigate teachers' *challenges towards new curriculum implementation* in order to implement it successfully.

This investigation is informed by a theory of curriculum implementation (Rogan & Grayson, 2003). This theory of curriculum implementation may go some way towards combating such wasteful and demoralizing experiences and challenges. This theory uses three constructs that form the heart of curriculum implementation, namely: profile of implementation, capacity to innovate and outside support. **The profile of implementation**, the first construct, offers a map of the learning area and a number of ways for implementation. In new curriculum, teachers have to structure learning activities, provide challenge and real-life problem-solving situations. Moreover, students have to participate actively and in collaboration with their peers. Assessment includes giving opportunities to students to demonstrate their individual skills and capabilities using a variety of assessment tools and instruments. Thus, teachers are facing challenges in implementing classroom interaction and assessment. In the second construct, **the capacity to support innovation**, teachers have challenges in implementing new curriculum if textbooks are not enough, classrooms and buildings are in poor condition. According to **support from outside agencies**, teachers cannot successfully implement a new curriculum without participating and being supported by relevant stakeholders. Therefore, based on the theory of curriculum implementation by Rogan and Grayson (2003), and challenges in new curriculum implementation described by Walelign and Fantahun (2007), Muneja (2015), Hipolite (2019), and Sifuna and Obonyo (2019), Baikenov (2020), Isaboke (2021), Nsengimana et al. (2021) and the results of the focus group interviews, exploring perception and the challenges of teachers in implementing new curriculum were explored.

Definition of Key Term

Curriculum : Curriculum was defined as a multifaceted concept, constructed, negotiated and renegotiated at a variety of levels and in a variety of arenas. (Goodson, 1994, cited in Su, 2021)

Challenge : Challenge is a perception that a task or situation exceeds one's comfort zone or capacities; thus, the challenge will require a person to find something extra. (Neill, 2002, cited in Onyeachu, 2008).

Operational Definition

New Curriculum : New curriculum refers to the curriculum that reformed in Myanmar since 2016-2017 academic year.

Teachers' challenges towards new curriculum implementation: Teachers' challenges towards new curriculum implementation refers to the challenges that faced by teachers in new curriculum implementation.

Methodology

As research method, both quantitative and qualitative methods were used to collect information about the teachers' challenges towards new curriculum implementation in Myitkyina Township, Kachin State.

In this study, there are 165 the number of Basic Education Schools in Myitkyina Township. And the population of teachers in this township are 2068. As the target participants in this study, 639 teachers from 21 Basic Education schools were selected by using equal-size stratified sampling method. Therefore, 213 primary teachers, 213 junior teachers and 213 senior teachers from Myitkyina Township were participated in this study. All items used in this study were measured by Five-point Likert Scale ranging from strongly disagree to strongly agree (1=strongly disagree, 2=disagree, 3=slightly agree, 4= agree, 5=strongly agree). In addition, open-ended questions and interview were included in this questionnaire for qualitative study in order to get detail information.

As data analysis, exploratory factor analysis, frequency analysis and Descriptive statistics were also conducted. Qualitative data obtained from open-ended questions and interview section were analyzed and interpreted by using cyclical process.

Findings

The teachers' challenges towards new curriculum implementation were explored by using exploratory factor analysis. The Kaiser-Meyer-Olkin (KMO) was 0.94. From the result, there were 7 factors related to teachers' challenges towards new curriculum implementation. When these factors were categorized, it was found that there were ten challenges in implementing new curriculum. The first factor had factor loading ranging from .881 to .611, the second factor had factor loading from .726 to .509, the third factor had factor loading from .666 to .534, the fourth factor loading from .744 to .578, the fifth factor had factor loading from .691 to .502, the sixth factor had from .615 to .557 and the seventh factor had factor loading from .610 to .502. These seven factors, ten challenges and its relevant items were shown in Table 1.

Table 1 Name of Factors, Variable and Items

Factors and Variables Name	Items
Factor 1 Inadequate Supervision	Failure to make recommendations and reviewing the requirements found after the inspection
	Failure to provide full information necessary for the implementation of the new curriculum
	Not giving specific guidelines in implementing the new curriculum
	Lack of recognition of teachers' actions
	Lack of continuous teacher professional development (CPD) by assigning subject leaders and teachers with teaching experience
	Not giving the teachers the opportunity to talk about the difficulties they encounter in their teaching
	Lack of supporting teaching aids for teachers in the implementation of the new curriculum
	Lack of information to teachers about the monthly CPD program and lack of support for subject leaders to make it happen
	Lack of time-based measures to ensure continuous teacher professional development (CPD) programs are carried out during school hours
	Lack of monthly monitoring and evaluation of the CPD program
	Failure to monitor, evaluate and comment on the CPD program and complete CPD records
	Lack of frequent round inspections to support teachers' instruction
Factor 2 Inadequate Professional Development and over-work load	Inadequate training and inadequate teachers' knowledge on teaching and assessment
	Having difficulty in assessing student progress through the results of the oral and written tests
	Having difficulty in remedial teaching, revision and extension for students.
	Having difficulty in assessing students' achievement after each lesson
	Having difficulty in keeping records of students' activities and homework in the classroom
	Having difficulty in giving recommendations for further improvement of individual student in a timely manner after assessing them
	Having difficulty in assessing non-progressing and progressing the soft skills (5'C) of students
	Due to the short duration of the training, the implementation of the new curriculum could not be fully implemented.
	Having difficulty in practical teaching because there is no practical demonstration (group teaching) in the new curriculum training
	Large Class size and over-workload
	Difficulty in doing group learning activities due to the large number of students in his classroom
	Having difficulty teaching in a student-centered approach due to the large number of students in his classrooms
	There are too many students in the classrooms and it is difficult to teach according to the needs of individual students
	Often dealing with disciplinary problems due to the large number of students in classroom

Factors and Variables Name	Items
	Spending a lot of time in non-teaching activities
	Teachers are overworked and have to spend a lot of time because activities in teaching lessons and teaching aids have been prepared
	Insufficient time in teaching new curriculum lessons.
Factor3 Teachers' challenges related to learners, parents and community and implementing process	Low level of students' readiness and motivation Lack of willingness of students to actively participate in teaching and learning activities
	Students' inability to participate in teaching and learning activities
	Not willing of students to express their ideas (for example, shyness, fear.
	Inadequate participation and support from parents and community Parents' lack of interest in implementing the new curriculum
	Parents do not understand well about the implementation of the new curriculum
	Lack of support from parents in implementing the new curriculum
	Parents do not like the way the new curriculum is implemented (for example, they don't like not teaching methods in KG).
	Parents' lack of cooperation to help their children learn effectively.
	Inadequate support from other organizations in implementing the new curriculum.
	Fast transition process and time mismatch with teacher guide Having difficulty to teach in accordance with the monthly content because of having to use student-centered approaches in teaching lessons.
	Students who were taught with the old curriculum have difficulty in teaching with the new curriculum
	Difficulty for students to understand the contents of the new curriculum.
Factor 4 Teachers' negative attitude	Most of the teachers do not understand the reason for changing the new curriculum
	Most teachers do not understand the concepts of the new curriculum well
	Most of the teachers do not like the new curriculum that teaches in a student-centered approach
	Some teachers believe that the new curriculum cannot improve students' performance
	Not understanding well assessment tools and instruments
	Some teachers do not believe that the new curriculum is very beneficial
Factor 5 Teachers' challenges related to infrastructures and resources	Insufficient desks and chairs for students
	Students' desks are not flexible desks for group learning activities.
	Poor lighting and ventilation in classrooms
	Lack of sport field in school(or)lack of using the field to be strong of students' body
	Inequal size between classrooms and number of students (for example, too many students).
	Lack of laboratory room in school.
	Lack of library in school (or) but it is not being used effectively
	Lack of materials (or funding) needed to create learning materials
	Lack of necessary equipment in the laboratory room

Factors and Variables Name	Items
Factor 6 Teachers' challenges related to information, communication and technology	Lack of preparation of software related to lesson content (e.g video files, files related to lesson content).
	Having difficulty in accessing the Internet to search for broader lesson content which is supportive in teaching; (e.g, poor Internet connection, power outages).
	Lack of adequate provision of ICT equipment (e.g. Computers, Projector, Bluetooth speakers).
Factor 7 Teachers' Challenges related to inadequate teachers and lack of coordination among teachers	Having difficulty in teaching by giving learning activities that students have to participate in themselves because there is no equal ratio of students and teacher
	Facing difficulties due to the insufficient strength of teachers
	Having difficulty in implementing a new curriculum because the subject taught by the teachers does not match their specialized subject.
	Lack of coordination among teachers.
	Lack of sharing the knowledge and skills gained from the trainings
	Having difficulty of teaching and sharing of concepts and knowledge got from trainings in real situation

The result of the frequency analysis was shown in Table 2 to investigate the numbers and percentage of teachers' agreement level of challenges towards new curriculum implementation in detail.

Table 2 Numbers and Percentage of Teachers' Agreement Level of Challenges towards New Curriculum Implementation(N=639)

No.	Teachers' Challenges	Number and Percentage of Agreement level					Total
		1	2	3	4	5	
1	Inadequate Supervision	131 (20.55%)	404 (63.30%)	55 (8.76%)	40 (6.29%)	9 (1.10%)	639 100%
2	Inadequate training and Inadequate Teachers' Knowledge on teaching and assessment	44 (6.90%)	259 (40.58%)	152 (23.81%)	155 (24.35%)	29 (4.53%)	639 (100%)
3	Large class size and over-workload	41 (6.41%)	232 (34.95%)	190 (29.75%)	143 (22.43%)	33 (5.16%)	639 (100%)
4	Low level of students' readiness and motivation	39 (6.06%)	343 (53.53%)	201 (31.43%)	51 (8.00%)	5 (0.71%)	639 (100%)
5	Inadequate participation and support from parents and community	35 (5.61%)	221 (34.70%)	200 (31.40%)	154 (24.18%)	25 (3.98%)	639 (100%)

No.	Teachers' Challenges	Number and Percentage of Agreement level					Total
		1	2	3	4	5	
6	Fast transition process and time mismatch with teacher guide	37 (5.83%)	237 (37.06%)	170 (26.53%)	168 (26.23%)	27 (4.20%)	639 (100%)
7	Teachers' Negative Attitude	116 (18.20%)	447 (70%)	50 (7.90%)	24 (3.23%)	2 (0.26%)	100%
8	Teachers' challenges related to infrastructures and resources	77 (12.07%)	343 (53.68%)	100 (15.78%)	95 (14.88)	24 (3.75%)	639 (100%)
9	Teachers' challenges related to information, communication and technology	37 (5.90%)	195 (30.63%)	136 (21.37%)	194 (30.50%)	77 (12.05%)	639 (100%)
10	Teachers' Challenges related to inadequate teachers and lack of coordination among teachers	89 (13.96%)	395 (61.9%)	91 (14.3%)	54 (8.53%)	10 (1.56%)	100%

Agreement Level: 1 = strongly disagree 2 = disagree
 3 = slightly agree 4 = agree 5 = strongly agree

Table 3 Means and Standard Deviations of Teachers' Challenges Towards New Curriculum Implementation (N=639)

Variables	Mean	SD	
Inadequate supervision (IS)	2.02	.65	Little extent
Inadequate training and inadequate teachers' knowledge on teaching and assessment (ITK)	2.78	.74	Moderate extent
Large class size and over-workload (LCSOW)	2.81	.74	Moderate extent
Low level of students' readiness and motivation (LSRM)	2.42	.63	Moderate extent
Inadequate participation and support from parents and community (IPS)	2.86	.85	Moderate extent
Fast transition process and time mismatch with teacher guide (FTPTM)	2.86	.81	Moderate extent
Teachers' negative attitude (TNA)	2.00	.54	Little extent
Teachers' challenges related to infrastructures and resources (IR)	2.41	.67	Moderate extent
Teachers' challenges related to information, communication and technology (ICT)	3.11	.98	Moderate extent
Teachers' challenges related to inadequate teachers and lack of coordination among teachers (ITLC)	2.52	.97	Moderate extent

Variables	Mean	SD	
Challenges Towards New Curriculum Implementation	2.49	.52	Moderate extent

Scoring direction: 1.00-2.33=Little extent 2.34-3.66=Moderate extent 3.67-5.00=Great extent

According to mean values, it was found that the teachers faced mostly such challenges as teachers' challenges related to information, communication, and technology. The challenge as teachers' negative attitude was encountered least by participant teachers. The teachers' challenges towards new curriculum implementation were clearly shown in figure 1 according to descending order of the mean values.

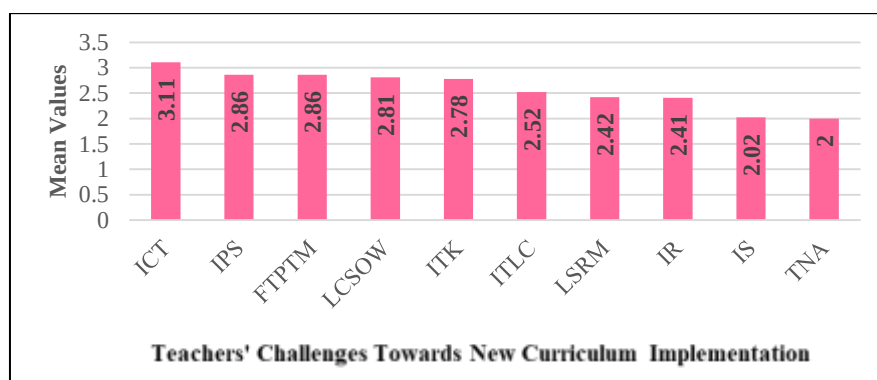


Figure1 Mean Comparisons of Teachers' Challenges towards New Curriculum Implementation

Findings from Qualitative Study

Describe major challenges you encountered while implementing new curriculum. Teachers provided the following challenges.

- Lack of supporting electronic devices especially Bluetooth boxes and projectors and being not good internet connection. (n=17,3%)
- Being not enough time to do activities, to teach all lessons according to teachers' guide. (n=74,13%)
- Having difficulties in using teaching aids especially Science subjects and lack of adequate teaching aids. (n=113,19%)
- Having difficulties in assessing individual progress because of large class size. (n=92,)
- Lack of adequate teachers. (n=58,10%)

What ways are being used to solve the difficulties encountered in the implementation of new curriculum? Participant teachers are using the following ways to solve the challenges encountered in the implementation of new curriculum. They are:

- Sharing and coordination with principals, subject leaders and teachers. (n=109,19%)
- Using internet and reading books. (n=101,17%)
- Teaching the respective subject in co-curricular period. (n=23,4%)

Findings from interview

When the researcher interviewed teachers from rural schools about teachers' challenges towards new curriculum implementation, all teachers (100%) said that there were not enough teachers and they taught three grades; therefore, they cannot teach well the subjects according to the teachers' guides. Among them, three teachers (27%) said that there was not **enough time in teaching all lessons and to assess each student**. All teachers (100%) said that there were **large class sizes**, so they could not pay attention to each student. Three teachers (27%) said that there were not **enough textbooks for all students**.

In addition, all teachers (100%) said that new curriculum **trainings** were not effective and sufficient. Moreover, all teachers (100%) responded that teaching aids were not enough and especially, there was not enough **teaching aid for co-curricular**. They created teaching aids as much as they can but could not provide enough teaching aids for each student or group. Three teachers (27%) said that there were not enough laboratory equipment and they could not do well practical activities. All teachers (100%) said that parents in rural areas had a little collaboration with schools and they could not support well to their children. Three teachers (22%) responded that there were **difficulties in teaching students who was taught by old curriculum**.

Furthermore, all teachers (100%) said that students in rural area were **less interested in teaching and learning** and only a few students were interested in teaching learning approaches. Moreover, students were low level of readiness. All teachers (100%) said that there was **not good internet connection**; therefore, they had difficulties in studying the lessons on online. Moreover, necessary books for each subject should be supported by the Government. In addition, three teachers (27%) said that their **teaching subjects did not match with their major subject**, so they could not teach effectively.

When the researcher interviewed teachers from urban schools about teachers' challenges about new curriculum implementation, all teachers (100%) said that it **needed to be effective training** for new curriculum courses. Moreover, all teachers (100%) responded that there were **large class sizes**; therefore, they could not assess each student. In addition, six teachers (35%) said that there was **not enough time in teaching**, so they could not do all activities presented in teachers' guide. Three teachers said that they had difficulties in doing practical activities because they could not do well practical activities. One teacher (9%) said that she had difficulties in teaching because there was **no projector for showing demonstrable videos** for some lessons.

Six teachers (35%) responded that **students who were taught with old curriculum were less participative in doing activities**. One teacher said that they do not have CD, DVD and blue tooth boxes for doing listening activities. Moreover, she had difficulties in using technological devices, so she suggested that teachers should be trained to improve in IT skills. Two teachers (2.7%) said that **their major subjects did not match with their teaching subjects**.

Moreover, two teachers (9%) said that parents **did not like teaching method of new curriculum** (e.g. teaching method in KG). Thus, they had difficulties in teaching. One (9%) said that they had **difficulties in teaching co-curricular activities** because she didn't know exactly in teaching co- curricular activities. Thus, the teachers who could teach co-curricular activities (e.g. music and art teachers) should be hired. One teacher said that this period was the studying period for new curriculum and is unfamiliar with the changes, so she could not teach students skillfully. Moreover, one teacher said that teachers didn't have enough time to share knowledge and experiences and coordinate among themselves because they were always busy with paper work and doing other school activities.

Conclusion

According to Research Question 1, the challenges of teachers towards new curriculum implementation were explored. It was found that there were **seven** factors related to teachers' challenges towards new curriculum implementation by conducting exploratory factor analysis. When these factors were categorized, there were ten challenges of teachers in implementing new

curriculum: inadequate supervision, inadequate training and inadequate teachers' knowledge on teaching and assessment, large class size and over-workload, low level of students' readiness and motivation, inadequate participation and support of parents and community, fast transition process and time mismatch with teacher guide, teachers' negative attitude (the lowest challenge), teachers' challenges related to infrastructures and resources, teachers' challenges related to information, communication and technology (the highest challenge) and teachers' challenges related to inadequate teachers and lack of coordination among teachers were the challenges that the teachers faced in new curriculum implementation. According to the findings, the challenges that the teachers mostly faced were **the challenges related to information, communication and technology**. This result is compatible with the qualitative findings in that teachers suggested that the government should support ICT tools, especially projectors that are helpful in new curriculum implementation. In this age of technological development, ICT has proved very useful and effective in the teaching and learning process. Secondly, teachers faced the challenge as **inadequate participation and support from parents and the community**. Most parents generally do not understand what the new curriculum is all about, their expectations, learners' assessment, grading, and others. This finding of Chang (1995) showed that many parents who did not see the need and merits of involvement activities, had little participation in the educational process, even the PTA offered them the opportunities.

Additionally, teachers faced **fast transition process and time mismatch with teachers guide**. Baikenov (2020) also stated that fast transition process was one of the challenges for teachers who teach at secondary level. Walelign and Fantahun (2007) also outlined the challenge as time mismatch with the school calendar. Findings of the study by Hipolite (2019) also revealed that teachers had faced the challenge as inadequate training in implementing new curriculum. Thirdly, it was explored that the challenge as **large class size and over-workload** had been faced by participant teachers. Many researchers, such as Hipolite (2019) and Baikenov (2020) also mentioned that many teachers felt stressed with their extra workload and large class size in implementing new curriculum. Fourthly, it was observed that participant teachers faced challenges as **inadequate training and inadequate teachers' knowledge on teaching and assessment**. Findings of the study by Hipolite (2019) also revealed that, teachers had faced the challenge as inadequate training in implementing new curriculum. This result is also consistent with the study of Muneja (2015) who explored the challenge of inadequate teachers' knowledge on teaching and assessment. With reference to curriculum implementation by Rogan and Grayson (2003), adequate professional development is essential for effective curriculum implementation. Fifthly, participant teachers faced **the challenges related to inadequate teachers and lack of coordination among teachers**. From the result of qualitative findings, most of the teachers had faced not having enough teachers. Thus, their teaching subject do not match their major subjects. Similarly, the major findings of Projest (2013) revealed that the shortage of teachers seemed to be a major factor hindering the implementation of curriculum. Moreover, they had full time teaching periods, therefore; they could not do enough sharing and coordination among teachers. Sixthly, the challenge as **low level of students' readiness and motivation** had been faced by participant teachers in implementing new curriculum. With respect to the curriculum implementation theory of Rogan and Grayson (2003), learner factor is

one of the factor for curriculum implementation. This finding matched those of Makunja (2015) and Hipolite (2019) whereby they found that there was a poor willingness of students adopt the new syllabus which required the use of learner-centered approach during classroom interaction. Seventhly, participant teachers had faced **the challenges related to infrastructures and resources**. According to the theory of curriculum implementation by Rogan and Grayson (2003), physical resources are important for curriculum implementation. Eightly, participant teachers agreed that they had faced the challenges as **inadequate supervision**. According to curriculum implementation theory of Rogan and Grayson (2003), curriculum implementation cannot be achieved unless it has adequate supervisory function of school management. This result is consistent with the result of the study by Walelign and Fantahun (2007) who also found the challenge as inadequate supervision faced by teachers in implementing new curriculum. At last, the challenge as **negative attitude towards new curriculum implementation** had been faced by participant teachers. This finding correlate with the previously conducted research by Walelign and Fantahun (2007). At the very beginning of the reform implementation teachers were very negative about the introduced changes. This is a normal reaction, since it is human nature to repulse those changes that make him leave his “comfort zone” (Baikenov ,2020).

Recommendations

The policymakers should support necessary technological devices such as blue-tooth boxes, televisions, projectors, computers with access to free internet to search the lessons that teachers want to study, especially for rural schools and provide trainings related to ICT skills (e.g. computer training). The principals should persuade non-government organizations, parents and community to support in implementing the new curriculum. The policy makers should consider and use teachers’ views as curriculum implementer in designing a curriculum that would benefit all the learners. The policymakers should appoint adequate teachers for all schools. The policymakers should provide opportunities for teachers to develop their professional knowledge and skills by arranging conference, workshops, in-service seminars and by encouraging teachers to do such activities as reading groups, peer observation, writing about teaching, project work and action research. The policymakers should provide guidelines on how to implement policies in schools, and they should also make a follow-up at the schools to observe whether the curriculum was being implemented successfully. The teachers should read National Assessment Policy for Basic Education (NAP) and apply assessment techniques effectively in real situation because the finding indicated that teachers faced the challenge as inadequate teachers’ knowledge on teaching and assessment. The teachers should encourage students and use variety of teaching methods to express their ideas during teaching learning process. The policymakers should provide adequate textbooks, teaching aids, desks, infrastructures for all students. The principals should give advice, timely information and instruction for implementing new curriculum. The teachers should be enthusiastic to adapt the changes and more effort to be effective implementation of new curriculum in their classrooms. The teachers should coordinate and share their knowledge and teaching methods among experienced teachers and their colleagues.

Need for Further Study

This study was conducted to investigate challenges of teachers towards implementing new curriculum in Myitkyina township, Kachin State. Therefore, research need to conduct in other areas to know more different challenges.

Acknowledgements

Firstly, we would like to express my deepest gratitude to Dr. Kay Thwe Hlaing (Rector) and Dr. May Myat Thu (Pro-Rector), Dr. Khin Khin Oo (Pro-Rector), Dr. Nyo Nyo Lwin (Pro-Rector) and Dr. Khin Mar Ni (Professor, Head of Department, Department of Educational Theory and Management. We also thank to Township Education Officers, the principals and teachers from Basic Education Schools, Myitkyina Township, Kachin State.

References

- Baikenov, K. (2020). Teachers' perceptions and challenges of implementing updated curriculum reform in a secondary school in Central Kazakhstan.
- Berkovich, I. (2011). No we won't! Teachers' resistance to educational reform. *Journal*
- Chan, W. P. (1995). The impact of the Parent-Teacher Association (PTA) on a secondary school in Hong Kong. *HKU Theses Online (HKUTO)*.
- Hipolite, J. (2019). Teachers' Strategies In Addressing Challenges Of Implementing Competence Based Curriculum: The Case Of Selected Public Secondary Schools In Morogoro Municipality (Doctoral dissertation, Mzumbe University in Tanzania)
- Isaboke, H. (2021). Challenges Facing Implementation of the Competency Based Curriculum in Kenya. *International Journal of Education and Research*, 71-84.
- Muneja, M. S. (2015). *Secondary School teachers' implementation of the competency-based curriculum in the Arusha Region, Tanzania* (Doctoral dissertation, University of South Africa).
- National Assessment Policy For Basic Education (NAP)
- National Education Strategic Plan (2021-2030)
- Nsengimana, T., Mugabo, L. R., Ozawa, H., & Nkundabakura, P. (2021). Science competence-based curriculum implementation in Rwanda: A multiple case study of the relationship between a school's profile of implementation and its capacity to innovate. *African Journal of Research in Mathematics, Science and Technology Education*, 25(1), 3851.
- Onyeachu, J. A. (2008). Curriculum implementation at the primary education level challenges for the 21st century. *Multidisciplinary Journal of Research Development*, 10(1), 38-49.
- Projest, G. (2013). *The effects of shortage of teachers on curriculum implementation in community secondary schools in Tanzania* (Doctoral dissertation, The Open University of Tanzania).
- Rogan, J. M., & Grayson, D. J. (2003). Towards a theory of curriculum implementation with particular reference to science education in developing countries. *International journal of science education*, 25(10), 1171-1204.
- Sifuna, D. N., & Obonyo, M. M. (2019). Competency Based Curriculum in Primary Schools in Kenya- Prospects and Challenges of Implementation. *Journal of Popular Education in Africa*, 3(7), 39-50.
- Su, S. W. (2012). The various concepts of curriculum and the factors involved in curricula-making. *Journal of language teaching and research*, 3(1), 153-158.
- Walelign, T., & Fantahun, M. (2007). Assessment on problems of the new pre-service teachers training program in Jimma University. *Ethiopian Journal of Education and sciences*, 2(2), 63-72.

PRE-SERVICE TEACHERS' PERCEPTIONS AND USE OF PERSONALIZED LEARNING ENVIRONMENTS

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Abstract

This paper concerns a research study of the pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region. The purpose of this study was to investigate the pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region. A total of 350 pre-service teachers from the Teacher Education Institutions participated in this study. Descriptive statistics, one way ANOVA, Post Hoc Multiple Comparison Tests (Tukey HSD), independent sample *t*-Test and Pearson Product Moment Correlation were used to identify differences between the various independent variables. The finding, $F(3,346) = 16.381, p < .001$ showed that there was a statistically significant difference in pre-service teachers' perceptions of personalized learning environments at Teacher Education Institutions in Sagaing Region. In addition, the finding, $F(3,346) = 23.402, p < .001$ showed that there was a statistically significant difference in the pre-service teachers' use of personalized learning environments at Teacher Education Institutions in Sagaing Region. A positively moderate relationship between perceptions and use of personalized learning environments was revealed ($r = .519, p < .001$). Information gained by interviewing the pre-service teachers and responses of the open-ended questions was complementary to the quantitative findings. Then, the suggestions taken into account the pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region were presented.

Keywords: Perceptions of Personalized Learning Environments (PPLE), Use of Personalized Learning Environments (UPLE), Teacher Education Institutions (TEI)

Introduction

Educational environments are evolving with the integration of technology in the learning process. Instruction with one-type of content in a learning environment is not an appropriate approach for learners with varying amounts of prior knowledge, paces and learning styles.

A personalized learning environment, or PLE, is the platform from which a learner can direct his or her own learning in a personalized learning environment, the learner is able to set learning goals, manage the content and learning process, and communicate with others in the learning process in order to achieve learning goals (Barnes, 2011).

According to Atwell (2007), personalized learning environments are activity environments whose final outcome is cooperative learning, where learners communicate and interact with other learners and experts (as cited in Sahin & Uluyol, 2016).

Most uses of PLE are focused online; however, personalized learning environments embody the entire set of resources that the learner is using in the learning process, which can be offline as well.

Significance of the Study

Personalized learning is an emerging trend which seeks to support student centered, 21st century teaching and learning. This research therefore aims to examine the current real-world usage of personalized learning environments by evaluating pre-service teachers' perceptions and use of personalized learning environments.

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Purpose of the Study

The main purpose of this study is to investigate the pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region.

Research Objectives

The main objective is to investigate the pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region.

The specific objectives of this study are:

1. To study the level of pre-service teachers' perceptions on their personalized learning environment at Teacher Education Institutions in Sagaing Region,
2. To explore the significant difference among the pre-service teachers' perceptions of personalized learning environment at Teacher Education Institutions in Sagaing Region,
3. To study the level of pre-service teachers' use on their personalized learning environment at Teacher Education Institutions in Sagaing Region
4. To examine the significant difference among the pre-service teachers' use of personalized learning environment at Teacher Education Institutions in Sagaing Region and
5. To find out the relationship between pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region.

Research Questions

1. What is the level of pre-service teachers' perceptions on their personalized learning environments at Teacher Education Institutions in Sagaing Region?
2. Is there any significant difference among the pre-service teachers' perceptions of personalized learning environment at Teacher Education Institutions in Sagaing Region?
3. What is the level of pre-service teachers' use on their personalized learning environments at Teacher Education Institutions in Sagaing Region?
4. Is there any significant difference among the pre-service teachers' use of personalized learning environment at Teacher Education Institutions in Sagaing Region?
5. Is there any relationship between pre-service teachers' perceptions and use of personalized learning environments at Teacher Education Institutions in Sagaing Region?

Definitions of Key Terms

Personalized Learning Environments (PLEs): The tools, communities and services that constitute the individual educational platforms learners use to direct their own learning and pursue educational goals (Pearson, 2009).

Theoretical Framework

George Siemens' Connectivism theory has been an integral part of e-learning and personalized learning (as cited in Barnes, 2011).

Review of Related Literature

In this day and age, a personalized learning environment (PLE) has emerged in educational field around the world. PLE allows for a learner or anyone to emerge in a distributed environment consisting of a network of people, services and resources.

Personalized learning environments are the environments in which learners are trained without let or hindrance of time, space etc. and that environment can be updated continuously

according to the needs, necessities, personal characteristics, background knowledge level, interest and abilities of the learners (Smith, 2014)).

The significant emphasis of the PLE concept on learner's engagement and activeness, power, support and independence dimensions were translated into the active roles. A learner should undertake in their own learning, namely knowledge developer, socializer, and decision maker, respectively (Rahimi, 2015).

Personal Learning Environments (PLEs) emerged around 2001 and became widespread from 2004. They were first mentioned by Olivier and Liber, who developed a learning environment for students at a University in Wales to store their learning records in 2001 (Charlier, 2010).

The advantages of PLE for students include the opportunities of flexibility according to time and place (anytime and anywhere), and the opening of individual learning activities, communication, and collaboration in virtual environments (Codrina, 2016).

Methodology

This study was both quantitative study using the descriptive survey design and qualitative study using open-ended question and interview design.

(1) Quantitative Methodology

This study was to examine the pre-service teachers' perceptions and use of personalized learning environments at TEI in Sagaing Region by using questionnaire survey.

Population and Sample

-350 pre-service teachers (100 DTED Trainees, 100 PPTT Trainees, 100 BEd Trainees and 50 PGDMA Trainees) (175 Male and 175 Female), most of DTED & BEd Trainees are the age of between 16 and 20, and most of PPTT & PGDMA Trainees are between 20 and 30 from two Education Colleges (coded as EC1 & EC2) and two Universities for Teacher Education (coded as UOE1 & UOE2) in Sagaing Region in 2018-2019 AY.

Instrumentation

The questionnaires were constructed based on "PPLE" developed by Sahin & Uluyol, (2016) and "UPLE" developed by Rahimi, (2015). In the questionnaire: (1) demographic data (Gender, Age, and Trainees), (2) questionnaire for PPLE (36 items), (3) questionnaire for UPLE (40 items) through the use of five point Likert scale.

In "PPLE" consists of three dimensions; "Perception of Usability", "Perception of Usefulness" and "Perception of Limitations". In "UPLE" consists of four dimensions; "Use for Access", "Use for Construct", "Use for Manage" and "Use for Share".

Procedure of Data Collection

-The pilot tests were employed at the two Education Colleges in Mandalay Region (100 DTED and 100 PPTT trainees), and using SPSS version 22 (Cronbach alpha ranked above 0.7 is reliable).

Table (1) Internal Consistency (Cronbach's Alpha Reliability Coefficients) for PPLE

No.	Perceptions of Personalized Learning Environments	Cronbach's Alpha
1	Perception of Usability (PUs)	0.7
2	Perception of Usefulness (PUf)	0.8
3	Perception of Limitations (PL)	0.7
	Overall (PPLE)	0.8

Table (2) Internal Consistency (Cronbach's Alpha Reliability Coefficients) for UPLE

No.	Use of Personalized Learning Environments	Cronbach's Alpha
1	Use for Access (UA)	0.8
2	Use for Construct (UC)	0.8
3	Use for Manage (UM)	0.8
4	Use for Share (US)	0.8
	Overall (UPLE)	0.8

Analysis of the Data for Quantitative Study

SPSS 22.0 was used for the descriptive statistics and *t*-test. Descriptive statistics were used to tabulate mean (M) and standard deviation (SD). One-way ANOVA was conducted to test significant differences. Post Hoc Multiple Comparison Tests (Tukey HSD) was applied to know which specific means are different from which other ones. Pearson product-moment correlation coefficient was utilized to know the relationship between PPLE & UPLE.

(2) Qualitative Methodology

The qualitative data were obtained through interviews and open-ended questions.

Population and Sample

A total of 28 pre-service teachers, eight from DTed (Science=4, Art=4), 8 from B.Ed (Science=4, Art=4), 8 from PPTT (BSc=4, BA=4), and four from PGDMA (BSc=2, BA=2)

Instrument

Three open-ended questions and five interview questions were used.

Analysis of the Data for Qualitative Study

Data obtained from open-ended questions and interview were transcribed to complete the qualitative finding.

Findings**(1) Findings of Quantitative Study****Table (3) Demographic Information about the Participants**

Categories of Pre-service Teachers		EC1	EC2	UOE1	UOE2	Total	
						N	%
Gender	Male	50	50	50	25	175	50%
	Female	50	50	50	25	175	50%

Categories of Pre-service Teachers		EC1	EC2	UOE1	UOE2	Total	
						N	%
Age	<20	50	50	50	25	175	50%
	>20	50	50	50	25	175	50%
Trainees	DTEd	50	50	-	-	100	28.6%
	BEd	-	-	50	50	100	28.6%
	PPTT	50	50	-	-	100	28.6%
	PGDMA	-	-	50	-	50	14.3%

Table (4) Independent Samples *t*-test for Each Dimensions of PPLE between EC and UOE

Dimensions	Institutions	<i>t</i>	<i>df</i>	Sig	Mean Differences
Perceptions of Usability	EC UOE	-8.070	348	0.000	-0.291
Perceptions of Usefulness	EC UOE	-3.433	-3.433	0.001	-0.121
Perceptions of Limitations	EC UOE	-3.281	348	0.001	-0.112
PPLE	EC UOE	-6.731	348	0.000	-0.175

The result of *t*-test for PPLE revealed that there were statistically significant differences ($p<0.01$). For perceptions of usability, perceptions of usefulness and perceptions of limitations, significant differences ($p<0.01$) were found.

Table (5) Independent Samples *t*-test for Each Dimension of UPLE between EC and UOE

Dimensions	Institutions	<i>t</i>	<i>df</i>	Sig	Mean Differences
Use for Access	EC UOE	-5.815	348	0.000	-0.339
Use for Construct	EC UOE	-7.528	348	0.000	-0.438
Use for Manage	EC UOE	-5.849	348	0.000	-0.342
Use for Share	EC UOE	-5.355	348	0.000	-0.324
UPLE	EC UOE	-7.083	348	0.000	-0.361

The result of *t*-test for UPLE revealed that there were statistically significant differences in their use of personalized learning environments ($p<0.01$). In the dimensions of use for access,

use for construct, use for manage and use for share, there were statistically significant differences ($p < 0.01$).

Table (6) Means and Standard Deviations for PPLE according to the Institutions

Institutions	N	Mean	SD
EC1	100	3.94	0.29
EC2	100	3.93	0.24
UOE1	100	4.13	0.21
UOE2	50	4.06	0.20
PPLE	350	4.01	0.26

Low (1.00-2.33)

Moderate (2.34-3.67)

High (3.68-5.00)

The highest mean value ($\bar{X}=4.13$) was found for the PPLE in UOE1. The pre-service teachers in Un1 had higher PPLE than those in EC1, EC2 and UOE2. The mean values for all the institutions indicated that their PPLE were high ($\bar{X}=4.01$).

Table (7) ANOVA Table for PPLE according to the Institutions

PPLE	Sum of Squares	df	Mean Square	F	p
Between Groups	2.823	3	.941	16.381	.000
Within Groups	19.878	346	.057		
Total	22.701	349			

$P < .001$

ANOVA Result showed that there was a statistically significant difference in perceptions of personalized learning environments according to the Institutions, $F(3, 346) = 16.381$, $p < .001$.

Table (8) Results of Multiple Comparisons for PPLE according to the Institutions

(I)Institutions	(J)Institutions	Mean Differences (I-J)	p
UOE1	EC1	0.192*	0.000
	EC2	0.208*	0.000
UOE2	EC1	0.116*	0.029
	EC2	0.132*	0.009

*The mean difference is significant at 0.05 level.

The pre-service teachers from UOE1 rated higher PPLE than those in EC1 and EC2. The pre-service teachers from UOE2 also rated higher PPLE than those in EC1 and EC2.

Table (9) Means and Standard Deviations for UPLE according to the Institutions

Institutions	N	Mean	SD
EC1	100	3.62	0.534
EC2	100	3.41	0.522
UOE1	100	3.94	0.319
UOE2	50	3.74	0.413
UPLE	350	3.67	0.504

Low (1-2.33)

Moderate (2.34-3.67)

High (3.68-5)

The highest mean value ($\bar{X}$ =3.94) was found in Un1 for UPLE. The pre-service teachers in UOE1 rated more UPLE than those in EC1, EC2 and Un2. The mean values of EC1and EC2 indicated moderate UPLE ($\bar{X}$ =3.62 & $\bar{X}$ =3.41). The mean values of UOE1 and UOE2 expressed more UPLE ($\bar{X}$ =3.94, & $\bar{X}$ =3.7).

Table (10) ANOVA Table for UPLE according to the Institutions

UPLE	Sum of Squares	df	Mean Square	F	p
Between Groups	14.926	3	4.975	23.402	.000
Within Groups	73.561	346	.213		
Total	88.487	349			

P<.001

ANOVA Result showed that there was a statistically significant difference in use of personalized learning environments according to the Institutions, $F(3, 346) = 23.402, p < .001$.

Table (11) Results of Multiple Comparisons for UPLE according to the Institutions

(I)Institutions	(J)Institutions	Mean Differences (I-J)	p
EC1	EC2	0.218*	0.005
UOE1	EC1	0.321*	0.000
	EC2	0.538*	0.000
UOE2	EC2	0.332*	0.000

*The mean difference is significant at 0.05 level.

The pre-service teachers in UOE1 rated more use of personalized learning environments than those in EC1 and EC2. The pre-service teachers in EC1 also rated more use of personalized learning environments than those in EC2, and UOE2 also rated more use of personalized learning environments than those in EC2.

Table (12) Correlation between PPLE & UPLE at Teacher Education Institutions

Variables	Perceptions of Personalized Learning Environments	Use of Personalized Learning Environments
Perceptions of Personalized Learning Environments Sig. (2-tailed)	1	.519**
N	350	350
Use of Personalized Learning Environments Sig. (2-tailed)	.519**	1
N	350	350

**Correlation is significant at the 0.01level (2-tailed).

Table (12) indicated that there is a positively moderate relationship between perceptions of personalized learning environments and use of personalized learning environments ($r=.519, p < .01$).

Table (13) Inter-correlations between PPLE & UPLE at TEI

Variables	PUS	PUF	PL	UA	UC	UM	US
PUS	1						
PUF	.547** .000	1					
PL	.202** .000	.266** .000	1				
UA	.455** .000	.364** .000	.124** .000	1			
UC	.493** .000	.369** .000	.162** .000	.753** .000	1		
UM	.484** .000	.410** .000	.190** .000	.688** .000	.772** .000	1	
US	.382** .000	.412** .000	.216** .000	.565** .000	.666** .000	.731** .000	1

**Correlation is significant at the 0.01 level.

As described in Table (13), almost all rating in components of PPLE & UPLE were found to be statistically significant to each other.

(2) Findings of Qualitative Study

(i) Responses to Three Open-ended Questions

- The Total of 350, Participants 292 (83%), Not Respond 58 (17%)

Q-(1), “What are the requirements to implement the PLE concept within the school context?”

- internet, school wi-fi, adequate computers, projector, laboratory, language lab,

Q-(2), “What types of learning content, skill, and competencies do you need?”

-not only from online learning environments but also from offline learning environments, and to explore personal interests

Q-(3), “What are your suggestions for improving the use of PLEs?”

-need to provide personalized learning opportunities, to promote creativity, and to improve technology skills

(ii) Responses to Five Interview Questions (28 Participants)

Q-(1), “Please explain your previous technology-based learning experiences”,

-they mostly used mobile phones to study the contents as they interest, and they practiced typing, and also used Microsoft word to write their lessons by using computers

Q-(2), “Based on your experiences, please explain your perception about the PLE,

- supported them to study any education, they had a deep understanding they could utilize time effectively, they had free to study, and they could share the information

Q-(3), “Have you considered using a more personalized learning environment with your trainings or other workplace learning? Do you think the outcome will be more or less just as effective?”

- using PLE in training for their peer group teaching, planning the lesson, assignments and teaching aids and have self-confidences and friendly with technology tools

Q-(4) “Do you believe that personalized learning environments could be utilized in your learning? Why or why not? ”

- could be utilized because supported them every time everywhere, and not limited knowledge and information, could learn what they wanted from Google and Browser

Q-(5) “What types of personalized learning environments do you usually use and how they impact on your learning?”

- use mobile phone and make them from dependent learners to independent learners

Conclusion And Discussion

Students’ learning should change from ‘dependent learning’ to ‘independent learning’ such as personalized learning and they should be given opportunities to make their own decisions according to their own interests.

It is the complete set of both online and offline resources that learners use to review their class room learning during their self-learning phases for answering their homework and assignment questions (Dabbagh & Kitsantas, 2011 as cited in Tanyong & Sharafuddin, 2016).

Personalized learning environments enable a learner to pool all of his or her learning experiences, whether these are workplace, academic or civic experiences. This can be employed to make more informed and self-directed decisions about learning needs (Hicks, 2015).

Personalized learning environment allows learners to become motivationally and behaviourally active participants, to regulate their own learning, and greatly enhancing their learning outcomes (Mikroyannidis, 2015).

The main benefit is that personalized learning environments prepare students for ongoing development beyond the classroom and provide a practical means to introduce the tools that will support lifelong learning (Reinders, 2014).

In this modern education age, personalized learning environment is an effective learning environment and learners need to have enthusiasm, critical thinking, right learning and understanding, and responsibility and accountability.

Therefore, using personalized learning environments reduces the dependence on the teachers and increases student control over their own learning and they have opportunities to achieve maximum personalization. PLE enables learners to organize their learning, provides the freedom to choose content, and allows communication and collaboration with others easily.

Recommendation for Further Research

The study only covered the concepts of personalized learning environments; the use of personalized learning environments; the characteristics of personalized learning environments; and the role of personalized learning environments in education. The research should also be carried out to investigate students and in-service teachers’ perceptions and use of personalized learning environments not only at Teacher Education Institutions but also in Basic Education Schools, Colleges, Degree Colleges, other Institutions, and Universities in the country.

Finally, it is recommended that today is rapidly changing education and employment conditions demand a lifelong learner who is flexible, motivated, and in control of his or her learning. The personalized learning environments have significantly advanced the lifelong learners with the tools and support they need for personalizing their learning and developing a wide range of technology skills.

Acknowledgements

First and foremost, I would like to express my profound gratitude and appreciation to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education). Second, my special thanks go to Dr. Khin Mar Ni, (Professor and Head of Department, Department of Educational Theory, Yangon University of Education) for her support and encouragement. Third, I would like to devote my endless acknowledgement and obedience to my teacher, Dr. Khin Mar Yee (Retired Professor and Head of Department, Department of Educational Theory, Sagaing University of Education) for her forbearance, encouragement and precious academic guidance and advice. Finally, my special thanks go to all teachers who participated in my thesis work. I would also like to express my appreciation and thanks go to pre-service teachers at Teacher Education Institutions in Sagaing Region.

References

- Barnes, R.J. (2011). *The use of personalized learning environments in corporate training programs*. Retrieved from <http://etd.ohiolink.edu>get>online>.
- Charlier, B. (2010). *From personal environment to personal learning environment*. Retrieved from Bernadette.Charlier@unifr.ch
- Codrina, L.(2016). *Students' perceptions reading personalized learning and educational communication*. Retrieved from www.upm.ro>cci>CCI-04>Psy
- Hicks, A. (2015). *Critical connections: personal learning environments and information_literacy/ Article in Research in Learning Technology*. Retrieved from <https://www.researchgate.net/publication/270884413>.
- Mikroyannidis, A. (2015). *Personal learning environments (PLEs): visions and concepts*. Retrieved from <http://www.role-project.eu>
- Pearson, E. (2009). *Personal learning environment to support learner's needs and preferences*. Retrieved from/ <https://www.ascilite.org.au/conferences/auckland09/procs/pearson.pdf>
- Reinders, H. (2014). *Personal learning environments for supporting out-of-class language learning*. Retrieved from www.innovationinteaching.org.
- Rahimi, E. (2015). *A design framework for personal learning environments; Master of science in software engineering, Amirkabir University of Technology, Tehran, Iran*. Retrieved from <https://doi.org/10.4233/uuid:432bbd60-c6b9>
- Smith, L.D. (2014). *Academic mentoring and how it can support personalized learning*. EdD Thesis, University of Nottingham. Retrieved from http://eprints.nottingham.ac.uk/14189/1/19012013_thesis.pdf
- Sahin, S., & Uluyol, C.(2016). *Pre-service teachers' perception and use of personal learning environments (PLEs); International review of research in open and distributed learning*. Retrieved from <https://www.researchgate.net/publication/296619402>
- Tanyong, S., & Sharafuddin, M.A. (2016). *Understanding personal learning environment perspectives of Thai international tourism and hospitality higher education students* Retrieved from www.iiste.org

THE EXPLORATION OF CULTURALLY RESPONSIVE TEACHING PRACTICES OF TEACHERS

Khin Lat Lat Mon¹, Su Su Hlaing² & Phyu Zar Zar Theint³

Abstract

This study aimed to study the exploration of culturally responsive teaching practices of teachers. A mix-method design (the Exploratory Design) was used. The survey questionnaire was developed by the review of literature and the results of focus group interview. The reliability coefficient (Cronbach's alpha) of the instrument was used to assess the reliability of the questionnaire, 0.95 for the degree of importance of culturally responsive teaching practices of teachers and 0.87 for the extent of culturally responsive teaching practices of teachers. A total of 849 teachers who are actually teaching culturally diverse students from Lower Myanmar were selected as samples through purposive sampling. For the qualitative study, focus group interview was employed. The questionnaires contained the information of teachers' culturally responsive teaching practices. Quantitative data analysis included exploratory factor analysis, confirmatory factor analysis and descriptive statistics. The result five factors were using cultural congruity in classroom instruction, creating conducive learning environment and collaborating with colleagues and parents, appreciating other culture and providing cultural awareness to students, practising procedural justice and providing learning opportunity for students to live together. And the teachers perceived that they practiced culturally responsive teaching to a moderate extent.

Keyword: culturally responsive teaching

Introduction

The diverse cultures in a nation should be reflected in the education system of a country. Education Acts have been enacted to encompass all cultures, in line with the inclusive principles found in the constitutions of progressive nations. There have been apprehensions regarding the extent and readiness of teachers to integrate multiculturalism into their daily teaching and learning practices. If teachers fail to grasp the intentions of students from diverse backgrounds, they may inadvertently push them away from the educational system, thereby contributing to the persistence of societal inequalities (Bennett, 2008). It is crucial for the teachers to possess cultural competency and practice culturally responsive teaching in their teaching and learning situation (Moule, 2012). With people increasingly engaging in diverse work environments, the ability to exhibit cultural competency is crucial for successful interactions with coworkers, clients, and neighbors (Banks, 2004). From this, culturally responsive teaching is commonly described as an educational equity practice, ensuring that every student receives the necessary support to succeed academically (Sleeter, 2012). Therefore, this study will also explore and investigate teachers' culturally responsive teaching practices within their teaching and learning environments.

Significance of the Study

Myanmar is characterized by a variety of ethnic groups and distinct cultures, resulting in a diverse student body in the schools, encompassing various cultural backgrounds, ethnicities, religions, and socioeconomic status. Therefore, it is important for all people to live peacefully

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and respectfully with each other and all the students should be cultivated to learn and live peacefully and respectfully.

It is crucial that teachers in the schools where there are culturally diverse students should possess cultural competency in order to be able to effectively instruct and collaborate with these student population and then they should practice culturally responsive teaching. When applied to education, cultural competency is demonstrated through the practice of culturally responsive teaching. Cultural competency is interconnected with culturally responsive teaching, as both ideas involve effectively harnessing the influence of culture to address students' requirements (Schalk, 2009). No education system can ever be better than the teachers (Khin Zaw, 2001). Therefore, Worley (2007) contended that modern education places a strong emphasis on accountability. The imperative to achieve success for every student compels teachers to continually developing strategies to facilitate each student's progress and proficiency in essential skills. The academic underperformance and achievement failure of diverse student populations is problematic. Studies indicated that classroom teachers are inadequately equipped to proficiently teach diverse student groups, lacking the essential knowledge, skills, and attitudes to work effectively with them. This deficiency has a detrimental effect on the students' learning and academic performance, posing a significant problem. As a result, students from diverse backgrounds may not acquire the necessary knowledge, skills, and mindset to thrive as productive members of their society. There is an urgency to address this problem (Perkins, 2012). Therefore, it is important to investigate culturally responsive teaching practices of teachers especially in the schools where there are culturally diverse students. In Myanmar, there were a few studies related with culturally responsive teaching especially in Education Sector. Therefore, this study will provide the necessary practices for the teachers to effectively teach and communicate with all of the culturally diverse students.

Theoretical Framework

In this study, the exploration and investigation of teachers' culturally responsive teaching practices will be based on The Racial Identity Theory modified by Howard (2006). This theory is based on the facts; (1) to know who ones are racially and culturally different, (2) to learn about and value ones' cultures different from ones' own, (3) to view social reality through the lens of multiple perspectives, (4) to understand the history and dynamics of dominance and (5) to nurture in teachers and their students a passion for justice and skills for social action.

Moreover, culturally responsive teaching will also be based on focus group interviews, the concept of culturally responsive teaching, and five elements of culturally responsive teaching by Gay (2002): (1) develop a cultural diversity knowledge base, (2) design culturally relevant curricula, (3) demonstrate cultural caring and build a learning community, (4) provide cross-cultural communications, and (5) use cultural congruity in classroom instruction, six categories in culturally responsive teaching by Hohensee (2013): (a) validating, (b) comprehensive, (c) multidimensional, (d) empowering, (e) transformative, and (f) emancipatory, three dimensions of culturally responsive teaching by Mitchell (2018): curriculum and instruction, relationship and expectation establishment and group belonging information.

Research Objectives

The general objective of this study was to study the exploration of culturally responsive teaching practices of teachers in Basic Education Schools.

The specific objectives were:

- To explore culturally responsive teaching practices of teachers in Basic Education Schools
- To study the extent of culturally responsive teaching practices of teachers in Basic Education Schools

Research Questions

- What are culturally responsive teaching practices of teachers in Basic Education Schools?
- To what extent do teachers practice culturally responsive teaching in Basic Education Schools?

Definition of Key Terms

Culturally Responsive Teaching: A compendium of teaching practices that promotes high expectations and yields academic success for students who are culturally and linguistically diverse (Gay, 2018).

Limitation of the Study

This study is geographically limited in Lower Myanmar: Thingangyun Township, Ngaputaw Township, Taungoo Township, Dawei Township, Hpa-An Township, Minbya Township, Kyaikmaraw Township. The participants of this study are primary teachers, junior teachers and senior teachers who are actually teaching culturally diverse students. This analysis was conducted by gathering data through questionnaire surveys based on the perspectives of participant teachers.

Operational Definition

Culturally responsive teaching is operationally defined as teachers' practices to effectively instruct and communicate with a culturally diverse student body, with the aim of enhancing student achievement. The level of culturally responsive teaching practices of teachers is determined by mean values responded by teachers on five-point Likert scale questionnaire which composed of fifty-nine items about their culturally responsive teaching practices. The more the mean values of responses, the greater the extent of culturally responsive teaching practices of teachers.

Methodology

This design started with qualitative data and then built quantitative phase. Focus group was conducted by using open discussions and included information about culturally responsive teaching practices to effectively teach for all of the culturally diverse students. The questionnaire included (59) items that were developed based on Culturally Responsive Teaching Inventory (CRTI) developed by Hohensee (2013), Culturally Responsive Teaching Self Efficacy Scale (CRTSE) developed by Siwatu (2007), Culturally Responsive Teacher Practice Scale (CRTPS-2) developed by Mitchell (2018), the results of focus group interview and the related literature. There were two parts: one part was to measure the degree of importance of culturally responsive teaching practices of teachers. The other part was to measure the extent of culturally responsive teaching practices of teachers and each item was rated on five-point Likert scale. It was evaluated

by five retired teacher educators from the Department of Educational Theory at Yangon University of Education and four expert teacher educators from the Department of Educational Theory and Management, Yangon University of Education. The items and format were modified according to their suggestions. A pilot study was conducted with 70 teachers from two Basic Education Schools in Patheingyi Township. Cronbach's alpha was used to assess the reliability of the questionnaire, 0.95 for the degree of importance of teachers' performance on culturally responsive teaching, 0.87 for the extent of teachers' performance on culturally responsive teaching. The researcher used purposive sampling method and 849 teachers from 73 Basic Education Schools across Lower Myanmar were chosen as sample. These schools are situated in Thingangyun Township in Yangon Region, Ngaputaw Township in Ayeyarwady Region, Taungoo Township in Bago Region, Dawei Township in Tanintharyi Region, Hpa-An Township in Kayah State, Minbya Township in Rakhine State, and Kyaikmaraw Township in Mon State. For exploring teachers' performance on culturally responsive teaching, Exploratory Factor Analysis and Confirmatory Factor Analysis were utilized. And then the resulted factors were named to represent the related items. And then, the names of these five resulted factors were validated by 3 experts, retired teacher educators from Department of Educational Theory. The extent of culturally responsive teaching practices of teachers for each item included in the questionnaire by the teachers was also analyzed by using the descriptive statistics.

Findings

Research Question (1): Exploring Culturally Responsive Teaching Practices of Teachers

First, the information and culturally responsive teaching practices were emerged from focus group interview. Then exploratory factor analysis will employ. Before the exploratory factor analysis, it needs to assess the suitability of the data. To determine the items were suitable for factor analysis, the Kaiser-Meyer-Olkin (KMO) measure to test the adequacy of the sample size and the Bartlett's test of sphericity to examine the item correlation matrix. From the result of the analysis, KMO was 0.95 and this value indicated that the items are suitable for analyzing the EFA because above 0.6 is the lower limit of the possible cutoff values (Eaton, 2019) and the Bartlett's test of sphericity was significant ($p < 0.001$) that means the variables are highly correlated for the researcher to move forward with the EFA. With regard to communality, this is a numerical measure of an item's variance (Eaton, 2019). The communalities from the result were all above 0.4 and the communalities between 0.25 and 0.4 have been suggested as acceptable cutoff values (Eaton, 2019). As the result, all the requirements for factor analysis are satisfied and therefore, exploratory factor analysis was conducted using with 59 items by 500 participant teachers (8.5 times of the number of items) for exploring culturally responsive teaching practices of teachers. The Principal Component Analysis (PCA) was run with the rotation of varimax with Kaiser Normalization.

Table 1 Rotation Sums of Squared Loadings for Culturally Responsive Teaching Practices of Teachers (N=500)

Rotation Sums of Squared Loadings		
Factors	Eigenvalues	% of Variance
Factor (1)	24.62	41.73
Factor (2)	4.58	7.77
Factor (3)	2.58	4.37
Factor (4)	1.95	3.30
Factor (5)	1.58	2.68

In Table 1, from the result of principal component analysis, it revealed the presence of five factors with eigenvalues exceeding 1, explaining 41.73%, 7.77%, 4.37%, 3.30% and 2.68% respectively.

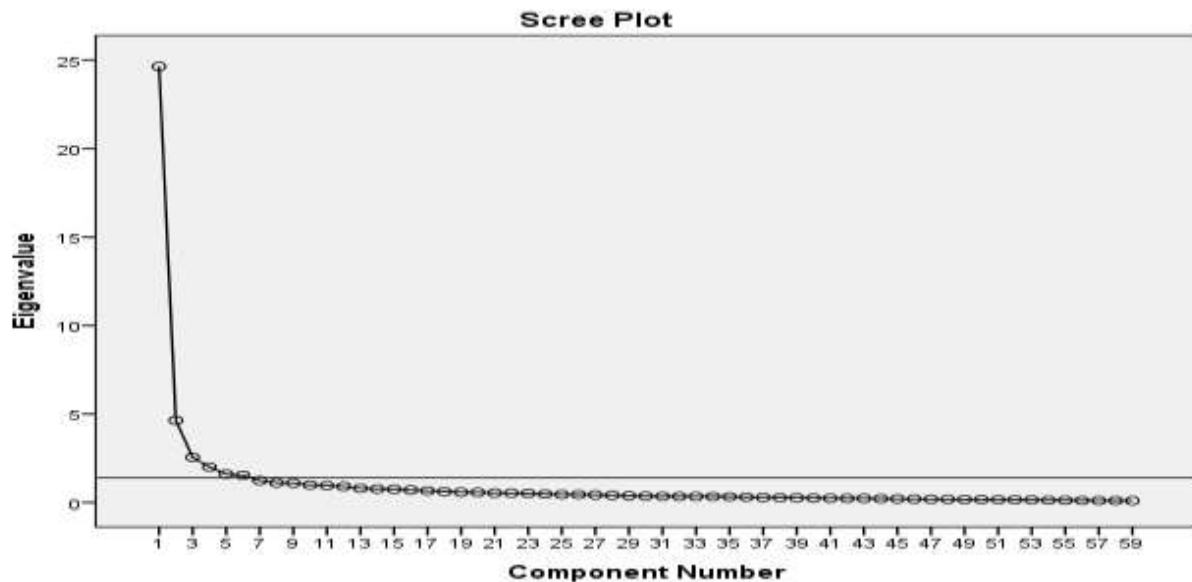


Figure 1 Scree Plot Showing Culturally Responsive Teaching Practices of Teachers

Figure 1 shows a scree plot of eigenvalues plotted against the factor numbers and the curve has an instant it could be interpreted that the scale has five factors. To explore culturally responsive teaching practices, the factors should be named in accordance with the construct explained by the items based on the subjective opinion of the researcher. According to Table 2, the items that were below factor loading .50 which is practically significance (Arifin, 2018) were cut off and therefore the number of items in the instrument remained 52. The first factor had factor loading .742 to .503, the second factor had factor loading ranging from .664 to .526, , the third factor had factor loading .771 to .594, the fourth factor had .737 to .531 and the fifth factor had from .721 to .580. The following Table 2 showed factor loadings and communalities for culturally responsive teaching practices of teachers.

Table 2 Factor Loadings and Communalities for Culturally Responsive Teaching Practices of Teachers (N=500)

No.	Items	Component					Communalities
		1	2	3	4	5	
1.	Using various teaching methods that accommodate the different learning style of students	.742					.680
2.	Using the concrete examples that are familiar with all of the culturally diverse students in order to understand the lesson clearly	.716					.647
3.	Performing to achieve learning objectives without discriminating all students	.715					.608
4.	Taking notes on unique information of each student and incorporating it into the preparation of learning activities.	.671					.674
5.	Promoting self-confidence of all students by helping them realize their strengths	.658					.703

No.	Items	Component					Communalities
		1	2	3	4	5	
6.	Assessing the students with the language that they understand	.656					.576
7.	Providing positive feedback to students' ideas	.640					.612
8.	Explaining the lessons with the language that all the students can understand easily	.637					.597
9.	Making students do self-assessment on their progress	.634					.549
10.	Modifying and creating learning activities so that all of the culturally diverse students can equally participate in learning	.623					.654
11.	Letting the students know having thorough knowledge of culture	.618					.624
12.	Incorporating teaching aids and content that can reflect the culture of different ethnicities into teaching	.551					.541
13.	Exhibiting preferred behaviour when culturally diverse students present their own opinions and ideas in group discussion	.543					.637
14.	Providing individualized teaching based on the strengths and weaknesses of all of the culturally diverse students	.530					.551
15.	Fostering all of the culturally diverse students to actively participate in group activities	.526					.633
16.	Showing the appreciation for the students' accomplishment and success	.519					.643
17.	Using various assessment techniques to make sure that all of the students achieve the desired learning outcomes	.517					.520
18.	Providing all the students with challenging learning activities	.503					.639
19.	Establishing reasonably high expectation for all students		.664				.653
20.	Creating an emotionally safe classroom environment for all students		.655				.690
21.	Establishing a physically safe classroom environment		.654				.659
22.	Encouraging culturally diverse students to believe that they can succeed		.629				.693

No.	Items	Component					Communalities
		1	2	3	4	5	
23.	Inviting the parents to discuss their children's learning progress		.629				.623
24.	Treating all of the culturally diverse students to believe that they are important students in classroom		.625				.586
25.	Caring and communicating with the parents of minority groups		.624				.621
26.	Discussing with the culturally diverse colleagues in order to teach all of the culturally diverse students effectively		.614				.689
27.	Developing and maintaining caring relationship with students		.614				.609
28.	Advising all of the students to live in love and friendship		.594				.657
29.	Asking questions and discussing with culturally diverse students by calling their names friendly		.584				.516
30.	Supporting the stationary to students who are really poor		.538				.502
31.	Interacting with culturally diverse students in accordance with their culturally accepted behavior		.526				.579
32.	Asking the students to bring pictures and symbols related to cultural rituals into the classroom and discuss respective culture			.771			.607
33.	Celebrating various cultural festivals in the classroom			.763			.590
34.	Visiting and studying various cultural environment where the students live			.726			.619
35.	Hanging some pictures and symbols showing the culture of different ethnic groups on bulletin boards and classroom walls			.721			.548
36.	Attending various cultural festivals and religious festivals			.679			.573
37.	Showing the respect to different cultures			.674			.566
38.	Learning languages of culturally diverse students			.643			.496
39.	Preparing and sending survey forms to the parents of culturally diverse students and fill them out in order to find out the students' traditional customs			.627			.417
40.	Friendly discussing with the students about their culture			.594			.401

No.	Items	Component					Communalities
		1	2	3	4	5	
41.	Selecting classroom monitors and five-houses leaders with transparency				.737		.785
42.	Responding every student who violates the classroom rules in very similar ways,				.721		.765
43.	Inviting and encouraging all of the students to present their own idea in establishing classroom rules and routines				.633		.640
44.	Intervening the problems with unbiased manner				.613		.693
45.	Marking and grading the students' work in accordance with marking scheme				.600		.720
46.	Avoiding the words that would ravage the unity				.549		.724
47.	Avoiding the words that can be sensitive				.531		.712
48.	Fostering the students to support and take care of each other					.721	.677
49.	Teaching songs that can promote unity					.717	.708
50.	Suggesting and encouraging students to watch TV Program and social media broadcasting various tradition and culture					.623	.528
51.	Encouraging all students to study and share their culture and tradition					.607	.578
52.	Providing group activities in which all of the culturally diverse students have to involve to improve unity and mutual respect among them					.580	.613
Eigenvalues		24.62	4.58	2.58	1.95	1.58	
% of Variance Explained		41.73	7.77	4.37	3.30	2.68	

The first factor consisted of 18 items and was mainly concerned with *using cultural congruity in classroom instruction*. The second factor contained 13 items and was mainly associated with *creating conducive learning environment and collaborating with colleagues and parents*. The third factor composed of 9 items and this factor was commonly related with *appreciating other culture and providing cultural awareness to students*. The fourth factor constituted with 7 items and this factor mainly represents as *practicing procedural justice*. Finally, the fifth factor contained 5 items and this was mainly associated with *providing learning opportunity for students to live together*.

Confirmatory Factor Analysis on Culturally Responsive Teaching Practices of Teachers

After exploratory factor analysis, the instrument of culturally responsive teaching practices remained five factors with 52 items. These items were also assessed through

Confirmatory Factor Analysis (CFA) by using Amos (24) with the rest 349 participant teachers to examine the goodness of the model fit as shown in Figure 2.

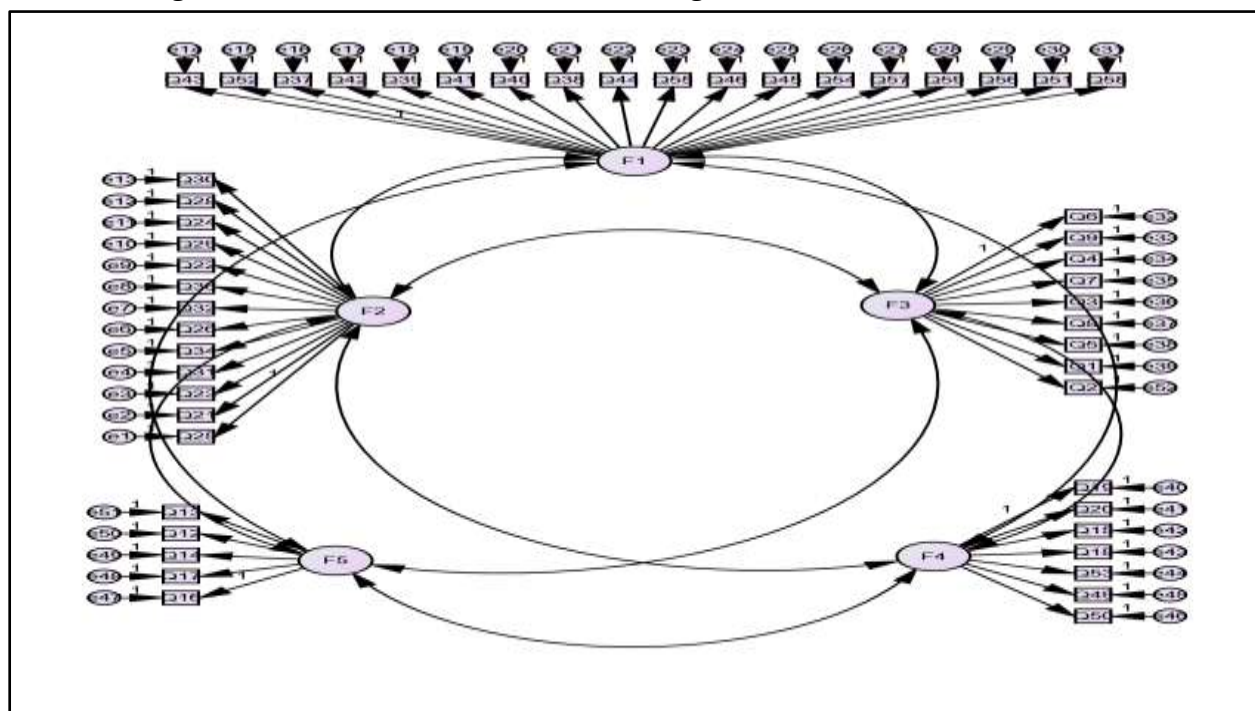


Figure 2: Factor Proposed Model of Culturally Responsive Teaching Practices of Teachers

Table 3 Model Fit Indices of Proposed Model

Index	Chisq	X^2/df	CFI	TLI	RMSEA	SRMR
Level of Acceptance	0.000	6.44	0.802	0.792	0.08	0.069

Note: Chisq= Discrepancy chi square, X^2/df = Relative X^2 , CFI= Comparative fit index
 TLI= Tucker-Lewis Index, RMSEA= Root Mean Square of Error of Approximation
 SRMR = Standardized Root Mean Square Residual

According to Table 3, absolute fit indices (RMSEA) and incremental fit indices (CFI and TFI) did not reach acceptable value. If CFI, TLI are equal or higher than 0.9 (Awang, 2012, as cited in Zaini et al., 2020) and RMSEA value is less than 0.06 and SRMR value is less than 0.08 (Hu & Bentler, 1999,), the model will be fit. To obtain a better-fitting model, modification indices in Amos facilitate the researcher to generate the expected model fit. By removing the items with too low loading or less than 0.5 and by drawing covariance between error terms, it can get a better fitting model. Therefore, after removing four items (No. 38, 49, 50 and 54) with loading less than 0.5 and error terms were correlated, the analysis was run to get an acceptable model fit and the final model remained 48 items with also five factors as shown in Table 4 and Figure 3.

Table 4 Model Fit Indices of Proposed Model (Revised)

Index	Chisq	X^2/df	CFI	TLI	RMSEA	SRMR
Level of Acceptance	0.000	3.80	0.913	0.90	0.058	0.050

Note: Chisq= Discrepancy chi square, X^2/df = Relative X^2 , CFI= Comparative fit index
 TLI= Tucker-Lewis Index, RMSEA= Root Mean Square of Error of Approximation
 SRMR = Standardized Root Mean Square Residual

According to the data from Table 4, CFI value was 0.913 and TLI value was 0.9, RMSEA was 0.058 that was an acceptable cutoff value, SRMR was also 0.05, that was also an satisfactory value, X^2/df was 3.80 and chi-square was significant at $p<0.001$. Therefore, the final model accepted as five-factor construct with 48 items.

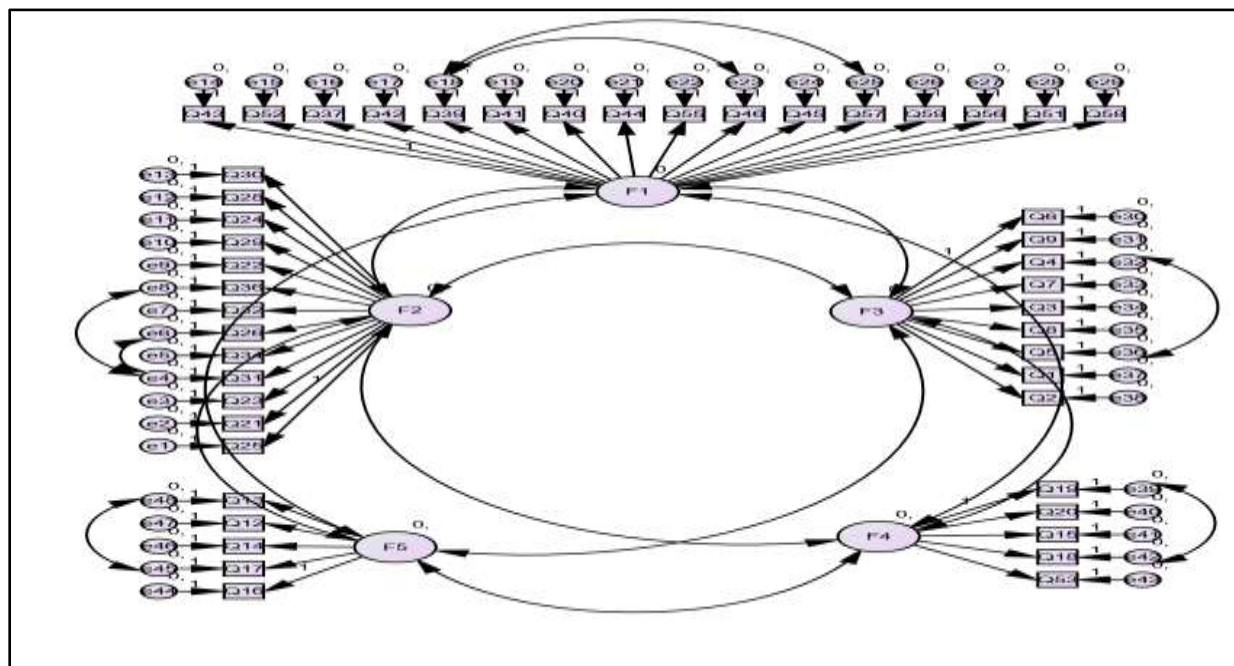


Figure 3 Factor Model Fit of Final Model of Culturally Responsive Teaching Practices of Teachers

Table 5 Descriptive Statistics and Reliability for Culturally Responsive Teaching Practices of Teachers (N=849)

Teachers' Performance on Culturally Responsive Teaching	No. of items	Mean (S.D)	Skewness	Kurtosis	Alpha
Factor1	16	3.87 (.62)	-.562	.857	0.93
Factor2	13	4.02 (.61)	-.796	1.571	0.93
Factor3	9	2.88 (.67)	.067	.152	0.86
Factor4	5	4.25 (.70)	-1.014	1.028	0.87
Factor5	5	3.59 (.65)	-.326	.341	0.78
Overall	48	3.73 (.50)	-.702	2.213	0.95

According to Table 5, the research results five factors for culturally responsive teaching practices of teachers. Moreover, the reliability coefficient of each factor ranged from 0.78 to 0.93 and the reliability of the whole instrument was 0.95. Therefore these five factors of teachers' performance were highly reliable to measure culturally responsive teaching practices of teachers in Myanmar context. The culturally responsive teaching practices of teachers were also named as follows:

Table 6 Name of Variable and Items in Each Factor

Factors	Variable Name	Items
Factor 1	Using cultural congruity in classroom instruction	Sub-dimension: Preparation
		Modifying and creating learning activities so that all of the culturally diverse students can equally participate in learning
		Taking notes on unique information of each student and incorporating it into the preparation of learning activities
		Providing all the students with challenging learning activities
		Sub-dimension: Teaching
		Performing to achieve learning objectives without discriminating all students
		Providing individualized teaching based on the strengths and weaknesses of all of the culturally diverse students
		Using the concrete examples that are familiar with all of the culturally diverse students in order to understand the lesson clearly
		Using various teaching methods that accommodate the different learning style of students
		Explaining the lessons with the language that all the students can understand easily
		Fostering all of the culturally diverse students to actively participate in group activities
		Promoting self-confidence of all students by helping them realize their strengths
		Incorporating teaching aids and content that can reflect the culture of different ethnicities into teaching
		Sub-dimension: Assessment
		Exhibiting preferred behaviour when culturally diverse students present their own opinions and ideas in group discussion
		Using various assessment techniques to make sure that all of the students achieve the desired learning outcomes
		Making students do self-assessment on their progress
		Providing positive feedback to students' ideas
		Showing the appreciation for the students' accomplishment and success
Factor 2	Creating conducive learning environment and collaborating	Establishing reasonably high expectation for all students
		Creating an emotionally safe classroom environment for all students
		Establishing a physically safe classroom environment
		Encouraging culturally diverse students to believe that they can succeed
		Treating all of the culturally diverse students to believe that they are

Factors	Variable Name	Items
	with colleagues and parents	important students in classroom
		Developing and maintaining caring relationship with students
		Advising all of the students to live in love and friendship
		Asking questions and discussing with culturally diverse students by calling their names friendly
		Supporting the stationary to students in the classroom who are really poor
		Interacting with culturally diverse students in accordance with their culturally accepted behavior
		Discussing with the culturally diverse colleagues
		Caring and communicating with the parents of minority groups
		Inviting the parents to discuss their children's learning progress
Factor 3	Appreciating other culture and providing cultural awareness to students	Asking the students to bring pictures and symbols related to cultural rituals into the classroom and discuss respective culture
		Celebrating various cultural festivals in the classroom
		Visiting and studying the cultural environment where the students live
		Hanging some pictures and symbols showing the culture of different ethnic groups on bulletin boards and classroom walls
		Attending various cultural festivals and religious festivals
		Showing the respect to different cultures
		Learning languages of culturally diverse students
		Preparing and sending survey forms to the parents of culturally diverse students and fill them out in order to find out the students' traditional customs
		Friendly discussing with the students about their culture
Factor 4	Practising procedural justice	Selecting classroom monitors and five-houses leaders with transparency
		Responding every student who violates the classroom rules in very similar ways
		Inviting and encouraging all of the students to present their own idea in establishing classroom rules and routines
		Intervening the problems with unbiased manner
		Marking and grading the students' work in accordance with marking scheme
Factor 5	Providing learning opportunity for students	Fostering the students to support and take care of each other
		Teaching songs that can promote unity
		Suggesting and encouraging students to watch TV Program and social media broadcasting various tradition and culture

Factors	Variable Name	Items
	to live together	Encouraging all students to study and share their culture and tradition
		Providing group activities in which all of the culturally diverse students have to involve to improve unity and mutual respect

Research Question (2): Investigating the Extent of Culturally Responsive Teaching Practices of Teachers

Table 7 Means and Standard Deviations of Culturally Responsive Teaching Practices of Teachers (N=849)

No.	Variables	Mean	SD	Remark
1	Using Cultural Congruity in Classroom Instruction (Preparation, Teaching, Assessment)	4.02	.61	Practice to a moderate extent
2	Creating Conducive Learning Environment and Collaborating with Colleagues and Parents	3.87	.62	Practice to a moderate extent
3	Appreciating Other Culture and Providing Cultural Awareness to Students	2.88	.67	Practice to a somewhat extent
4	Practising Procedural Justice	4.25	.70	Practice to a great extent
5	Providing Learning Opportunity for Students to Live Together	3.59	.65	Practice to a moderate extent
Culturally Responsive Teaching Practices		3.73	.50	Practice to a moderate extent

Scoring direction: 1.00 – 1.80 = do not practice at all

1.81 – 2.60 = practice to a little extent

2.61 – 3.40 = practice to a somewhat

3.41 – 4.20 = practice to a moderate

4.21 – 5.00 = practice to a great extent

extent

According to Table 7, it can be seen that the teachers perceived that they practiced “*practicing procedural justice*” to a great extent (Mean=4.25). Moreover, the teachers perceived that they performed to a moderate extent in such areas as *using cultural congruity in classroom instruction* (Mean=4.02), “*creating conducive learning environment and collaborating with colleagues and parents*” (Mean=3.87), and “*providing learning opportunity for students to live together*” (Mean=3.59). On the other hand, the teachers perceived that they practices “*appreciating other culture and providing cultural awareness to students*” to a somewhat extent as its related mean value was 2.88. And the teachers believed that they practiced culturally responsive teaching to a moderate extent as its associated mean value was 3.73.

Results and Discussion

In this study, based on the results of exploratory and confirmatory factor analysis, five factors resulted. The first factor, *using cultural congruity in classroom instruction* concerned with the facts modifying and creating learning activities so that all of the culturally diverse students can equally participate in learning, taking notes on unique information of each student and incorporating it into the preparation of learning activities and so on. When considering these information in conjunction with the expert statements, culturally responsive teaching consists of

teaching and learning that is contextualized (Christian, 2017). Concerned with the second factor, ***creating conducive learning environment and collaborating with colleagues and parents***, the items which are important by the perception of participant teachers were establishing reasonably high expectation for all students, creating an emotionally safe classroom environment for all students, caring and communicating with the parents of minority groups and inviting the parents to discuss their children's learning progress, and so on. Taking into account the information provided above alongside the statements made by experts, high teacher expectations foster positive student attitudes and social relationships, which leads to success in school. This occurs regardless of negative factors that could affect student achievement (Rubie-Davies, 2010).

Regarding third factor, ***appreciating other culture and providing cultural awareness to students***, the items deemed important by the perception of participating teachers were such as asking the students to bring pictures and symbols related to cultural rituals into the classroom and discuss respective culture, visiting and studying the cultural environment where the students live, and so on. Therefore, considering these facts that were linked and taken into account in conjunction with the experts' statements, appreciation is when someone seeks to understand and learn about another culture in an effort to broaden their perspective and connect with others cross-culturally. Culturally responsive pedagogy is a student-centered approach to teaching that includes cultural references and recognizes the importance of students' cultural backgrounds and experiences in all aspects of learning (Ladson-Billings, 1995).

Concerning fourth factor, ***practicing procedural justice***, the items considered important according to the perspective of participating teachers were such as selecting classroom monitors and five-houses leaders with transparency, responding every student who violates the classroom rules in very similar ways, intervening the problems with unbiased manner, and so on. Therefore, all students should be given the opportunity to learn in an unbiased environment (Banks, 2008, as cited in Mmagu, 2016). In relation to fifth factor, ***providing learning opportunity for students to live together***, the items regarded as significant from the viewpoint of participating teachers were such as fostering the students to support and take care of each other, and so on. Therefore, culturally responsive teaching helps schools meet the needs of all students by creating a learning environment that values the cultural and linguistic diversity of the entire student population (SimpleK12 Staff, 2023). From the result, it was found that the teachers perceived that they practiced culturally responsive teaching to a moderate extent. Therefore, if teachers are culturally and linguistically competent and engage in culturally responsive practice, students' academic success will be improved and the achievement gap bridged (Lucas & Villegas, 2013, as cited in Acquah, 2015).

Suggestions

The following suggestions are based on the research findings.

1. The teachers should utilize a variety of teaching approaches and assessment techniques to address the unique learning styles of students and should explain the lessons with the language that all the students can understand easily.
2. Should prepare and design educational activities in a way that ensures equitable participation for all culturally diverse students in the learning process.

3. The teachers should try to possess favourable relationship with the colleagues from different cultural background, the parents and the community.
4. The teachers should interven the problems with unbiased manner and respond every student who violates the classroom rules in very similar ways.
5. The teachers should establish a physical learning environment by displaying images and symbols that depict the cultures of various ethnic groups on bulletin boards and walls.
6. The teachers should visit and study the surrounding environment where the students live.
7. The teachers should create the teaching and learning situation for the students to live and learn together by grouping the students to involve different cultural background.
8. The teachers should foster the students to appreciate other culture and should plan to provide the activities to develop the awareness of other culture.
9. The policy maker ought to create and support networks within schools to facilitate open dialogue and collaboration for the teachers and students and to collaborate with community members to create a more holistic approach to cultural competency.

Need for Further Studies

The researcher intentionally did not include school principals as participants. If school principals had been included and asked about how they support teachers, the study could have yielded more robust and comprehensive conclusions.

Acknowledgements

We would like to express our sincere gratitude to the Rector and Pro-rectors of Yangon University of Education for granting us permission to conduct this research. We extend special thanks to other teacher educators in the Department of Educational Theory and Management for giving valuable comments. Additionally, we are grateful to all the teachers from the selected Basic Education Schools for their active participation in this study.

References

- Acquah, E. O. (2015). *Responding to changing student demographics in finland: a study of teachers' developing cultural competence* (Doctoral dissertation, University of Turku, Faculty of Education, Centre for Learning Research, and Department of Teacher Education).
- Arifin, W.N. (2018). Exploratory factor analysis. unit of biostatistics and research methodology, Universiti Sains Malaysia.
- Banks, J. (2004). Multicultural education: Historical development, dimensions, and practice. In J. A. Banks & C. A. M. Banks (Eds.), *Handbook of research on multicultural education*. San Francisco:
- Bennett, M. (2008). Understanding the students we teach: Poverty in the classroom. *The clearing house*, 81(6), 251-256.
- Christian, S. (2017). *Culturally Responsive Teaching and Student Self-Efficacy in Alaskan Middle Schools*. (Doctoral dissertation, University of Alaska Fairbanks, Multicultural Education: Interdisciplinary Program).
- Eaton (2019). Comparing exploratory factor models of the brief electricity and magnetism assessment and the conceptual survey of electricity and magnetism. *Physical Review Physics Education Research* 15, 020133
- Gay, G. (2002). Preparing for culturally responsive teaching. *Journal of Teacher Education*. <https://www.cwu.edu/teaching-learning/sites/cts.cwu.edu/teaching-learning/files/documents/Pre>
- Gay, G. (2018). Preparing for culturally responsive teaching. *Journal of Teacher Education*. <https://www.cwu.edu/teaching-learning/sites/cts.cwu.edu/teaching-learning/files/documents/Pre>
- Hohensee, J.-A. (2013). *Elementary teachers' perceived use of culturally responsive teaching practices and their relationship to teachers' demographics*. (Doctoral Dissertation, University of Phoenix). ProQuest Disseratation.

- Howard, G. R. (2006). *We can't teach what we don't know: White teachers, multiracial schools*. 2nd ed. New York, NY: Teachers College Press.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.
- Khin Zaw, Dr. (2001). *Theoretical pedagogy (I) (Ontology)*. PhD Programme Course Material. Yangon Institute of Education.
- Ladson-Billings, G. (1995). But that's just good teaching! The case for culturally relevant pedagogy. *Theory into Practice*, 34(3), 159-165.
- Mitchell, T. S. (2018). *An examination of the relationship between teacher competence and student achievement*. (Doctoral dissertation, Sothern Connecticut State University).
- Mmagu, V. C. (2016). *Exploration of Culturally Responsive Teaching: A Basic Qualitative Study* (Doctoral dissertation, Capella University). ProQuest Dissertation.
- Moule, J. (2012). *Cultural competence: A primer for educators (international edition) (2nd ed.)*. Oregon State University, United States: Wadsworth Cengage Learning.
- Perkins, R. M. (2012). *The multicultural awareness, knowledge, skills and attitudes of prospective teacher: A quantitative and heuristic phenomenological study*. (Doctor Dissertation, The University of Missouri-Kansas City).
- Rubie-Davies, C. (2010). Teacher expectations and perceptions of student attributes: Is there a relationship? *British Journal of Educational Psychology*, 80, 121-135.
- Schalk, A. V. (2009). *Elementary teacher candidates' degree of cultural competency and beliefs regarding special education referrals: uncovering factors related to disproportionality* (UMI No. 3407512) (Doctoral dissertation, Saint Joseph's University). ProQuest Dissertation.
- SimpleK12 Staff. (2023). What is culturally responsive teaching? 2023 guide with examples.
- Siwatu, K. O. (2007). Preservice Teachers' Culturally Responsive Teaching Self-Efficacy and Outcome Expectancy Beliefs. *Department of Educationl Psychology and Leadership, College of Education, Texas Tech University*.
- Sleeter, C. E. (2012). Confronting the marginalization of culturally responsive pedagogy. *Urban Education*, 47(3), 562-584. doi.org/10.1177/0042085911431472
- Worley, C. L. (2007). *At-risk students and academic achievement: The relationship between certain selected factors and academic success*.
- Zaini, B. J., Yusof, Z. M., Mansor, R., Zainuddin, N., Adlee, N. F. K., & Ahmad, H. N. L. (2020). Constructing motivation for sports activities among college students using cb-SEM Path Model. *European Journal of Molecular & Clinical Medicine*, 7(6), 2299. ISSN 2515-8260.

A STUDY OF PRINCIPALS' LEADERSHIP SELF-EFFICACY

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Abstract

The primary purpose of this study is to study leadership self-efficacy of principals. Totaling 75 principals were selected by using stratified sampling from Basic Education Schools in Hinthada Townships in Ayeyarwaddy Region as the participants. Two sets of questionnaire and open-ended questions were used to collect the required data. The internal consistency (Cronbach's alpha) of the questionnaire for principals' leadership self-efficacy was (0.96). Descriptive research method was used to tabulate the mean values and standard deviations for groups of items. Moreover, Independent Samples *t*-Test, One-way ANOVA and post-hoc test by Tukey were used for the analysis of the data. The results found that the level of principals' leadership was 3.86. According to the mean value, all principals participated in this study were found that **Quite Confident** on their leadership self-efficacy. Statistically significant differences were found in some areas of principals' leadership self-efficacy according to their personal factors perceived by teachers. When investigating the levels of leadership self-efficacy of principals according to the qualitative findings, it was found that the mostly principals had quite confident in leadership self-efficacy according their responses.

Keywords: self-efficacy, leadership self-efficacy, principals' leadership self-efficacy

Introduction

In 21st century, educational reforms and changes are the most common process to be quality education. The accomplishment of such is dependent on many factors including numerous personnel within the education system. In particular, the school principal is one of the pivotal elements in education system in achieving the quality to which all aspire as the agent of change. Leaders, key figures of groups and organization, are typically described as highly committed people, perseverant in the face of obstacles, goal-oriented, able to solve problems in efficient, practical, and quick way (Locke et al, 1991; Yukl, 2006 cited in Bobbio & Manganeli, 2009). Today's leaders face unprecedented challenges as organizations struggle to adapt to ever-accelerating rates of change both internally and with the external environment in with they are embedded. Such change challenges not only the knowledge, skills and abilities of leaders, but perhaps even more important, the self-conceptualizations of their leadership capabilities and psychological resources to meet the ever increasing demands of their roles (Avolio and Luthans, 2006). What seems to emerge from the literature is moreover that leadership roles are generally assumed by people with high self-efficacy beliefs who are inclined to expend greater efforts to fulfill their leadership roles and to persevere longer when faced with difficulties (Bandura, 1997; Chemers, Watson, & May, 2000; McCormick, Tanguma, & Sohn, 2002; Yukl, 2006; Bobbio & Manganeli, 2009). Leadership efficacy is an essential component of effective leadership because it influences a leader's behavior, decision-making and ability to inspire and motivate others (Locke, 2003; cited in Bobbio & Manganeli, 2009). The leaders need to adopt appropriate leadership and leadership self-efficacy to lead the organization and to face the challenges of the 21st century. It can be assumed that the idea of leadership self-efficacy related to the principals for the development of organization competencies that can help to create better future. Therefore, the principals' leadership self-efficacy is needed to study.

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Significance of the Study

Myanmar is trying to enhance the quality of education and upgrade the education system. In doing so, the role of educational principal leadership today is considerable that the process of enlisting and guiding the talents and energies of stakeholders towards achieving common educational objectives (Wachira et al., 2017). The only and the most important reason of the success or failure in educational institutions is accepted the principals' leadership self-efficacy as a vital role in order to improve the quality of education. Thus, the purpose of the study is to find out the principals' leadership self-efficacy and their leadership styles in Basic Education High Schools.

Objectives of the Study

General Objective

The general objective of the study is:

- To study the principals' leadership self-efficacy in Basic Education Schools

Specific Objectives

The specific objectives of the study are:

- To identify the levels of principals' leadership self-efficacy in Basic Education Schools
- To study the significant difference of the principals' leadership self-efficacy in terms of their personal factors

Research Questions

- What is the level of the principals' leadership self-efficacy?
- Is there any significant difference of the principals' leadership self-efficacy in terms of their personal factors?

Limitation of the Study

The scope of this study is geographically limited to selected basic education schools from Hinthada Township, Ayeyawaddy Region. This study is concerned with the principals' leadership self-efficacy.

Theoretical Framework

Leadership self-efficacy, grounded in social cognitive theory, is the belief that one has the capabilities and resources to perform a specific task-leadership (Nguyen, 2016). In this study, the theoretical framework is established based on a new multidimensional scale for measuring Leadership Self-Efficacy (LSE) developed by Bobbio & Manganelli, (2009). Leadership self-efficacy undergoes six dimensions in order to cover all the crucial leadership areas.

1. Starting and leading change process in group
2. Choosing effective followers and delegating responsibilities
3. Building and managing interpersonal relationships within the group
4. Showing self-awareness and self-confidence
5. Motivating people
6. Gaining consensus of group members

Starting and Leading Change Process in Group

A principal's sense of efficacy is required continuously an effort of goal-orientation and starting and leading change process in group, effective task strategies, and artistic practicing of various conceptual, technical and interpersonal skills. The leader needs to set a new direction for a group, if the one currently taken doesn't seem correct for the current situation. They can usually change the attitudes and behaviors of group members if they don't meet group objectives and figure out the best direction and plan important new direction for change process in the future. The self-efficacy of leaders is crucial in influencing effective leadership in an organization (Anderson et al., 2008; Paglis & Green, 2002; Adewle, 2019). A strong sense of efficacy is needed to make an effort for actualizing the goals of institution (Tschannen & Gareis, 2004; Cobanoglu & Yurek, 2018). High self-efficacy enables principals to lead and facilitate organizational learning by assisting teachers to perform their various tasks and facilitating the exchange ideas between the various systems in the school (Hesbol, 2019).

Choosing Effective Followers and Delegating Responsibilities

Principals' self-efficacy facilitates group attainment and ability to choose group members in order to build up an effective and efficient team and optimally share out the work between the members. Leadership self-efficacy as one's sense of competency that the leaders can be exert direction and delegate the task of accomplishing specific goals in specific tasks to other group members within a group setting. They focus cohesion instead of forced alignment to maintain a rapport with follower to have them committed to the group's efforts, and manage obstacles which impede group members' ability to complete their tasks. One of the most important leadership responsibilities is the selection of the best group members for any specific task or situation, in order to enhance their commitment, make them grow, and get the best possible results (Yukl, 2006). Within the self-efficacy literature, there is a strong suggestion that people use self-efficacy perceptions when determining the amount of time, effort, and resources to expend on a given task (Baker, 2021). Self-efficacy is vital to the type of cognitive and thought regulation that allows for effective problem-solving, solutions, and performance (Hannah et al., 2012). These qualities are included in many leadership models, suggesting the significance of cognitive capacity in leadership (Hannah et al. 2008).

Building and managing interpersonal relationships within the group

Leadership is generally defined art of influencing people so that they can establish very good relationships with the people and will strive willingly towards the achievement of group goals. Interpersonal skills are an important part of effectively working with and leading others so that they can communicate with others, going straight to the heart of the matter and manage relationships with all the members of the group. Self-efficacy directly promotes effective leader engagement to develop trusting relationships and build good communication and collaboration with the local community. Leadership experts will assert that there are two sides to leading: the "hard" side of analyzing, planning, making decisions, and strategizing, and the "soft" side of leadership that involves inspiring, motivating, and persuading followers, building good working relationships, networking, rallying, and cajoling (Riggio and Tan, 2014). Hannah and others (2008) found that efficacy directly promote effective leader engagement, flexibility, and adaptability (Baker, 2021).

Showing self-awareness and self-confidence

Successful leadership is grounded in self-awareness and identifies the strengths and weaknesses, identify their blind spots, and adapt their leadership style and know how to get the best out of the situations. Self-aware leaders can contribute to ability to get things done. Efficacy beliefs of principals is competence to help group members to reach the group's targets and able to affirm my beliefs and values. Self-efficacy is a task-specific construct (Bandura, 1997 cited in Smith, 2006). Principals may feel efficacious for leading in particular contexts, it is necessary to assess one's strength and weakness in relation to the requirements of the task (Tschannen- Moran & Gareis, 2004). Principals with a strong sense of self-efficacy have been found to be persistent in pursuing their goals, but are also more flexible and more willing to adapt strategies to meeting contextual condition (Tschannen- Moran & Gareis, 2004). Through a strong sense of leadership skills, effective leaders have understood their strengths and weakness in ways that served the group.

Motivating people

Motivation is then increased by the ability of the leader to encourage increased self-efficacy of the group or collective efficacy and motivate the members of a group. The leaders with high self-efficacy motivate group members and arouse their enthusiasm and give opportunities to any group member in the exercise of his/her tasks or functions for the improvement of the school. They can motivate their subordinates to focus the concept of team work. Self-efficacy has played a pivotal role in cognitive, motivational, affective, and selective processes related to social cognitive theory (Cormier, 2017). Lunenburg (2011) argued that self-efficacy is the task-specific characteristic of self-esteem which augments people's capacity to motivate, acquire and increase performance (Almutairi, 2020). A leader's self-efficacy has shown to be beneficial to positively reinforcing followers' optimism (Cormier, 2017).

Gaining consensus of group members

Successful leadership involves using social influence processes to organize, direct and motivate the action of others to be appreciating them. It is necessary for effective leadership because leadership is crucial to organization to gain the consensus of group members. The self-efficacy of leaders is crucial in influencing effective leadership in an organization and to gain commitment and genuine support of group members to new goals. Gaining support for change and commitment from followers is indicative of the success of a leader (Hannah et al., 2012; Paglis & Green, 2002; Pendley, 2021). The principal's beliefs affect their behaviors and teacher commitment (Hallinger et al., 2017 cited in Cobanoglu & Yurek, 2018) and essential for school management (Fisher, 2014). Leadership self-efficacy, a subcategory of self-efficacy, can be defined as personal beliefs related to knowledge, skills, and abilities associated with the leadership of groups (Bobbio & Manganelli, 2009; Hannah et al., 2008). These beliefs allow leaders to use their skills to provide direction and garner support and commitment from followers (Hannah et al., 2012; Paglis & Green, 2002).

Definition of Key Terms

Self-Efficacy

Self-efficacy is defined as a person's belief in his or her capability to successfully perform a particular task (Bandura, 1997).

Leadership Self-Efficacy

A leader's perceived capabilities to organize the positive psychological capabilities, motivation, means, collective resources, and courses of action required to attain effective, sustainable performance across their various leadership roles, demands, and contexts (Hannah et al., 2008).

Principals' Leadership Self-Efficacy

Principals' leadership self-efficacy is defined as a judgement of one's own capabilities to structure a particular course of action in order to produce desired outcomes in the school he or she leads (Tschannen-Moran & Gareis, 2007).

Operational Definition of Leadership Self-Efficacy

In this study, leadership self-efficacy is operationally defined as a leader's belief in their course of actions in leadership to start the change process and build interpersonal relationship with followers to gain consensus to achieve organizational goals.

Methodology

In this study, both quantitative and qualitative research method were used to collect the required data. For the quantitative research study, questionnaire surveys were used. For qualitative research study, the open-ended questions and interviews were applied. For participants, 75 school principals from Basic Education Schools in Hinthada Township, Ayeyarwaddy Region were selected by using stratified sampling method.

Questionnaire survey was used to collect the required data to investigate the leadership self-efficacy of principals. All items used in this study were measured by Five-point Likert Scale ranging from Strongly Disagree to Strongly Agree (1= Strongly Disagree, 2=Disagree, Slightly Agree, 4=Agree, 5=Strongly Agree). The scale is comprised of 30 items to assess the level of the principals' leadership self-efficacy. For the qualitative data, six open-ended questions were used. Both instruments were developed based on the review of literature related to leadership self-efficacy under the guidance of the supervisor.

Quantitative Research Findings

In this study, the level of principals' leadership self-efficacy was explored by six subscales. First, mean values and standard deviation of principals' leadership self-efficacy on their leadership areas were described in Table 1.

Findings on the Level of Principals' Leadership Self-Efficacy

Table 1. Mean and Standard Deviations Showing the Level of Principals' Leadership Self-Efficacy (N=75)

No.	Variables	Mean (SD)	Remark
1.	Starting and leading change process in group	3.74(0.41)	Quite Confident
2.	Choosing effective followers and delegating responsibilities	3.95(0.41)	Quite Confident
3.	Building and managing interpersonal relationships within the group	3.89(0.31)	Quite Confident
4.	Showing self-awareness and self-confidence	3.84(0.39)	Quite Confident

No.	Variables	Mean (SD)	Remark
5.	Motivating people	3.92(0.42)	Quite Confident
6.	Gaining consensus of group members	3.82(0.49)	Quite Confident
Principals' Leadership Self-Efficacy		3.86(0.35)	Quite Confident

Scoring Direction: 1.00-1.80 = Not at all Confident 1.81-2.60 = Slightly Confident
2.61-3.40 = Somewhat Confident 3.41-4.20 = Quite Confident
4.21-5.00 = Extremely Confident

According to the data presented in Table 1, the area of “Starting and leading change process in group” showed a slightly lower mean value having 3.74 than other areas and the area “Choosing effective followers and delegating responsibilities” presented the higher mean value having 3.95. As the data presented, the overall mean score for the principals’ leadership self-efficacy of principals in basic education schools was (3.86). Thus, it was found that all principals have quite confident and high level of leadership self-efficacy in all areas of their principals’ leadership self-efficacy.

Finding on the Variations of the Level of Principals’ Leadership Self-Efficacy in terms of their Personal Factors

To investigate the variations of leadership self-efficacy of principals in basic education schools, their gender, age, position, and administrative service were utilized as their personal factors in this study.

First of all, the overall mean values of male and female groups of principals were 3.89 and 3.85 respectively. It can be found that the mean values between two gender groups were slightly different. There was no significant difference in all areas of principals’ leadership practices between male and female principals.

In addition, the overall mean values among their age group were 3.92, 3.79 and 3.87 respectively. Therefore, it can be found that there were no significant differences in the principals’ self-efficacy on their leadership among their age group.

According to their position, One-Way ANOVA was concluded to attain more detail information and it showed that the significant differences in the dimension of “Gaining consensus of group members”.

In Table 2, it was found that there were significant differences in the dimension of gaining consensus of group member ($F = 2.439$, $p < 0.05$) and there were no significant differences in other areas.

Table 2 One-Way ANOVA Result Showing Significantly Different Areas of Principals’ Leadership Self-Efficacy Grouped by Position (N=75)

No.			Sum of square	Df	Mean Square	F	p
1.	Starting and leading change process in Group	Between Groups	0.814	2	0.407	2.439	n.s
		Within Groups	12.013	72	0.167		
		Total	12.827	74			

No.			Sum of square	Df	Mean Square	F	p
2.	Choosing effective followers and delegating responsibilities	Between Groups	0.017	2	.009	0.050	n.s
		Within Groups	12.269	72	.170		
		Total	12.286	74			
3.	Building and managing interpersonal relationships within the group	Between Groups	0.183	2	.092	0.159	n.s
		Within Groups	12.720	72	.177		
		Total	12.903	74			
4.	Showing self-awareness and self-confidence	Between Groups	0.670	2	.335	2.234	n.s
		Within Groups	10.794	72	.150		
		Total	11.463	74			
5.	Motivating people	Between Groups	0.906	2	.453	2.285	n.s
		Within Groups	14.266	72	.198		
		Total	15.171	74			
6.	Gaining consensus of group members	Between Groups	1.787	2	.893	3.961	0.023*
		Within Groups	16.240	72	.226		
		Total	18.027	74			
	Principals' Leadership Self-Efficacy	Between Groups	0.515	2	.258	2.373	n.s
		Within Groups	7.818	72	.109		
		Total	8.333	74			

Note: * $p < 0.05$, n.s= no significance

To get the detailed information about the difference among the groups, Post-Hoc analysis was carried out with the use of Tukey HSD method.

Table 3. Tukey HSD Result Showing Multiple Comparisons for Significantly Different Areas of Principals' Leadership Self-Efficacy by Position (N=75)

No.	Dependent Variables	(I) Position	(J) Position	(I-J) Mean Different	p
1.	Gaining consensus of group members	Primary	Middle	-.36000	0.023*

Note: * $p < .05$

As shown in Table 3, it was found that the Middle School Principals groups showed surpassed than Primary School Principals in gaining consensus of group members ($p < 0.05$). Therefore, it can be concluded that the higher position the principal possessed, the higher leadership self-efficacy in the area of gaining consensus of group members.

Table 4. One-Way ANOVA Result Showing Significantly Different Areas of Principals' Leadership Self-Efficacy Grouped by Administrative Service (N=75)

No.			Sum of square	Df	Mean Square	F	P
1.	Starting and leading change process in Group	Between Groups	0.889	3	0.296	1.763	n.s
		Within Groups	11.938	71	0.168		
		Total	12.827	74			
2.	Choosing effective followers and delegating responsibilities	Between Groups	1.434	3	.478	3.126	.031*
		Within Groups	10.852	71	.153		
		Total	12.286	74			
3.	Building and managing interpersonal relationships within groups	Between Groups	0.525	3	.175	1.005	n.s
		Within Groups	12.378	71	.174		
		Total	12.903	74			
4.	Showing self-awareness and self-confidence	Between Groups	1.590	3	.530	3.812	.014*
		Within Groups	9.873	71	.139		
		Total	11.463	74			
5.	Motivating people	Between Groups	1.641	3	.547	2.870	.042*
		Within Groups	13.530	71	.191		
		Total	15.171	74			
6.	Gaining consensus of group members	Between Groups	0.856	3	.285	1.179	n.s
		Within Groups	17.171	71	.242		
		Total	18.027	74			
	Principals' Leadership Self-Efficacy	Between Groups	0.845	3	.282	2.671	n.s
		Within Groups	7.488	71	.105		
		Total	8.333	74			

Note: * $p < 0.05$, n.s= no significance

One-Way ANOVA was concluded and it showed that the significant differences in the dimension of “Choosing effective followers and delegating responsibilities”, “Showing self-awareness and self-confidence” and “Motivating People” according to their administrative service. In Table 4, it was found that there were significant differences in the dimension of Choosing effective followers and delegating responsibilities ($F = 3.126$, $p < 0.05$), Showing self-awareness and self-confidence ($F = 3.812$, $p < 0.05$), and Motivating People ($F = 2.870$, $p < 0.05$).

To get the detailed information about the differences among the groups, Post-Hoc analysis was carried out with the use of Tukey HSD method.

Table 5. Tukey HSD Result Showing Multiple Comparisons for Significantly Different Areas of Principals' Leadership Self-Efficacy by Administrative Service (N=60)

No.	Dependent Variables	(I) Administrative Service	(J) Administrative Service	(I-J) Mean Different	P
1.	Choosing effective followers and delegating responsibilities	< 1 Year	1-5 Years	-.39583	0.023*
			> 11 Years	-.37471	
2.	Showing self-awareness and self-confidence	< 1 Year	1-5 Years	-.4111	0.014*
3.	Motivating people	< 1 Year	1-5 Years	-.4389	0.042*

Note: * $p < 0.05$, n.s= no significance

According to Table 5, it was found that 1-5 years and > 11 years administrative service principals showed surpassed than < 1 year administrative service principals in choosing effective followers and delegating responsibilities ($p < 0.05$). In addition, 1-5 years administrative service principals showed surpassed than < 1 year administrative service principals in showing self-awareness and self-confidence ($p < 0.05$). Moreover, there was also significant difference in motivating people between < 1 year administrative service principals and 1-5 years administrative service principals ($p < 0.05$). Therefore, it can be concluded that the more experienced in administrative service the principal had, the higher leadership self- efficacy in the area of choosing effective followers and delegating responsibilities, showing self-awareness and self-confidence and motivating people.

Qualitative Research Findings

Responses to Open-ended Question

As the qualitative findings, the open-ended questions were conducted in this study to investigate the principals' leadership self-efficacy. There are six open-ended questions for principals in this study and the principals' various responses for these questions are described in detail as follow.

The first was concerned with principals' leadership self-efficacy belief about starting and leading change process to attain achievement and how do they manage well. In this question, the most principals had self-efficacy belief about their leadership in this area. However, a few principals claimed that they had some extent of leadership self-efficacy belief in this area but they struggle to manage common challenges.

The second question was concerned with principals' leadership self-efficacy belief about choosing effective followers and delegating responsibilities and how they delegate well. In this question, the principals had quite confident in delegating and responsibilities. However, there was a few principals answered that they have not at all confident in this area. They complain of some issues.

Relating to third question, it is concerned with principals' leadership self-efficacy belief about building and managing interpersonal relationships within the group and how they build well. In this question, a number of principals have confident in their interpersonal skill. They build their good interpersonal relationship with subordinates. However, there was a few principal expressed openly that they have not much confident and their poor is relationship with others.

The fourth question was concerned with principals' leadership self-efficacy belief about showing self-awareness and self-confidence. In this question, the principals mentioned their leadership capabilities, strength and weakness. Most of the principals can focus on themselves and evaluate well. Although they have confident their leadership, they have sense in weakness in organizing and communicating with others persuasively.

The fifth question was concerned with principals' leadership self-efficacy belief about motivating people and how to motivate well. In this question, the most principals had confident and can motivate their subordinates to attain goals in school but they cannot motivate their subordinates completely all members of school community to express their view, voices and advices for the improvement of the school and weak in shared leadership.

The sixth question was concerned with principals' leadership self-efficacy belief about gaining consensus of group members and how to gain consensus and how to solve conflicts well. In this question, the most principals they have confident in solving the problems and managing the conflicts among teachers. However, a few number of principals mentioned that they have somewhat confident in solving problem and conflicts, therefore they sometimes receive the advices of superiors or experienced others but they try to gain consensus as possible as they can.

Conclusion and Discussion

Based on the research questions, findings of this study could be concluded as follows. Regarding the principals' leadership self-efficacy, the overall mean value was 3.86. Accordingly, it can be said that the level of principals' leadership self-efficacy is quite confident. Specifically, the mean values of starting and leading change process in group, choosing effective followers and delegating responsibilities, building and managing interpersonal relationships within the group, showing self-awareness and self-confidence, motivating people, gaining consensus of group members were 3.74, 3.95, 3.89, 3.84, 3.92, 3.82 respectively and these mean values indicated that the levels of all of the six dimensions were quite confident. In related literature, there is some research supporting this result. This finding is consistent with the result by Bobbio and Manganelli (2009) and Yurek and Cobanoglu (2018) that the participants have a high level of self-efficacy beliefs.

When investigating the differences of the principals' leadership self-efficacy according to their personal factors, it was found that there were significance differences in position and administrative service and there were no significance differences in gender, age and school size. This finding is consistent with previous studies as McCormick et al. (2002), Bergman et al. (2021) and Lucas (2003).

When investigating the leadership self-efficacy of principals according to the qualitative findings, it was found that the principals quite confident in their leadership according to their responses.

Suggestions

Based on the results of this study, the following suggestions are presented for principals' leadership self-efficacy in Basic Education Schools. Some of the principals face in troubles as poor infrastructure and insufficient facilities and resource limit and cannot make good progress on a journey to change process and this effect on their leadership self-efficacy. Thus, it is needed to be fully attention and considered these issues as stakeholder and policy makers. According to their answers, there is no adequate staff to delegate well, and over-workload and poor salary are also considerable factors. In current situation, it is needed to be fulfilled the adequate quantified and qualified staffs on behalf of the attrition staffs. Some of principals face in trouble as establishing multiple ways for parents and community to be involved in the day-to-day running of the school. Thus, to establish collaborative culture, the stakeholders and policy maker should be shared the knowledge, beliefs and awareness infiltrated by the current change and educational reform process all over the country not to behind in implementing in change process. Ministry of Education should provide a continuous process for leadership training to sharpen the competencies of principals to adapt and equip with 21st century skills and face the challenges and obstacles in current situation to meet the vision of education. In order to motivate teachers and to meet their expectation, the responsibility is not only relying on the principals. In current situation, the teachers are needed to be safe both physically and mentally. They should be provided and supported their personal well-being and professional development safely. Therefore, the Ministry of Education should support the well-appointed work place and environment and should give the opportunities for their professional and career development. To gain consensus of the all members of school community, the principals should persuade to better understand and appreciate the function of education in individual in school community. The principals should mobilize to make sense to consider as the individuals are critical roles in educational change and reform process rather than using the approaches by authority power.

Limitations

One of the limitations is the cross-sectional nature of this study. By the reason of measurements were made at one point in time. Another limitation of the study is the sample was from a single township of the Ayeyarwaddy region and participants were small amount of sample, generalizability of the results may be limited.

Need for Further Study

This study is conducted to the principals of Basic Education Schools in Hinthada Township, Ayeyarwaddy Region. The future researchers who would like to study the similar content should be conducted in other contexts as Higher Education and Education Degree College and other region of Myanmar widely. It is suggested that other researcher should focus on the relationship study between leadership self-efficacy and other variables and causal comparative study. It is also investigated to deeper information by using qualitative research design and should investigate the principals' leadership self-efficacy from the teachers' point of view and should investigate other participant group as teachers and students. Last but not least, it is also suggested to conduct the factors affecting on the principals' leadership self-efficacy as this study at the same context. New paths of inquiry were provided for future researchers.

Acknowledgements

I would like to express my gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector, Yangon University of Education), Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education) and Dr. Khin Mar Ni (Professor and Head of Department of Educational Theory and Management, Yangon University of Education). We also appreciate all persons who willingly helped us in carrying out this research.

References

- Adewale, A. S., Jamil, H. & Khadijah. A., (2019). Leadership Self-Efficacy, Change Oriented Behavior and Organizational Citizenship Behaviours: The Moderating Effect of Experience. *International Journal of Higher Education*. 8 (4).
- Anderson, D. W., Krajewski, H. T., Goffin, R. D., & Jackson, D. N. (2008). A leadership self-efficacy taxonomy and its relation to effective leadership.
- Avolio, B., & Luthans, F. (2006). High impact leader: Moments matter in authentic leadership development. New York: McGraw-Hill.
- Almutairi, Y. M. N. (2020). Leadership Self-Efficacy and Organizational Commitment of Faculty Members, Higher Education. *administrative sciences*.10 (66). doi: 10.3390/admsci10030066
- Baker, C. (2021). *Confident Leaders – by design: A Case study of self-efficacy in educational leadership development*. (Thesis, The Faculty of Arts, Creative Industries and Education (ACE). Retrieved from <https://uwe-repository.worktribe.com/OutputFile/8512488>
- Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.
- Bobbio, A. & Manganelli, A. M. (2009). LEADERSHIP SELF-EFFICACY SCALE. A NEW MULTIDIMENSIONAL INSTRUMENT. *TPM*, 16 (1), 3-24.
- Chemers, M.M., Watson, C.B. & May, S.T. (2000). Dispositional affect and leadership effectiveness: A comparison of self-esteem, optimism, and efficacy. *Personality and Social Psychology Bulletin*, 26, 267-277.
- Cobanoglu, F., & Yurek, U. (2018). School administrators' self-efficacy beliefs and leadership styles. *European Journal of Educational Research*, 7(3), 555-565. doi: 10.12973/eu-jer.7.3.555
- Cormier, J. C. (2017). Linking Adolescents' Leadership Exposure to Transformational Leadership: The Mediating Effects of Leadership Self-Efficacy and Social Intelligence. (Psychology Dissertation, Georgia State University, 2017). Doi:<https://doi.org/10.57709/10068296>
- Dembo, M. H., & Gibson, S. (1985). Teachers' sense of efficacy: An important factor in school improvement. *The Elementary School Journal*, 86(2), 173-184.
- Hannah, S. T., Avolio, B. J., Luthans, F., & Harms, P. D., (2008). Leadership efficacy: Review and future directions. *The Leadership Quarterly*, 19 (6), 669-692. <https://doi.org/10.1016/j.leaqua.2008.09.007>
- Hannah, S. T., Avolio, B. J., Walumbwa, F. O., & Chan, A. (2012). Leader self and mean efficacy: A multi-component approach. *Organizational Behavior and human Decision Processes*. 118 (2), 143-161. <https://doi.org/10.1016/j.obhdp.2012.03.007>
- Hesbol, K. A. (2019). Principal Self-Efficacy and Learning Organizations: Influencing School Improvement. *International Council of Professors of Educational Leadership*.
- McCormick, M.J., Tanguma, J. & Lopez-Forment. A.S. (2002). Extending Self-Efficacy Theory to Leadership: A Review and Empirical Test, *Journal of Leadership Education*, 1 (2). 1-15.
- Nguyen, H. K. (2016). Student Success Through Leadership Self-efficacy: A Comparison of International and Domestic Students, *Journal of International Students*, 6 (4), 829-842. ISSN: 2162-3104 Print/ ISSN 2166-3750 Online, <http://jistudents.org/>
- Paglis, L. L., & Green, S. G. (2002). Leadership self-efficacy and managers' motivation for leading change. *Journal of Organizational Behavior, J. Organiz. Behav.* 23, 215-235. DOI: 10.1002/job.137
- Pendley, M., (2021). "School Social Work Leadership Self-Efficacy and Perceptions of Multidisciplinary Collaboration". *Walden Dissertations and Doctoral Studies*. 9796. <https://scholarworks.waldenu.edu/dissertations/9796>

- Riggio, R. E., and Tan, S. (2014). *LEADER INTERPERSONAL AND INFLUENCE SKILLS*. Routledge (Taylor & Francis Group).
- Smith, R. W. (2006). CONFIRMATORY FACTOR ANALYSIS OF THE PRINCIPAL SELF EFFICACY SURVEY (PSES). *Academy of Educational Leadership Journal*. 10 (3).
- Tschannen- Moran, M. & Gareis, C. R. (2004). Principals' sense of efficacy: Assessing a promising construct. *Journal of Educational Administration*. 42 (5). 573-585. DOI 10.1108/09578230410554070.
- Tschannen- Moran, M. & Gareis, C. R. (2007). Cultivating principals' self-efficacy: Supports that matter. *Journal of School Leadership*, 17 (1), 89 Retrieved from <https://eric.ed.gov/?id=EJ807374>
- Wachira, F. M., Gitumu, M., & Mbugua, Z. (2017). Effect of Principals' Leadership Styles on Teachers' Job Performance in Public Secondary Schools in Kieni West Sub- County. *International Journal of Humanities and Social Science Invention*, 6(8), 72–86. Retrieved from www.ijhssi.org
- Yukl, G. (2006). *Leadership in Organizations* (6th ed.). Upper Saddle River, NJ: Pearson Education. Retrieved from <https://nibmehub.com/opacservice/pdf/read/Leadership%20in%20Organizations%20by%20Gary%20Yukl.pdf>

THE RELATIONSHIP BETWEEN PRINCIPALS' CONFLICT MANAGEMENT STRATEGIES AND TEACHER JOB PERFORMANCE

Nang Mway Hom¹, Saw Myat Nwe²

Abstract

The main purpose of this research is to investigate the relationship between principals' conflict management strategies and teacher job performance in Kyaukme Township, Northern Shan State. In this study, 224 teachers from the selected seven Basic Education High Schools in Kyaukme Township participated. Quantitative methodology was used in this study. The questionnaires for principals' conflict management strategies (PCMS) was based on the instrument developed by Shitambasi (2022) and teacher job performance scale (TJPS) was based on the instrument developed by Amin et al. (2013). Principals' conflict management strategies consisted of 29 items, and teacher job performance consisted of 23 items, including four dimensions. Descriptive statistics, independent samples *t*-test, one-way ANOVA, and Pearson product-moment correlation were employed for the analysis of quantitative data. The Cronbach's alpha reliability coefficient for principals' conflict management strategies was 0.954, and for teacher job performance was 0.873. According to research findings, the principals at the selected high schools of Kyaukme Township most practiced communication strategies and creativity strategies according to teachers' perceptions. Teachers from the selected high schools highly performed well in their job. The research finding pointed out that there was a positive and moderate relationship between principals' conflict management strategies and teacher job performance at ($r=.310$). It can be concluded that if the principals employ conflict management strategies systematically and effectively in their schools, the school environment will be more pleasant and the teachers in the workplace will have self-confidence and improve their job performance.

Keywords: Conflict Management, Conflict Management Strategies, Teacher Job performance

Introduction

Conflict is the natural element of every social organization because of human interactions. In the 21st century, conflict is assumed to be a natural part of modern organization. Conflicts build a stressful, disruptive, and uncomfortable working climate, which affect employees' productivity (Shitambasi et al., 2022). Ghavifekr and Nair (2019, as cited in Shitambasi et al., 2022) maintain that school effectiveness depends on the school principal's administrative skills which must include the most effective conflict management strategies in dealing with conflicts that affect teacher job performance.

The performance of teachers is of high applicability for both student generations and educational organizations; it is a basic component of the education sector, instructional and behavioral research, and is considered a fundamental element of educational reform and an effective environment. There are many ways to improve the work performance of teachers, such as by giving awards for their achievements, giving promotion to their specialization, giving them the opportunity to participate in the decision-making process, creating a healthy climate and culture in the organization, and training their professional development. In this training, the principals need to develop teams that would be beneficial to their schools, especially in conflict

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situations. Therefore, if a principal can handle and solve various conflict situations in the school, there may be a positive relationship between the teacher, student, and school head.

Aims of the Study

The main aim of the study is to investigate the relationship between principals' conflict management strategies and teacher job performance at Basic Education High Schools, Kyaukme Township, Northern Shan State.

The specific objectives of the study are as follows:

- (1) to find out the principals' conflict management strategies at selected schools
- (2) to examine whether there are significant differences in principals' conflict management strategies as perceived by teachers according to their demographic information
- (3) to identify the level of teacher job performance
- (4) to explore whether there are significant differences in teacher job performance according to their demographic information
- (5) to investigate the relationship between principals' conflict management strategies and teacher job performance

Research Questions

Based on the specific objectives of the study, the research questions are stated as follows:

- (1) What are the conflict management strategies used by the principals at selected Basic Education High Schools in Kyaukme Township, Northern Shan State?
- (2) Are there any significant differences in principals' conflict management strategies as perceived by teachers according to their demographic information?
- (3) What are the levels of teacher job performance?
- (4) Are there any significant differences in teacher job performance according to their demographic information?
- (5) Is there any relationship between principals' conflict management strategies and teacher job performance?

Definition of Key Terms

- **Conflict management** refers to minimizing the negative outcomes of conflict and promoting the positive outcomes of conflict with the goal of improving learning in a school (Rahim, 2002).
- **Conflict management strategies** refer to methods that may be utilized to avoid, control, or resolve conflicts (Shitambasi, 2022).
- **Teacher job performance** can be defined as the actions they perform in schools in order to achieve educational goals (Hwang et al., 2017).

Scope of the Study

This study was conducted at the selected Basic Education High Schools (BEHS) in Kyaukme Township, Northern Shan State. The current study targeted only the teachers who work in those schools. All schools in Kyaukme Township were selected for the sample.

Review of Related Literature

Principals' Conflict Management Strategies

In this study, there were four dimensions of principals' conflict management strategies identified by Shitambasi (2022). They are communication strategies, creativity strategies, motivational strategies and team spirit strategies.

Communication and Conflict Management

The communication process primarily involves the use of listening and speaking skills. Listening involves attaching meaning to the information being presented from another person's perspective. Speaking requires expressing one's thoughts and feelings and conveying information clearly and accurately through words and behavior to ensure understanding. Both skills are considered especially beneficial in conflict situations. (Goleman, 2000, as cited in Min, 2017).

Creativity and Conflict Management

Creativity is defined as new and useful ideas, rules, and procedures that restrict improvisation and experimentation (Sarooghi, Libaers, & Burkemper, 2015, as cited in Durrah et al., 2018). Carnevale (2006) suggested that conflict is an important element of creativity. Sometimes, productive change would not occur without conflict. The role of leaders in creative conflict management is one of the most important sectors in the literature concerning principal management (Eisaguirre, 2003).

Motivation and Conflict Management

An individual's motivation is influenced by external factors. Every employee has activities, events, people, and goals in his or her life that he or she finds motivating. So, motivation about some aspect of life exists in each person's consciousness and actions. (Susan, 2014, as cited in Adetiba et al., 2019). Motivational practices by principals have to do with acknowledging teacher accomplishments, appreciating their effort, and also giving encouragement so as to improve their performance in their job (as cited in Adetiba et al., 2019).

Teamwork and Conflict Management

Teamwork is necessary to ensure democracy at the workplace, enhance change, encourage innovation and creativity, and allow for effective decision-making and networking (as cited in Kelemba et al., 2017). An empowered school principal would prepare team members for a number of roles that they need to play in the organization, including conflict resolution. Convey (1994, as cited in Msila, 2012) states that if a team is to be successful, it is crucial that members know the basics of conflict resolution, delegation, and consensus building.

Teacher Job Performance

Amin, Shah, Ayaz and Atta (2013) determined a teacher job performance model based on empirical research. So, they proposed teacher job performance as having four dimensions: teaching skills, management skills, discipline and regularity, and interpersonal skills.

Teaching skills

Teaching effectiveness has been accepted as a multidimensional construct since it measures a variety of different aspects of a teacher such as; teacher's discipline, evaluation skills, teaching skills, interpersonal relations, management skills, subject mastery, effective communication, lesson preparation and presentation (as cited in Adetiba et al., 2019).

Management skills

Management is a practical skill and is essential for the effective functioning of an organization. Today, a teacher has to have a command over certain skills that are concerned with the teaching-learning process, classroom management, handling pedagogical issues, using technology for teaching, knowledge of various electronic gadgets, etc. Managerial skills in noneducational organizations may not be directly related to classroom management but indirectly help in the teaching process (Gore & Begum, 2012). Managerial skills of principals are their special abilities to administer the schools, which are usually attributed to training and practice. In other words, we can say that managerial skills are a set of behaviors that lead to effective job performance, and without them, in many cases, the knowledge of school managers does not have any effect (Akporehe & Asiyai, 2023).

Discipline and Regularity

Discipline in school generally means order and system in doing things, regularity, and obedience to commands. School discipline refers to the actions taken by a teacher or the school organization towards a student or a group of students when the student's behavior disrupts the ongoing educational activities or breaks a rule created by the school. Discipline can guide the student's behavior or set limits to help them learn to take better care of themselves, other people, and their surroundings (Das, 2020).

Interpersonal Skills

Interpersonal skills center on how teachers relate to other personnel in the school system, i.e., the cordial relationship between the teachers and the school principals as well as other teaching and non-teaching staff. It requires an understanding of one's self and group dynamics and the ability to motivate other people, either as individuals or groups (Peretomode, 2003, as cited in Adetiba et al., 2019).

Methodology

Research Method

Quantitative research method was used in this study.

Population and Sample

The target population of the study was seven Basic Education High Schools in Kyaukme Township, Northern Shan State. All High Schools were selected by using a simple random sampling method, and totally 238 teachers were chosen as participants at different levels (primary teachers, junior teachers and senior teachers).

Research Instruments

In this study, two research instruments, the "Conflict Management Strategies Questionnaire (CMSQ)" developed by Shitambasi (2022) and the "Teacher Job Performance Scale (TJPS)" developed by Amin et al., (2013) were utilized to measure principals' conflict management strategies and teacher job performance as perceived by teachers. There are 29 items in CMSQ, concerning four dimensions and including four-point Likert scale (1. Strongly Disagree, 2. Disagree, 3. Agree, 4. Strongly Agree). There are 23 items in TJPS, concerning 4 dimensions and including four-point Likert scale (1. Never, 2. Sometimes, 3. Often, and 4. Always).

Before the pilot study, the instruments were reviewed by a panel of experts. The modified instruments were used to find out the reliability of the pilot study by investigating 30 teachers at Basic Education High School, Ywathitgyi village, Sagaing Township. According to pilot test, The Cronbach's Alpha of Principals' Conflict Management Strategies was .893 and Teacher Job Performance was .752.

Data Collection and Analysis

After receiving the permission of the responsible persons, the questionnaires were distributed to the teachers from the seven selected Basic Education High Schools in Kyaukme Township, Northern Shan State, in the first week of October, 2023 and the questionnaires were collected after five days. Out of 238 teachers, 224 teachers completed the questionnaires. Using SPSS, descriptive statistics were used to calculate the mean and standard deviations for groups of items. An independent samples *t*- test was employed to analyze the differences in teachers' perceptions according to gender, and analysis of variance, to analyze the significant differences between groups and within groups with regard to school, qualification, teaching service, and position. Post-Hoc test by Tukey (HSD) test was used to determine which group had significant mean differences. Pearson product-moment correlation was conducted to describe the relationship between teachers' perceptions of principals' conflict management strategies and teacher job performance.

Findings

Table 1 Mean Values and Standard Deviations of the Principals' Conflict Management Strategies according to Schools

Schools	N	Communication Strategies		Creativity Strategies		Motivational Strategies		Team Spirit Strategies	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
A	34	3.22	.39	3.14	.39	2.91	.37	3.02	.31
B	33	3.24	.40	3.25	.40	3.11	.28	3.20	.40
C	40	3.04	.40	3.00	.41	2.77	.46	2.88	.45
D	39	2.88	.45	2.90	.40	2.68	.51	2.93	.41
E	17	3.21	.27	3.26	.30	3.00	.15	3.12	.24
F	22	3.02	.11	3.05	.17	2.85	.16	3.02	.11
G	39	2.86	.32	2.78	.41	2.75	.33	2.85	.28
Total	224	3.05	.39	3.03	.41	2.85	.39	2.99	.37

According to Table 1, teachers from School B rated the highest mean values in "Communication Strategies", "Motivational Strategies" and "Team Spirit Strategies". Teachers from School E rated the highest mean values in "Creativity Strategies".

Table 2 One-way ANOVA Results of Principals' Conflict Management Strategies Perceived by Teachers at the selected Basic Education High Schools

Dimensions	Region Group	Sum of Squares	df	Mean Squares	F	p
Communication Strategies	Between Groups	5.124	6	.854	6.135	.000***
	Within Groups	30.203	217	.139		
	Total	35.326	223			
Creativity Strategies	Between Groups	6.053	6	1.009	6.797	.000***
	Within Groups	32.205	217	.148		
	Total	38.258	223			
Motivational Strategies	Between Groups	4.560	6	.760	5.362	.000***
	Within Groups	30.759	217	.142		
	Total	35.319	223			
Team Spirit Strategies	Between Groups	3.167	6	.528	4.182	.001***
	Within Groups	27.391	217	.126		
	Total	30.558	223			

Note. *** $p < .001$.

Based on the research findings, there were significant differences in “Communication Strategies” at ($F= 6.135, p< 0.001$), in “Creativity Strategies” at ($F=6.797, p< 0.001$), in “Motivational Strategies” at ($F=5.362, p< 0.001$) and in “Team Spirit Strategies” at ($F=4.182, p< 0.001$). There were significant differences in teachers’ perceptions on their principals’ conflict management strategies between groups and within groups.

Table 3 Results of Multiple Comparisons (Tukey HSD) of the Principals' Conflict Management Strategies Perceived by Teachers according to Schools

Dimensions	School (I)	School (J)	Mean Difference (I-J)	p
Communication Strategies	School A	School D	.34*	.003**
			.36*	.001***
	School B	School G	.36*	.001***
			.38*	.001***
	School E		.33*	.040*
			.35*	.022*
Creativity Strategies	School A	School G	.36*	.002**
	School B	School D	.35*	.003**
			.47*	.000***
	School E	School G	.36*	.024*
			.47*	.001**

Dimensions	School (I)	School (J)	Mean Difference (I-J)	p
Motivational Strategies	School B	School C	.34*	.003**
		School D	.43*	.000***
		School G	.37*	.001**
Team Spirit Strategies	School B	School C	.32*	.003**
		School D	.27*	.026*
		School G	.35*	.001**

Note. *** $p < .001$. ** $p < .01$. and * $p < .05$.

According to Tukey (HSD) test, teacher perceptions were significantly different in communication strategies between School A, School B, School E and School D, School G, in creativity strategies between School A and School G, between School B, School E and School D, School G, in motivational strategies between School B and School C, School D, School G, in team spirit strategies between School B and School C, School D, School G.

Table 4 Mean Values and Standard Deviations of the Principals' Conflict Management Strategies Perceived by Teachers according to Gender

Dimensions	Gender	N	Mean	SD	t	df	p
Communication Strategies	Male	19	2.96	.51	-.989	222	.324
	Female	205	3.05	.38			
Creativity Strategies	Male	19	3.00	.62	-.188	222	.853
	Female	205	3.03	.39			
Motivational Strategies	Male	19	2.76	.44	-.967	222	.335
	Female	205	2.85	.39			
Team Spirit Strategies	Male	19	2.95	.50	-.449	222	.654
	Female	205	2.99	.35			

According to Table 4, female teachers rated slightly higher mean values than male teachers in all dimensions. But, the result of the findings showed that there was no significant difference in teachers' perceptions on the Principals' Conflict Management Strategies according to gender.

Table 5 Mean Values and Standard Deviations of the Principals' Conflict Management Strategies Perceived by Teachers according to Age

Age	N	Communication Strategies		Creativity Strategies		Motivational Strategies		Team Spirit Strategies	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
≤ 25 years	8	2.87	.46	2.84	.58	2.73	.39	2.98	.27
26-35 years	67	3.05	.38	3.01	.40	2.78	.39	2.92	.38
36-45 years	45	3.00	.42	3.00	.45	2.76	.47	2.95	.41
46-55 years	68	3.09	.40	3.09	.36	2.95	.31	3.07	.33
≥ 56 years	36	3.06	.37	3.02	.41	2.92	.39	2.98	.33

As shown in Table 5, in all dimension all teachers of 46 to 55 years rated higher mean value in “Communication Strategies”, “Creativity Strategies”, “Motivational Strategies” and “Team Spirit Strategies” than other age groups.

Table 6 One-way ANOVA Results of Principals’ Conflict Management Strategies Perceived by Teachers according to Age

Dimension	Region Group	Sum of Squares	df	Mean Squares	F	p
Motivational Strategies	Between Groups	1.757	4	.439	2.866	.024*
	Within Groups	33.562	219	.153		
	Total	35.319	223			

Note. * $p < .05$.

Based on the ANOVA result, there was significant mean difference in “Motivational Strategies” at ($F=2.866$, $p < 0.05$). In Post Hoc Test, there was no significant difference (Tukey HSD) at motivational strategies.

Table 7 Mean Values and Standard Deviations of the Principals’ Conflict Management Strategies Perceived by Teachers according to Positions

Position	N	Communication Strategies		Creativity Strategies		Motivational Strategies		Team Spirit Strategies	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
PT	63	3.08	.43	3.03	.40	2.87	.30	3.03	.26
JT	82	3.02	.42	3.00	.44	2.87	.41	2.99	.42
ST	79	3.05	.33	3.05	.38	2.81	.44	2.95	.38

Note. PT= Primary Teachers; JT= Junior Teachers; ST= Senior Teachers.

In Table 7, in “Communication Strategies”, primary teachers rated the highest mean value. In “Creativity Strategies”, senior teachers rated the highest mean value. In “Motivational Strategies”, primary and junior teachers rated the highest mean value. In “Team Spirit Strategies”, primary teachers rated the highest mean value. The results of the findings showed that there was no statistically significant difference in all dimensions.

Table 8 Mean Values and Standard Deviations of the Principals’ Conflict Management Strategies Perceived by Teachers according to Qualifications

Qualification	N	Communication Strategies		Creativity Strategies		Motivational Strategies		Team Spirit Strategies	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
Diploma	25	3.12	.35	3.03	.45	2.87	.34	2.99	.40
Bachelor	192	3.04	.40	3.03	.41	2.85	.40	2.99	.37
Master	7	2.95	.08	3.03	.30	2.73	.27	2.94	.29

As shown in Table 8, all teachers rated high mean values in “Creativity Strategies”. Diploma holders rated high mean value in “Communication Strategies”, “Creativity Strategies”, “Motivational Strategies”, and “Team Spirit Strategies”. All the Bachelor degree holders rated

high mean value in “Creativity Strategies” and “Team Spirit Strategies”. The result of the findings showed that there was no statistically significant difference in all dimensions.

Table 9 Mean Values and Standard Deviations of the Principals’ Conflict Management Strategies Perceived by Teachers according to Teaching Services

Service	N	Communication Strategies		Creativity Strategies		Motivational Strategies		Team Spirit Strategies	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
≤ 5 years	18	2.98	.37	2.93	.48	2.73	.38	2.97	.37
6-15 years	71	3.05	.37	3.01	.38	2.77	.38	2.93	.35
16-25 years	50	3.03	.43	3.04	.46	2.83	.46	2.99	.45
26 years ≥	85	3.07	.40	3.06	.39	2.94	.35	3.04	.32

As shown in Table 9, teachers with 26 and above years of teaching service rated the highest mean value in “Communication Strategies”, “Creativity Strategies”, “Motivational Strategies” and “Team Spirit Strategies”.

Table 10 One-way ANOVA Results of Principals’ Conflict Management Strategies Perceived by Teachers according to Teaching Services

Dimension	Region Group	Sum of Squares	df	Mean Squares	F	p
Motivational Strategies	Between Groups	1.414	3	.471	3.059	.029*
	Within Groups	33.905	220	.154		
	Total	35.319	223			

Note. * $p < .05$.

Based on ANOVA result, there were statistically significant difference in “Motivational Strategies” at ($F=3.059$, $p < 0.05$).

Table 11 Results of Multiple Comparisons (Tukey HSD) of the Principals’ Conflict Management Strategies Perceived by Teachers according to Teaching Services

Dimension	Service (I)	Service (J)	Mean Difference (I-J)	p
Motivational Strategies	26 years and above	6-15 years	.17*	.042*

Note. * $p < .05$.

According to Tukey (HSD) test, the perceptions of teachers with 26 and above years of teaching service were statistically significant difference from those with 6 to 15 years of teaching service in “Motivational Strategies”.

Table 12 Mean Values and Standard Deviations of Teacher Job Performance according to Schools

School	N	TS		MS		D&R		IS		Overall, TJP	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
A	34	3.21	.38	3.27	.21	3.72	.27	3.11	.43	3.33	.23
B	33	3.32	.44	3.12	.40	3.73	.32	3.10	.40	3.32	.33
C	40	3.36	.48	3.24	.36	3.67	.44	3.13	.51	3.35	.40
D	39	3.31	.42	3.25	.35	3.74	.30	3.17	.49	3.37	.30
E	17	3.39	.15	3.28	.18	3.69	.27	3.15	.48	3.38	.22
F	22	3.18	.40	3.19	.30	3.53	.32	2.96	.38	3.21	.28
G	39	3.19	.39	3.15	.32	3.58	.37	3.02	.40	3.24	.28
Total	224	3.28	.41	3.21	.32	3.67	.34	3.09	.44	3.31	.31

Note. TS = Teaching Skills; MS = Management Skills; D&R = Discipline and Regularity; IS= Interpersonal Skills; TJP = Teacher Job Performance.

Table 12 showed that teachers from School D rated the highest mean values in “Discipline and Regularity,” and “Interpersonal Skills.” Teachers from School E rated the highest mean values in “Teaching skills” and “Management Skills”. For overall teacher job performance, the teachers from School E rated the highest mean values and those from School F rated the lowest mean value among the schools. For overall perceptions of teachers according to schools, the level of teacher job performance is the highest in “Discipline and Regularity”. According to ANOVA result, there was no significant difference in teachers’ perceptions of teacher job performance between groups and within groups.

Table 13 Mean Values and Standard Deviations of Teacher Job Performance according to Gender

Dimensions	Gender	N	Mean	SD	t	df	p
Teaching Skills	Male	19	3.10	.57	-1.957	222	.052
	Female	205	3.29	.39			
Management Skills	Male	19	3.05	.50	-1.502	222	.149
	Female	205	3.23	.30			
Discipline and Regularity	Male	19	3.42	.56	-2.125	222	.047*
	Female	205	3.70	.31			
Interpersonal Skills	Male	19	2.96	.49	-1.328	222	.185
	Female	205	3.11	.44			
Job Performance Total	Male	19	3.13	.49	-1.731	222	.100
	Female	205	3.33	.28			

Note. 1.00-2.00 = Low Level; 2.01-3.00 = Moderate Level; 3.01-4.00 = High Level; * $p < .05$.

According to Table 13, female teachers rated slightly higher mean values than male teacher in all dimensions. All male teacher perceptions in “Interpersonal Skills” were moderate level and, in “Discipline and Regularity”, high level. The results showed that there was a

significant difference in teachers' perceptions on the facet of "Discipline and Regularity" according to gender.

Table 14 Mean Values and Standard Deviations of Teacher Job Performance Perceived by Teachers according to Age

Age	N	TS		MS		D&R		IS		Overall	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
≤ 25 years	8	3.39	.47	3.12	.33	3.56	.37	3.05	.59	3.28	.37
26-35 years	67	3.27	.48	3.19	.35	3.63	.42	3.08	.44	3.29	.36
36-45 years	45	3.22	.37	3.16	.34	3.64	.31	3.01	.47	3.26	.28
46-55 years	68	3.35	.35	3.27	.28	3.75	.26	3.17	.44	3.38	.27
≥ 56years	36	3.22	.40	3.23	.33	3.69	.33	3.09	.40	3.31	.27
Total	224	3.28	.41	3.21	.32	3.67	.34	3.09	.44	3.31	.31

Note. 1.00-2.00 = Low Level; 2.01-3.00 = Moderate Level; 3.01-4.00 = High Level;

TS = Teaching Skills; MS = Management Skills; D&R = Discipline and Regularity;

IS= Interpersonal Skills.

As shown in Table 14, the teachers of all ages rated the highest mean value in "Discipline and Regularity". At all the selected schools, the teachers of 46 to 55 years rated the highest mean value in "Management Skills", "Discipline and Regularity," and "Interpersonal Skills". Teachers of 25 years and under 25 years rated the highest mean value in "Teaching Skills." Based on the research findings, there was no significant difference according to teachers' age.

Table 15 Mean Values and Standard Deviations of Teacher Job Performance Perceived by Teachers according to Positions

Position	N	TS		MS		D&R		IS		Overall	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
PT	63	3.33	.42	3.24	.26	3.72	.31	3.13	.45	3.35	.28
JT	82	3.32	.41	3.23	.32	3.76	.28	3.15	.49	3.36	.30
ST	79	3.19	.39	3.16	.37	3.55	.39	3.01	.38	3.23	.32
Total	224	3.28	.41	3.21	.32	3.67	.34	3.09	.44	3.31	.31

Note. 1.00-2.00 = Low Level; 2.01-3.00 = Moderate Level; 3.01-4.00 = High Level;

TS = Teaching Skills; MS = Management Skills; D&R = Discipline and Regularity;

IS= Interpersonal Skills.

Table 15 showed that primary teachers rated the highest mean value in "Teaching Skills" and "Management Skills". Junior teachers rated the highest mean value in "Discipline and Regularity" and "Interpersonal Skills". For overall teacher job performance, junior teachers rated the highest mean value.

Table 16 One-way ANOVA Results of Teacher Job Performance Perceived by Teachers according to Positions

Dimension	Region Group	Sum of Squares	df	Mean Squares	F	p
Discipline and Regularity	Between Groups	1.903	2	.951	8.414	.000***
	Within Groups	24.986	221	.113		
	Total	26.889	223			

Note. *** $p < .001$.

Based on the findings, there was a significant mean difference in “Discipline & Regularity” ($F=8.414, p < 0.001$).

Table 17 Results of Multiple Comparisons (Tukey HSD) of Teacher Job Performance Perceived by Teachers according to Positions

Dimension	Position (I)	Position (J)	Mean Difference (I-J)	P
Discipline and Regularity	PT	ST	.17*	.010*
	JT	ST	.21*	.000***

Note. * $p < .05$. *** $p < .001$.

According to Tukey (HSD) test, the perceptions of primary teachers and junior teachers were significantly difference stronger than senior teachers in “Discipline and Regularity.”

Table 18 Mean Values and Standard Deviations of Teacher Job Performance Perceived by Teachers according to their Qualifications

Qualification	N	TS		MS		D&R		IS		Overall	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Diploma	63	3.45	.48	3.26	.22	3.74	.26	3.24	.47	3.42	.28
Bachelor	82	3.26	.40	3.20	.34	3.67	.35	3.08	.44	3.30	.31
Master	79	3.20	.35	3.22	.29	3.59	.37	2.82	.33	3.21	.27
Total	224	3.28	.41	3.21	.32	3.67	.34	3.09	.44	3.31	.31

Note. 1.00-2.00 = Low Level; 2.01-3.00 = Moderate Level; 3.01-4.00 = High Level;

TS = Teaching Skills; MS = Management Skills; D&R = Discipline and Regularity;

IS = Interpersonal Skills.

As shown in Table 18, all teachers rated the highest mean values in “Discipline and Regularity”. Diploma holders rated the highest mean values in all dimensions. Master degree holders rated moderate level in “Interpersonal Skills.” For overall teacher job performance, Diploma holders rated the highest mean value. The result showed that there was no significant difference according to teachers’ qualification.

Table 19 Correlations between the Principals’ Conflict Management Strategies and Teacher Job Performance

Dimensions	Communication Strategies	Creativity Strategies	Motivational Strategies	Team Spirit Strategies	Conflict Management Strategies Total
Teacher Job Performance	.275**	.278**	.251**	.301**	.310**

Note. ** $p < .001$, two-tailed.

According to Table 19, it was found that the dimensions of principals’ conflict management strategies such as “Team Spirit Strategies” ($r=.301, p=.000$) was moderately and positively correlated with teacher job performance. “Creativity Strategies” ($r=.278, p=.000$), “Communication Strategies” ($r=.275, p=.000$) and “Motivational Strategies” ($r=.251, p=.000$) were positively and weakly correlated with teacher job performance. The correlation between the

principals' conflict management strategies and teacher job performance is statistically significant at $r=.310$, $p<0.01$. Thus, there is a significant, positive and moderate relationship between principals' conflict management strategies and teacher job performance.

Discussion and Conclusion

Research question one asked the teachers to express the conflict management strategies used by the principals at the selected Basic Education High School in Kyaukme Township, Northern Shan State. According to mean values and standard deviations, teachers from School A, School C, School G, and School F perceived that their principals mostly used "Communication Strategies" for conflict management. It can be concluded that the principals at those high schools were good listeners, persuasive speakers, and effective communicators. Effective communication is essential for school conflict negotiation; it can reduce fear, anxiety, insecurity, instability, and negative emotions; it can enhance self-esteem, confidentiality, job satisfaction, and happiness in their schools; and it can improve teachers' working skills.

Then, teachers from School B, School E, and School F perceived that their principals mostly handled "Creativity Strategies" in their schools. It can be said that the principals of those high schools had creative ideas to solve the problems and they always paid attention to their high concern for themselves and others. Creativity gives positive outcomes to improve job performance helps in problem-solving, and helps get new ideas for the school organization.

Moreover, teachers from School D and School F perceived that their principals mostly applied "Team Spirit Strategies" in their schools. It can be stated that the principals of those high schools provide empowerment and delegation of power to teachers to solve some problems. Teamwork was one of the effective techniques designed to improve interpersonal or inter-group relationships or a better fit between the needs of people and the tasks they perform. Furthermore, collaboration can not only improve the goals of the school organization, especially academic performance, teachers' teaching skills, maintenance of the schools' discipline, and school activities yearly, but it can also promote teachers job performance.

Research question two evaluated whether there was significant difference in principals' conflict management strategies as perceived by teachers in terms of demographic information. According to teaching service, it was found that the perceptions of teachers with 26 years and above of teaching service were significantly different from those with 6 to 15 years of teaching service on "Motivational Strategies." It can be concluded that teachers with 26 years and above teaching service generally have varied experiences and they are likely to bring about their new and existing knowledge to their job, which places them in a better position to handle conflicts constructively. Such a wide range of experiences would also benefit in resolving conflict. According to gender, age, positions, and qualifications, there were no significant differences in principals' conflict management strategies perceived by teachers.

Research question three was to find out the level of job performance at all selected high schools. According to the findings, the level of job performance perceived by teachers was high. It can be said that teachers have good teaching skills, use various teaching methods in their teaching, always prepare the lesson well before the class, use teaching aids, give practical exercises and try to complete the syllabus on time. Moreover, they manipulate the learner-centered approach in order to equip the pupils with 21st century skills. They also have self-

management skills and manage their students well. Apart from teaching, they fulfill other responsibilities very nicely at their school. They also come to school regularly and attend class on time. They always maintain discipline in their school. They have good interpersonal relationships with colleagues. Sometimes, novice teachers consult veteran teachers for lesson preparation and classroom problems.

Research question four asked the teachers to find out whether there was significant difference in teacher job performance in terms of demographic information. According to gender, male and female teachers from all selected schools job performance was high. It was found that the perceptions of male teachers were significantly different from the perceptions of female teachers in “Discipline and Regularity.” According to positions, all teachers (primary, junior and senior teachers) highly performed their jobs. It was also found that the perceptions of primary and junior teachers were significantly different from those of senior teachers in “Discipline and Regularity.” According to the teacher age, qualifications and teaching services, there was no significant difference in teacher job performance.

Research question five investigated whether there was significant relationship between teachers’ perceptions of principals’ conflict management strategies and their job performance. According to the result, there was significant, positive, and moderate relationship between principals’ conflict management strategies and teacher job performance at the selected schools ($r=.310$, $p<0.01$). It can be concluded that if the principals employ conflict management strategies systematically and effectively in their schools, the school environment will be more pleasant, and the teachers in the workplace will have self-confidence and improve their job performance.

Conclusion

To summarize, based on the findings of the present study, at the selected schools, the principals’ conflict management strategies are significantly and positively correlated with teachers’ job performance. Though the sample is small and the results may not be generalized for the whole country, hopefully, to some degree, the results will be assumed to predict the authentic situations of schools in Myanmar. It is satisfactory that the principals at the selected high schools are effective conflict mediators, and teachers are content with their principals’ management. This makes them high performers for the development of their schools, and most importantly, for the development of student achievement. Therefore, principals are suggested to apply conflict management strategies to conform to the time, the situation, and the nature of the issues, keeping in mind that these are of crucial importance for the all-round development of the schools, the teachers, and the students.

Acknowledgements

First and foremost, we would like to offer respectful gratitude to U Aung Thaik Htun (Rector, University for the Development of the National Races of the Union, UDNR). Dr. Moe Moe (Pro-Rector, Academic, UDNR). U Zam Shin Khine (Professor, Head of Department of Educational Theory, UDNR) and U Than Zaw (Associate Professor, Department of Educational Theory, UDNR) for their suggestions, expert guidance and fulfillment of our requirements. Special thanks to our external examiner Dr. Zin Nwe Than (Professor/ Head of Department of Educational Theory and Management, Sagaing University of Education) for her invaluable suggestions, judgement.

References

- Adetiba, A. A., James, O. O., & Sayuti, O. A. (2019). Principals' leadership practices and teachers job performance in Kwara State Public Secondary Schools. *University of Ilorin, Nigeria. Fudma journal of educational foundation*, 2(3) <https://uilspace.unilorin.edu.ng/bitstream/handle/academicjournals.org/journal/IJEAPS/article-full-text-pdf/D97E129973>
- Adeyemi, T. O. (2010). Principals' leadership styles and teachers' job performance in senior secondary schools in Ondo State, Nigeria. *Current Research Journal of Economic Theory*, 3(3), 84-92. <https://academicjournals.org/journal/IJEAPS/article-full-text-pdf/D97E129973>
- Akporehe, D., & Asiyai, R. (2023). Principals' managerial skills and teachers' job performance: Evidence from public secondary schools in Delta State, Nigeria. *European Journal of Education and Pedagogy*, 4(3), 78-84. www.academia.edu/104309380/
- Amin, M., Shah, R. U., Ayaz, M., & Atta, M. A. (2013). Teachers' job performance at secondary level in Khyber Pakhyunkhwa, Pakistan. *Gomal University Journal of Research*, 29(2), 100-104. <http://www.gomal.pk/GUJR/PDF/Dec-2013/>
- Carnevale, P. J. (2006). Creativity in the outcomes of conflict. In M. Deutsch, Peter T. Coleman, & Eric C. Marcus (Eds.), *Handbook of Conflict Resolution* (2 ed), 414-435. San Francisco: Jossey-Bass. <https://inclassreadings.files.wordpress.com/2018/07/>
- Das, M. (2020). A study on the role of discipline in education and its impact on the process of learning among the students. *Ilkogretim Online - Elementary Education Online*, 19(1), 1128-1136. <https://www.ilkogretim-online.org/fulltext/>
- Durrah, O., Allil, K., Gharib, M., & Alhamoud, A. (2018). Impact of conflict management styles on creativity. *International Journal of Management and Applied Science*, 4(10), 63-67. <http://www.ijar.in/journal/>
- Eisaguirre, L. (2003). A systematic approach to creative conflict management. *Workplace that work*, 1(19). <https://lynne-eisaguirre.s3.amazonaws.com/>
- Gore, V., & Begum, S. (2012). Role of a teacher in 21st century. *The Criterion: An International Journal in English*, III(III), 1-7. <https://scholar.google.com/>
- Hwang, Y.S., Bartlett, B., Greben, M., & Hand, K. (2017). A systematic review of mindfulness interventions for in-service teachers: A tool to enhance teacher wellbeing and performance. *Teaching and Teacher Education: An International Journal of Research and Studies*, 64(1), 26-42. <https://www.learntechlib.org/p/201963/>
- Kelemba, J., Chepkilot, R., & Zakayo, C. (2017). Influence of teamwork practices on employee performance in public service in Kenya. *African Research Journal of Education and Social Sciences*, 4(3). <http://www.arjess.org/social-sciences-research/>
- Min, J. (2017). *Mergers in higher education: A case study of organizational culture, communication, and conflict management strategies in the University System of Georgia*. Kennesaw State University. <https://digitalcommons.kennesaw.edu/cgi/viewcontent>
- Msila, V. (2012). Conflict management and school leadership. *Journal of Communication*, 25-34. <https://www.researchgate.net/publication/233868808>
- Rahim, M. A. (2002) Toward a theory of managing organizational conflict. *The International Journal of Conflict Management*, 13(3), 206-235. <https://www.international-arbitration-attorney.com/>
- Shitambasi, M. G. (2022). *Principals' conflict management strategies and teachers' job performance in public secondary schools in Kisii county, Kenya*. <https://repository.tangaza.ac.ke/handle/>
- Shitambasi, M. G., Okemasisi, K., & Kimotho, M. (2022). Assessment of good communication by the principal can be a conflict management strategy for enhancement of teachers' job performance in selected public secondary schools in Kisii county, Kenya. *Arifcan journal of emerging issues*, 5(7), 10-27. <https://ajoeijournals.org/index.php/ajoei/article/view/286>

AN EXPLORATION OF THE PEDAGOGICAL PRACTICE OF PRE-SERVICE TEACHERS USING PRODUCTIVE PEDAGOGIES*

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Abstract

The major purpose of this study is to explore the pre-service teachers' pedagogical practice using productive pedagogies. Productive pedagogies emphasize improving students' intellectual reasoning and makes teaching-learning in schools more applicable to the students' everyday lives by creating supportive environments that accommodate diversity and achieve agendas of equity. In line with the research objectives, this study follows an ethnographic case study. By using criterion sampling techniques, 12 participants were selected. Five types of data collection methods: semi-structured interview protocol, classroom observational protocol, reflective journals, documents (pre-lesson plan and post-lesson plan) and focus group interview were applied in this study. The participants were firstly observed and interviewed to confirm their initial pedagogical practices and engaged with productive pedagogies with four microteaching cycles. Then, participants were allowed to implement productive pedagogies in practicum and observed their pedagogical practices and interviewed by focus group interview. After that, thematic analysis, cross-case analysis, and summary-based reporting approach were employed to organize the data analysis. According to the results of this study, pre-service teachers' pedagogical practices enhanced when they were exposed to the training with productive pedagogies, especially in the areas of implementing supportive classroom environment. The noticeable strengths of implementing productive pedagogies by pre-service teachers in practicum practice have emerged as: (a) improvement in pedagogical practices, (b) guiding teachers' preparation, (c) valuable guide for teaching, and (d) engagement in professional development opportunities. They also encountered some key challenges that faced their implementation and limited their best efforts: metalanguage, time and class size as contextual factors. Therefore, the overall results proved that this study irrefutably contributes and fulfills some degree for enhancing the pre-service teachers' practicum practice although it would not support the absolute accomplishment for all teacher education sectors.

Keywords: pedagogy, productive, productive pedagogies, pedagogical practice, ethnographic case study

Introduction

Quality teachers are critical to achieve quality educational outcomes and improve students' learning for the development of the nation. According to Khin Zaw (2013), what Myanmar needs today is to develop a fully integrated programme for teacher education and professional development, based on a new pedagogy, or a new innovative approach. The initial preparation of teachers is critically important in teacher development and should reflect both the expectations which the community holds about the role of the teacher and the skills and abilities of individuals who enter the profession. Therefore, quality pre-service teacher education is needed in order to produce quality teachers for the pedagogically oriented society.

In the 21st century, there are many challenges facing contemporary teacher education and teacher educators still have a great deal to learn regarding how to best prepare future teachers to professionally handle the complexities of unknown classrooms. Teacher education is not just concerned with acquisition of knowledge, but equally and more importantly with the utilization

*First Prize(2024)

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of knowledge. Practicum is a crux of their preparation for the teaching profession. Performance during practicum provides some basis for predicting the future success of the pre-service teacher. Inadequate teaching practice impacts on the level of teacher readiness. So, it is crucial to highlight the pre-service teachers' pedagogical practices during their practicum practice. Hayes, D., Mills, M., Christie P., and Lingard, B. (2006) argued that productive pedagogies provide a comprehensive and multi-dimensional framework with potential for enhancing the quality of teaching and the quality of teacher education. By using productive pedagogies in pre-service teachers' practicum practice, there can be qualified teachers who can handle the future of the society with education. Therefore, this study will develop to explore the pre-service teachers' pedagogical practice using productive pedagogies and it can support as an effective way for enhancing pedagogical practices of pre-service teachers by building a bridge between theory and practice.

Purpose of the Study

The main purpose of this study is to explore the pre-service teachers' pedagogical practice using productive pedagogies. The specific objectives of the study are as follows:

1. to investigate how productive pedagogies enhance pre-service teachers' pedagogical practices
2. to explore the challenges of pre-service teachers in implementing productive pedagogies in their practicum
3. to make suggestions and recommendations for enhancing the pre-service teachers' pedagogical practice

Research Questions

In order to formulate the intended research objectives, two research questions are constructed. They are as follows.

1. To what extent do productive pedagogies enhance the pre-service teachers' pedagogical practice?
2. What are the challenges that the pre-service teachers encountered while implementing productive pedagogies in their practicum?

Definition of Key Terms

Pedagogy

Pedagogy informs teacher actions, judgments, and teaching by taking into consideration theories of learning, understanding of students and their needs, and the backgrounds and interests of individual students (Shulman, 1987).

Productive

The concept of productive is an indication of the production of learning outcomes in the classrooms (Hayes, Mills, Christie, & Lingard, 2006).

Productive Pedagogies

Productive pedagogies can be defined as a framework for teaching that aims at improving students' intellectual reasoning, makes school teaching and learning more connected to students' everyday lives, and addresses the concerns of equity support that students need (Alsharif & Atweh, 2012).

Pedagogical Practice

Pedagogical practice is the union of theory and practice in the exercise of teaching and apprehending knowledge, in pedagogical action. These practices involve being aware of the entire educational process and the tools used by teachers to make it happen (Silva, 2021).

Ethnographic Case Study

Ethnographic case study is defined as a study focusing on describing the activities such as institutional culture or teaching methods of a specific group and the shared patterns of culture/behavior the group develops over time (Mills & Gay, 2016).

Limitation of the Study

According to Creswell (2008), despite all the chronicled strengths of qualitative research methods, researchers also advance limitations or weaknesses of their study that may affect their results. Therefore, although this study was conducted with great care and effort, there were a number of important limitations: (a) as this study was conducted during the Covid-19 pandemic, the practicum is designed and implemented only within on-campus, (b) being an ethnographic case study, this study is limited to 12 third-year pre-service teachers at the Sagaing University of Education, (c) this study was conducted only with two dimensions of productive pedagogies: intellectual quality and supportive classroom environment in consideration with time constraints and (d) this study is limited on the fact that the individual differences between the participating pre-service teachers have not been considered.

Review of Related Literature

Educational philosophy is committed to laying down a plan for what is considered to be the best education absolutely. It governed any productive teaching methods or activities, training program and educational practices. No educational system can ever be better than its teachers. No teacher education program is complete without a course on educational philosophy. Therefore, the practicing pedagogue should require understanding educational philosophies related to different educational areas. In this study, pragmatism, constructivism and social constructivism are deeply taken into philosophical considerations to explore the pre-service teachers' pedagogical practice using productive pedagogies.

Productive pedagogies provide a comprehensive starting point for reflecting on pre-service teachers' pedagogical practices and ensuring all students are engaged with intellectually challenging and relevant curriculum provided in a supportive environment. It is a framework for pre-service teachers to integrate theory into practice with meaningful experiences by themselves. It comprises four dimensions: intellectual quality, supportive classroom environment, connectedness, and recognition of difference.

Based on these theoretical considerations, this proposed model for pre-service teachers' pedagogical practice was developed to provide a situation in which they learn through productive pedagogies as the necessary ingredients for quality teaching and learning for designing future quality education through practicum practice. This study was developed in consideration of Gilbert's praxeonomic training model, Flanders' interaction analysis model, V³SK model of National Institute of Education (NIE), Cognitive Apprenticeship model, The Quality Outcomes, Teaching and Learning (QOTL) model, and New South Wales (NSW) quality teaching model. The proposed model includes four phases: assessing pre-service teachers' initial knowledge and

skills about pedagogies, training with productive pedagogies, implementing productive pedagogies in practicum practice, and consolidating.

Method

Research Design

In this study, to investigate how productive pedagogies enhance pre-service teachers' pedagogical practice; a qualitative ethnographic case study was used. Ethnographic case study tends to focus on institutional culture or particular group, teaching methods, or behaviours (Merriam, 1998, cited in Hamilton & Corbett-Whittier, 2013). Using ethnography and case study, this qualitative ethnographic case study was an opportunity to reveal insight into the pre-service teachers' pedagogical practices as culture and how the key informants relate while engaging in practicum practice.

Subjects

In this study, being a qualitative ethnographic case study, the purposeful sampling strategy was employed. Criterion sampling was used among purposive sampling approaches. As the number of participants, 12 third year pre-service teachers from Sagaing University of Education were selected with three pre-determined criteria and this is the adequate sample for qualitative case study.

Table 1 Criteria for the Selection of the Participants

Participant	Criterion 1	Criterion 2	Criterion 3
12 third-year pre-service teachers	Different training experiences in the first two years (direct intake & bridge)	Different specializations	Willingness to participate in the study

Instruments

According to Merriam (1988), using multiple methods of data collection is a major strength of qualitative case studies. In this study, five types of data collection methods were used to answer the research questions and achieve the research objectives. Data were collected through semi-structured interview protocol, classroom observational protocol, reflective journals, focus group interview, and documents from pre-service teachers (pre-lesson plan and post-lesson plan).

Procedure

Training with productive pedagogies for the pre-service teachers' pedagogical practice was designed based on the literature and the instruments required for the study were constructed under the guidance of the supervisor. Then, the main study was conducted with the participating pre-service teachers according to the research design.

Data Analysis

As being an ethnographic case study, among three major approaches to qualitative data analysis, the social anthropological approach was adopted in this study to obtain in-depth information about pre-service teachers on the use of productive pedagogies in practicum. Under the research questions, three methods were used to organize the data analysis: thematic analysis, cross-case analysis, and summary-based reporting approach were employed.

Findings

There is no statistical significance in qualitative inquiry as there is in quantitative inquiry, rather qualitative findings are judged by their substantive significance (Patton, 2002). In this study, the key findings that emerged from the analysis of the multiple sources of data are presented according to the research question, among five ways of organizing and presenting qualitative data analysis by Cohen, Manion, and Morrison (2007) so that all the relevant data from various data streams are collated to provide a collective answer to a research question.

Research Question 1: To what extent do productive pedagogies enhance the pre-service teachers' pedagogical practice?

Pedagogical shifts after implementation of four dimensions of productive pedagogies for pre-service teachers' practicum practice are described with effect matrix by Miles, Huberman, and Saldana (2014). The productive pedagogies framework includes four dimensions: intellectual quality, supportive classroom environment, connectedness and recognition of difference. In this study, two dimensions were applied to enhance the pre-service teachers' practicum practices. Accordingly, two effect matrixes related to the pedagogical shifts of pre-service teachers are provided in the following section.

Effect Matrix: Pedagogical Shifts after Implementation of Intellectual Quality for Pre-Service Teachers' Practicum Practice

Productive Pedagogies	Early Use	Later Use
Intellectual Quality	▪ Bloom's taxonomy ▪ Questioning (rarely open-ended) ▪ Building prior knowledge	▪ Bloom's taxonomy (use effectively and efficiently) ▪ Effective questioning skill- scaffolding (no right or wrong answer) and sustained interaction ▪ Building prior knowledge (concept/key map) ▪ De Bono's hats ▪ Gardner's multiple intelligences ▪ Discovery learning
	▪ Deep understanding ▪ Building block process	▪ Deep understanding ▪ Building block process ▪ Constructing their own knowledge
	▪ Limited perspectives on classroom interaction ▪ Simple explanations of language	▪ Different perspectives (sustained interaction about the substance of the lesson) ▪ High levels of talk about language with different ways in different contexts ▪ Real life-authentic learning ▪ Substantive conversation

Concerning the application of intellectual quality dimension within teachers' teaching practices, the qualitative data from classroom observations showed that teachers attempted to apply some activities that aimed to deepen students' understanding of the main ideas that teachers taught. One pre-service teacher also mentioned that:

“Focusing on higher-order thinking in learning process helps students to understand the subject matter and enjoy the activities better.” (PT10, Reflective journal)

The participants in this study appeared to focus on teaching strategies such as the use of Bloom's taxonomy, De Bono's thinking hats, and Gardner's multiple intelligences. They readily identified these strategies which they had been taught at university and exposed without really understanding and demonstrating how this specially and practically related to intellectual quality. One participant stressed by saying that:

"I just did teaching strategies early, this sounds bad, but I actually thought more about how I was delivered it rather than just content focus. Because we've come off all the different subjects where it's all content focus and that kind of part for me came secondary." (PT5, Reflective journal)

The participants effectively applied, in accordance with the observations, De Bono's hats such as green hat (creativity), yellow hat (benefits), white hat (fact), red hat (feeling), blue hat (process), and black hat (caution) in their teaching learning process. They could use these hats efficiently and wisely depending on the student ability and classroom situation.

The pre-service teachers' questioning skills improved over the training, they seemed to believe that their questioning of students would lead the class to the destination that they had previously chosen and determined. One pre-service teacher asserted that:

"I've developed my style of questioning after the training and knowing sometimes when to use open-ended questions and knowing what kinds of question should be used for students' better achievement." (PT5, Reflective journal)

The participants implemented discovery learning after training with productive pedagogies. One example of discovery learning that one participant put into practice is that:

"Well, I would say that science would be a lot of modeling and experimentation and stuff like you would say "Alright we're going to see, um, why you know oil and water what happens with them, etc." So, I give them the materials and then they would describe what's happening instead of saying that oil and water don't mix well and why it is. I wouldn't just tell them the answer first and give them an experiment that allows them to discover it." (PT 8, Reflective journal)

With regard to the substantive conversation, according to the observation results, the pre-service teachers' pedagogical practice enhanced in using high levels of talk about language with different contexts. One of the pre-service teachers mentioned that:

"I gradually focused on substantive conversation in my classroom because it increased students' thinking and confidence so they interacted with each other and exchanged ideas, which in turn, facilitated effective understanding of the concepts discussed." (PT4, Reflective journal)

In particular, one participant also indicated that:

"The enthusiasm and interaction of students are apparent when they not only rely on delivery of knowledge, but on their self-reliance in accessing to information and using the high-order thinking to combine facts or analyse ideas. This helps students to gain a better understanding of the lessons." (PT6, Reflective journal)

Another participant has put the usefulness of productive pedagogies in this way:

"I think the framework is necessary for pre-service teachers, because it helps us to become teachers in ways that change the picture of a teacher from one who just transfers knowledge to the student." (PT3, Reflective journal)

Effect Matrix: Pedagogical Shifts after Implementation of Supportive Classroom Environment for Pre-Service Teachers' Practicum Practice

Productive Pedagogies	Early Use	Later Use
Supportive Classroom Environment	▪ Teacher-student ▪ Whole class	▪ Student-student ▪ Teacher-student ▪ Social support ▪ Respect and care
	▪ Student work	▪ Rule and behavior management ▪ Academic engagement ▪ Valuing their own opinions ▪ Developing students' self-esteem

Concerning the above effect matrix, it can be seen that all pre-service teachers' pedagogical practices related to supportive classroom environment progress according to the training with productive pedagogies.

The pre-service teachers felt that the idea behind supportive classroom environment was very close to their traditional way of teaching. One of the pre-service teachers said:

“This dimension depends on the teacher's personality such as teacher's ability to control her class, her effective ability to assess students' work and her excellence in dealing with her students. From the beginning, I feel that I am empowered to achieve this dimension.” (PT12, Reflective journal)

The pre-service teachers stressed that encouraging students to work in groups or pairs contributed towards raising the level of classroom social support. One participant stated that:

“Providing tasks that required group work helped students to have long and extensive discussions on the task. Students exchanged ideas, experiences, and skills and helped each other to understand the concepts. This resulted in creating a great spirit of cooperation between groups.” (PT9, Reflective journal)

The pre-service teachers seemed to provide a good social climate in which students feel that it is beneficial to question the teachers about plans and methods that affect their learning. In a group-work situation, each member of the group had opportunities to discuss, explain and reflect their ideas with each other. Another pre-service teacher commented that:

“Even if a particular response or idea expressed is incorrect, students should be encouraged to speak out so that every student realizes that everyone is not always right, but needs an opportunity to express themselves.” (PT6, Reflective journal)

Secondly, academic engagement was another element in which pre-service teachers performed relatively well during their practice. Academic engagement occurs when students show enthusiasm for their tasks by taking the initiative to raise questions, contribute to group activities and help and support peers. One participant stressed by saying that:

“What concerns me is the motivation of my students and their desire to learn, what productive pedagogies changed; the participation of my students improved, and the students who did not participate at all, became more engaged because they had found much to talk about during class.” (PT7, Reflective journal)

In a similar manner another teacher described the personal effort and role in enabling the supportive classroom environment. As cited:

“That depends entirely on the teacher. A good teacher makes the classroom an environment where students can evolve socially.” (PT4, Reflective journal)

The pre-service teachers identified that students could express their opinion freely and obtained opportunities to collaboratively share their views and thoughts in productive and positive classroom environment. One participant mentioned that: “I can create supportive classroom environment to express students’ ideas freely in safe and comfortable environment with their colleagues. This caused their learning more achievable and memorable.”

This part summarizes regarding the pedagogical shifts of the pre-service teachers’ practicum practice concerned with the two dimensions of the productive pedagogies.

Research Question 2: What are the challenges that the pre-service teachers encountered while implementing productive pedagogies in their practicum?

To respond to this research question, focus group interview was conducted in order to explore the challenges faced by the pre-service teachers in the implementation of the productive pedagogies framework. For the analysis of focus-group data, summary-based reporting approach was used. Each focus group is composed of four participants according to their specialization: Group 1 is for Pure Science; Group 2 is for Pure Arts; and Arts and Science for Group 3. Accordingly, in the following section, four responses related to the two dimensions of productive pedagogies are provided using summary-based reporting approach.

Challenges Experienced by Pre-service Teachers in Implementing Intellectual Quality in their Classroom

With regard to this, in order to explore the challenges experienced by pre-service teachers in implementing intellectual quality in their classroom, the following guidelines for each focus group are utilized.

Question (1): In which component of the intellectual quality dimension did you encounter the challenges? Why?

Question (2): How would you transform the new ways of teaching related to intellectual quality dimension for further teaching?

The following table illustrates the summary responses related to intellectual quality obtained from all focus groups.

Table 2 Summary-Based Reporting Related to Intellectual Quality

Group	Question 1	Question 2
1	Metalanguage	Different contexts
2	Substantive conversation	More challenging activities
3	Time	Belief about teacher’s ability

With respect to metalanguage, from the data collected, the participating teachers had varied opinions on the implementation of metalanguage. Some were of the view metalanguage partially implemented, while others were of the view they were implemented.

“There was an improvement in almost all the elements of intellectual quality in my classroom. However, metalanguage was totally absent; though I feel there was no need for it in my lesson.” (PT2, focus group 1)

Interestingly, another participant had a better perspective of the concept of metalanguage. He argued:

“For me, I implemented all the elements of intellectual quality very well including the metalanguage..., since it is not only on difficult words..., it involves the definitions of terms..., re-emphasis on difficult words..., retreating to explain..., the concepts of axioms, theories, laws etc. are all metalanguage concepts. So, the metalanguage was there during classroom practice.” (PT5, focus group 2)

The interactions between the pre-service teachers on metalanguage provided that they did not really have agreement of the concept of metalanguage and its implementations. Therefore, these results indicate that, productive pedagogies may work in one environment and fail to work in other environments depending on the prevailing circumstances surrounding the environment and different context.

According to the participants’ responses of this study, the productive pedagogies framework influenced the pre-service teachers by challenging their views about their assumed learning theories. The pre-service teachers indicated that their views of learning and teaching had changed after studying and implementing the productive pedagogies framework. They commented that the framework could assist them achieve pedagogical shift.

One of the participants pointed out the change in her teaching towards student- centered approaches and said:

“Previously we did not pay enough attention to deepen higher levels of thinking among students and to consider that the student is the focus of our teaching. We started giving more interest to the role of the student to discover, explain and draw conclusions about some of the facts and ideas.” (PT12, focus group 3)

The another challenge to pre-service teachers’ ability related to intellectual quality elements was the fact that the principles of productive pedagogies need significant time to be applied in lessons which is last for only 45 minutes. One pre-service teacher mentioned that:

“Higher-order thinking activities take up so much time to prepare and apply, that I often run out of time. I just have 45 minutes for the class!” (PT7, Focus group 2)

Moreover, exchanging ideas and opinions during the class dialogue helped students to grasp the complex relationships between central ideas. One participant mentioned:

“The sustained discussion on today’s concepts which included exchanging the opinions with each other and using students’ examples and experiences meant the lesson became more understandable.” (PT1, focus group 1)

One interesting thing is the pre-teachers’ beliefs about their abilities in implementing productive pedagogies. One participant summarized his experience as follows:

“The main point is my weakness in English. I don’t dare to speak in English and I’m not used to speaking in English. And the students can understand me when I teach in Burmese. For these reasons, I teach only in Burmese. Next time, I’ll try to speak in English as much as I can.” (PT9, focus group 3)

Challenges Experienced by Pre-service Teachers in Implementing Supportive Classroom Environment in their Classroom

With respect to this, to explore the challenges experienced by pre-service teachers in implementing supportive classroom environment in their classroom, the following guidelines for each focus group are adopted.

Question (3): In which component of the supportive classroom environment dimension did you encounter the challenges? Why?

Question (4): How would you transform the new ways of teaching related to supportive classroom environment dimension for further teaching?

The summary responses related to supportive classroom environment revealed from all focus group are illustrated in the following table.

Table 3 Summary-Based Reporting Related to Supportive Classroom Environment

Group	Question 3	Question 4
1	Class control	Real school-based experiences
2	Time constraint	Use time wisely
3	Class size	Self-regulation

As can be seen from the above summary-based reporting, the responses related to supportive classroom environment revealed that pre-service teachers were better at producing a supportive classroom environment than they were at producing intellectual quality, connectedness, or recognition of difference. Pre-service teachers were more inclined to improve their learning environment by trying to support their students as a means of providing the best learning environment.

Endeavors to improve teaching needs to be spearheaded by greater sharing of control with students in the classroom and providing them with opportunities to negotiate and speak out. Pre-service teachers, to some extent, succeeded in creating the appropriate climate for students to raise questions and contribute to group activities. One participant stressed that:

“Working in pairs encouraged students to participate with their colleagues comfortably and show enthusiasm towards their tasks.” (PT4, Focus group 1)

Another pre-service teacher also highlighted as:

“With productive pedagogies I believe that knowledge must be expressed in various ways. I see us moving away from the traditional teaching methods and we are trying to introduce new student-centred interactions with the knowledge gained through discussion and a consensus being reached...In the end, students will have the correct information in an interactive learning environment which will ultimately help their learning.” (PT1, focus group 1)

From the views of the pre-service teachers, the use of productive pedagogies framework encouraged representative participation of students during classroom instruction and in decision making on how classroom activities are handled. One participant commented that:

“During class instruction, I made use of the students do most of the classroom activities. For example, the students are allowed to cite examples of daily activities like going to the markets to buy things. He also used two students working together to

describe how two lines could be parallel.... in short, the students were fully involved in his teaching. Students were relaxed to discuss their problems during the classroom instruction with us.” (PT11, focus group 3)

One of the pre-service teachers asserted the effect of large class size and said:

“Best application of productive pedagogies requires all students having opportunities to participate. However, following-up 35 students with different abilities and learning skills creates an extra burden for the teacher. Maybe if the class sizes were reduced to 15 that would be better.” (PT 10, focus group 3)

To sum up, as the pedagogical shifts, pre-service teachers’ practicum practice enhanced in all two dimensions of productive pedagogies by training with productive pedagogies. Among them, it can be concluded that pre-service teachers found it easiest to implement supportive classroom environment in the practicum in spite of the challenges such as metalanguage and hindrances and contextual factors (time and class size) are appeared during the practicum.

Discussion

The quality of the education system cannot exceed the quality of its teachers. In light of this focus, valuing the quality of pre-service teachers’ pedagogical practices to improve students’ outcomes has become a key consideration in reforming teacher education for the 21st century. The central premise of the successful application of productive pedagogies is that teachers consider backgrounds and students’ preferred learning styles, identify the repertoires of practice and operational fields to be targeted, evaluate their array of teaching strategies, and select and apply the appropriate ones. Therefore, this study was conducted to examine whether productive pedagogies enhance the pre-service teachers’ pedagogical practices. The three research objectives are laid down to achieve this purpose.

The first objective is to develop a training model for producing pre-service teachers’ practicum practice using productive pedagogies. Therefore, the proposed training model was firstly developed. It includes four phases: assessing pre-service teachers’ initial knowledge and skill, training with productive pedagogies, implementing productive pedagogies in practicum practice, and consolidating.

The second objective is to investigate how training with productive pedagogies enhances pre-service teachers’ practicum practice. An Effect matrix of Miles, Huberman, and Saldana (2014) was utilized to highlight the pedagogical shifts of the pre-service teachers’ pedagogical practices concerned with the two dimensions of the productive pedagogies: intellectual quality, and supportive classroom environment. Four main themes were appeared as the main strengths for implementing productive pedagogies by pre-service teachers in practicum practice: (a) improvement in pedagogical practices, (b) guiding teachers’ preparation, (c) valuable guide for teaching, and (d) engagement in professional development opportunities. The thematic interpretation map for the strengths of implementing productive pedagogies in practicum is provided as follows.

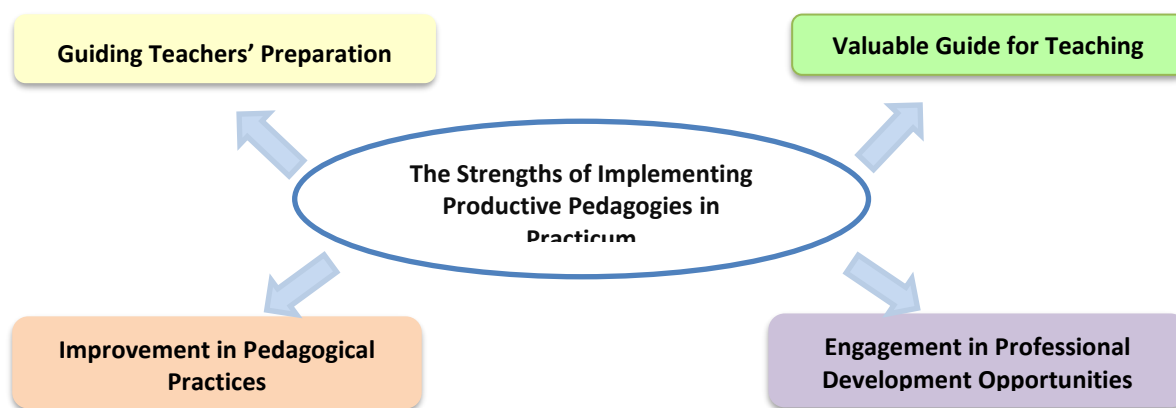


Figure 1 Thematic Interpretation Map for the Strengths of Implementing Productive Pedagogies in Practicum Practice

The third objective of this study is to find out the challenges faced by pre-service teachers in implementing productive pedagogies in their practicum. Based on the results of the summary-based report with regard to the challenges faced by pre-service teachers for implementing productive pedagogies in their practicum, metalanguage, time and class size are appeared as the main challenges for pre-service teachers.

The findings of this study showed that pre-service teachers' ability to implement productive pedagogies involved some challenges. Perhaps of the all dimensions of productive pedagogies, pre-service teachers in the study found that it is easiest to implement the supportive classroom environment dimension. This finding is in agreement with the study of Gore, Griffiths, and Ladwig (2004).

As mentioned above section related to metalanguage, pre-service teachers had different perspectives on implementation of metalanguage; some argued that it could omit from some of the lessons while some pointed out that it is necessary for their learning context. In this study, accordingly, the results from the pre-service teachers' focus group interviews showed that time, and class size are the hindrances and contextual influences that teachers faced for implementing productive pedagogies in their practicum. Figure 2 is the thematic interpretation map of the meanings indicated the challenges facing pre-service teachers in implementing productive pedagogies in their practicum.

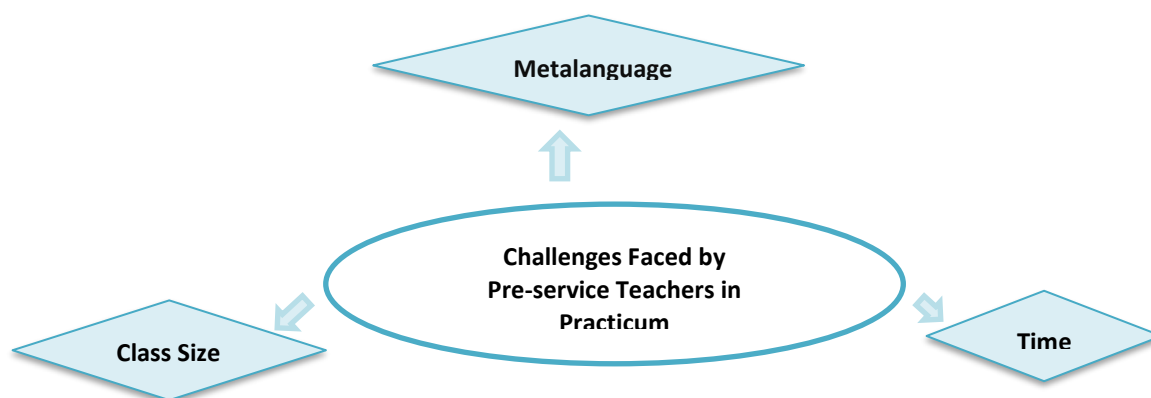


Figure 2 Thematic Interpretation Map for the Challenges Faced by Pre-service Teachers in Practicum

Suggestions

The overall findings of this study suggests interesting insights on pre-service teachers' needs and challenges to fill up the gap from their institution to school (theory into practice).

Firstly, for Myanmar teacher education program, an effective policy should be laid down for extending pedagogic internship or practicum component, buttressed by authentic mentor/instructor supervision, and solidly based on dynamic homeostasis. Since improving teacher performance is deemed crucial to improving student outcomes, an integrated teacher development programme, preferably under a separate department of teacher education, should be developed resulting in a viable strategy for supporting teachers or pedagogues throughout their pedagogic careers from selection to initial training to career development.

Secondly, in the structure of the teacher education system of institution, teaching practicum should be emphasized more and redesigned. Curriculum developers should consider giving more and more incorporation to utilize the theoretical concepts directly to practice teaching bridging the gap between theory and practice by taking into consideration the integration of the productive pedagogies for the pre-service teachers' practicum practice.

Thirdly, the institutional administrators should encourage the teacher educators to make more proficient and better collaboration with the practice schools for pre-service teachers' firsthand experiences and thus the strong coordination of the efforts to help their productive practice is indispensable to the stakeholders.

Fourthly, teacher educators should try to have the knowledge and skill to handle the changes to have a positive change in education as learning is itself an active process of change. They should cultivate pre-service teachers to have certain codes of pedagogic professional conduct and give thought and attention to how to better allow for the inclusion of productive pedagogies for all pre-service teachers.

Conclusion

Good teachers are made, not born; and, the making of a teacher is a complex process. Preparing pre-service teachers consistently throughout their preparation programs ensures a more vigorous transition to in-service teaching, creating a cadre of confident and effective educators for the pedagogically oriented society in the conceptual age.

Productive pedagogies framework provides background and some strategies around harnessing inner strength and developing a subsequent professional identity in order to pursue worthwhile, autonomous and transformative outcomes for practicum practice. Therefore, there is an urgent need to conduct a research dealing with the training with productive pedagogies for their pedagogical practices in their initial training.

According to the research question (1), the results of this study indicated that pre-service teachers' pedagogical practices enhanced when they applied productive pedagogies. Among the four dimensions of productive pedagogies, the pre-service teachers were better at producing supportive classroom environment than the other three dimensions. The strengths of implementing productive pedagogies by pre-service teachers in practicum practice have appeared as: (a) improvement in pedagogical practices (b) guiding teachers' preparation, (c) valuable guide for teaching and (d) engagement in professional development opportunities.

For the research question (2), while pre-service teachers expressed positive reactions towards introducing productive pedagogies in their pedagogical practices, they indicated some key challenges that they faced during their implementation. Time and class size emerged as challenges for implementing productive pedagogies in practicum. To overcome these challenges, all stakeholders such as curriculum developers, institutional administrators and teacher educators could reconsider to provide practicum experiences based on dynamic homeostasis, to adjust class size if possible, and promote pre-service teachers' abilities and other effective factors for achieving better practice of pre-service teachers in their practicum.

As a final conclusion, the researcher wishes to assert that, to be optimally successful, practicum practice procedures should be based upon extending pedagogic internship or the practicum component, buttressed by authentic mentor/instructor supervision, and solidly based on dynamic homeostasis. The researcher believes that these aforementioned pedagogic principles will result in increased effectiveness of the practicum, commendable for all teacher education arenas of the world, and as the universal strategy of global pedagogistics.

Acknowledgements

We would like to offer heartiest thanks to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector, Yangon University of Education), and Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education) for their administrative support and permission to conduct this study. And special thanks also go to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) for their administrative support for this study. Especially, we would like to record our wholehearted thanks to Dr. Khin Mar Khine (Professor and Head of Department of Curriculum and Methodology, Yangon University of Education) for generous guidance, enthusiastic devotion, and encouragement to complete this study. Furthermore, we also wish to express our deepest appreciation to Dr. Wai Wai Oo (Professor and Head of Department of Curriculum and Methodology, Sagaing University of Education) for her constructive suggestions, immense knowledge and benevolence to conduct this study.

References

- Gore, J. M., Griffiths, T., & Ladwig, J. G. (2004). Towards better teaching: Productive pedagogy as a framework for teacher education. *Teaching and teacher education*, 20(4), 375-387.
- Hamilton, L., & Corbett-Whittier, C. (2013). *Using case study in education research*. New Delhi: SAGE Publications India Pvt ltd.
- Hayes, D., Mills, M., Christie P., & Lingard, B. (2006). *Productive pedagogies: teacher, and schooling making a difference: productive pedagogies, assessments and performance*. Singapore: Allen and Unwin.
- Khin Zaw. (2013). *Rapid assessment on Myanmar teacher education* (CESR Area Report on Teacher Education). Yangon.
- Merriam, S. B. (1988). *Case study research in education: A qualitative approach*. San Francisco, CA: Jossey-Bass Publishers.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3rd ed.). USA: SAGE Publications.
- Patton, M. Q. (2002). *Qualitative research and evaluative methods* (3rd ed.). California, SAGE Publications.

THE IMPACT OF BRAIN-BASED LEARNING MODEL ON SCIENCE ACHIEVEMENT OF STUDENTS AT THE MIDDLE SCHOOL LEVEL*

Su Lae Yi¹ and Khin Mar Khine²

Abstract

The main purpose of this study is to investigate the impact of brain-based learning model on science achievement of students at the middle school level. The research design adopted was explanatory sequential mixed methods (Quan → qual) design. For the quantitative study, nonequivalent control group design, one of the quasi-experimental designs, was used. To follow up on quantitative results, case study research design was used. The research instruments used in this study were pretest, posttest, attitude questionnaire, observation checklists and interview questions. By using simple random sampling method, four basic education high schools were selected from Mandalay Region. As quantitative research findings, overall science achievement of middle school students who receive instruction with proposed brain-based learning model was significantly higher than that of those who do not. Also, there was a strong positive relationship between students' science achievement and their attitudes towards learning science with proposed brain-based learning model. The best predictor for students' science achievement was teaching-learning process, the second predictor was learning materials, the third predictor was learning environment and the last predictor was assessment of proposed brain-based learning model. As qualitative research findings, the results of observation checklists and interviews revealed that science teachers and students well performed and had positive attitudes towards applying proposed brain-based learning model in teaching and learning science. Therefore, the research findings proved that brain-based learning model contributes a positive impact on science achievement of students at the middle school level.

Keywords: brain, learning, brain-based learning, brain-based learning model, science

Introduction

Education is a deliberate process of transformation in the natural growth and development of the person and the surroundings. The ultimate goal of education or pedagogy is to grow, not just physically, of course, but in greater insight into and control over oneself and over one's environment. The young must be taught how to think when the method to use is not now known and the problem to be solved has not even been formulated (Khin Zaw, 2001). Teaching of science should give emphasis on certain important changes in young pupils, changes in their way of thinking, in their habits of action and in the values they endure.

Teaching should be compatible with students' brain behaviour because learning is a function of the brain. Brain-based learning enhances the brain's natural ability to learn by applying three core elements, namely, relaxed alertness, orchestrated immersion and active processing. Brain-based learning stimulates the whole brain for effective function which results in greater academic progress. Brain-based learning model transforms the students from passive recipients of information to active participants in the learning process. It engages the emotions of the students, provides enriched environment, actively process the information, makes meaning and takes maximum participation of learner with high challenge and low threat.

* Second Prize(2024)

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Objectives of the Research

The main purpose of this study is to investigate the impact of brain-based learning model on science achievement of students at the middle school level. The specific objectives of this research are described as follows:

1. to develop a brain-based learning model for teaching middle school science,
2. to explore the impact of brain-based learning model on science achievement of students, and
3. to make suggestions and recommendations for the improvement of teaching and learning science at the middle school level based on the results of the study.

Research Questions

The research questions addressed in this study are as follows:

1. Is there any significant difference in science achievement of middle school students who receive instruction with brain-based learning model and those who do not receive it?
2. Is there any significant relationship between middle school students' science achievement and their attitudes towards learning science with brain-based learning model?
3. How can middle school students' attitudes towards learning science with brain-based learning model: learning environment, learning materials, teaching-learning process and assessment predict their science achievement?

Scope of the Research

The scope of this study is as follows:

1. This study is limited to Grade Six students who are learning science and teachers who are teaching Grade Six science from the selected schools in Mandalay Region during 2023-2024 Academic Year.
2. This study is also limited to the content areas of force, living things, cell and cell structure, and reproduction from Grade Six science textbook prescribed by the Basic Education Curriculum, Syllabus and Textbook Committee, 2023.

Definition of Key Terms

The key terms in this study are as follows:

Brain: Brain is the one which is not only the control center of the entire human body, organizing behaviors and biological functions, but it is also the seat of humanity (Slavkin, 2004).

Learning: Learning is defined as a process that leads to change, which occurs as a result of experience and increases the potential for improved performance and future learning (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010).

Brain-based Learning: Brain-based learning is defined as a comprehensive learning approach that is aligned with how the brain naturally learns best and based on findings derived from research in neuroscience (Jensen, 2008).

Brain-based Learning Model (Operational Definition): Brain-based learning model is one which emphasizes creating learning conditions that increase student motivation, engagement and long-term retention in consideration of students' different learning styles and by tapping into the natural ways the brain receives, processes and stores information.

Science: Science is defined as a way of thinking in the pursuit of understanding nature, a way of investigating, and a body of established knowledge (Collette & Chiappetta, 1989).

Statement of the Problem

Basic education curriculum plays an important role for the children and youths of every country by fulfilling their physical, intellectual, linguistic, emotional and social needs. The new curriculum focuses on 21st century skills, soft skills including personal development and employability skills and higher-order thinking skills. Importantly, the new curriculum reduces the content to a manageable level to ensure that there is sufficient time: (a) for teachers to adequately cover the full curriculum within each academic year; and (b) for students to understand new concepts and to develop higher-order thinking skills appropriate for Myanmar's modern economy and changing society needs (Ministry of Education [MOE], 2016).

One of the challenges in implementing the new curriculum in Myanmar is whether the teachers will actually change or upgrade their teaching methods which will be needed to reach the targets of the new curriculum. Promoting students' critical thinking and reasoning will surely need to give the students the chance to question to the teachers. Most of the students are found being reluctant to ask questions (Wint Zaw Htet, 2020).

Most science teachers are curriculum-driven and are more interested in finishing the contents of the syllabus as stipulated by the curriculum at the expense of the students' brain. Both the teachers and the students seem to forget that there is a connection between the brain and everything that goes on in school (Rehman & Haider, 2013). According to Jensen (2008), any attempt to disconnect this will lead to failure, frustration, and disaster in teaching and learning. For the issues and the various efforts made to confront these challenges and the problems remain unsolved, the need for a practical approach as the brain-based learning model might work out better. Therefore, this study is an attempt to investigate the impact of brain-based learning model on science achievement of students at the middle school level.

Review of Related Literature

Philosophical Considerations: Pragmatism, progressivism, humanism, naturalism and constructivism are taken into consideration in developing brain-based learning model. Pragmatism emphasizes an activity-oriented approach so students would learn not only that they can relate various kinds of knowledge and use them to attack a problem but also that they can act on them (Ozmon & Craver, 1986). Progressivism emphasizes the need for students to learn through their own experiences and be actively involved in their own learning process (Armstrong, Henson, & Savage, 1989). Naturalistic educations advocated the system of developing inherent tendencies by providing conducive experiences and the children imbibing knowledge according to their interests and aptitudes by their own efforts, observations and experimentation (Dhiman, 2007). According to humanism, mastering of the subject matter is a natural by-product of such a relaxed environment characterized by warm, positive and accepting human quality. It emphasizes to provide for rich environment with a view to facilitate total and integrated child development (Siddiqui, 2009). A constructivist approach to teaching and learning does not deny the importance of factual knowledge, but it does emphasize that the best way for learners to retain and apply this knowledge is to put it into a larger, more lifelike context that stimulates learners to reflect, organize, analyze, and solve problem (Borich & Tombari, 1997, as cited in Killen, 2016). Therefore, in implementing brain-based learning model, students are given learning experiences from which they can construct their own meaning and share the

ideas with other students, and the learning environment where they are with real-world problems that encourage them to do critical thinking and challenge them to have problem-solving skills.

Learning Theories: As the second part of theoretical considerations, Piaget's stage theory of cognitive development, Vygotsky's theory of cognitive development, Bruner's theory of cognitive growth, Ausubel's meaningful learning theory, information processing theory, brain-based learning theory and Gardner's theory of multiple intelligence are taken into consideration to develop brain-based learning model. Therefore, in implementing brain-based learning model, effective learning procedures are created to tailor instruction to meet the needs of diverse learners and promote better learning outcomes, and appropriate learning activities are prepared to maximize students' experiences. Students are more engaged in learning when they are presented with activities that match their strengths and interests.

Background Teaching Models: To support the proposed brain-based learning model, six teaching models were considered as background concepts. These are Glaser's basic teaching model, Dr. Khin Zaw's multimodal model, Selfridge's sequential (serial) parallel model, Kovalik's integrated thematic instruction model, Hardiman's brain-targeted teaching model and Jensen's brain-based teaching model.

Brain-based Learning Model: The summary of brain-based learning model is described in Table 1 and brain-based learning model for teaching middle school science is presented in Figure 1.

Table 1 Summary of Brain-based Learning Model

Phase	Step		Major Activity
Prepare	Selection of Content		- selecting the content
	Clarification of Learning Objectives		- clarifying specific statements of what the students will be able to do at the end of teaching-learning process
	Preparation of Required Materials		- preparing materials required for instruction to provide students with enriched experiences
	Pre-exposure	to provide relaxed alertness	- providing students with an overview of the new learning
	Preparation of Learning Environment		- preparing learning environment in which students feel physically and emotionally secure (physically secure → pleasant smells, sounds, various sources, samples, working space emotionally secure → strong positive expectations, strong positive rapport)
Implement	Making Connection	to provide orchestrated immersion	- asking questions about the previous lesson or giving an activity to recall the learned concept (brain-based learning principles nine and ten)
	Activation		- engaging the mind and the body (brain-based learning principles six and eleven)

Phase	Step		Major Activity
	Framing		- explaining students learning outcomes expected from studying the learned concept - overviewing the new information with the help of the poster hung on the wall at the pre-exposure step (brain-based learning principles one, six and twelve)
	Acquisition		- digesting, thinking about, reflecting on and making sense of experience utilizing visualization, auditory, reading/writing and kinesthetic in multiple contexts - providing enriched learning activities for students with different learning styles: uni-modal, bi-modal, tri-modal and multi-modal (brain-based learning principles one, two, four, six, eight and twelve)
	Brain-breaks		- giving break time and providing with reflection and metacognition opportunities to internalize the newly learned material (brain-breaks based on breathing or relaxation, those based on vigorous physical activity and those focused on mental activity)
	Intricacy	to provide active processing	- giving opportunity to the brain to sort, investigate, analyze, test and elaborate lessons
	Incubation and Application		- allowing students to consolidate and internalize information effectively - providing opportunities for students to apply what they have learnt (brain-based learning principles one, ten and twelve)
	Memory Encoding		- enhancing the learning where the brain of the learner will encode what he/she learned
Confirm	Review and Verification		- confirming student learning - stimulating working memory to summarize the lesson (brain-based learning principle eight)
	Functional Integration		- providing opportunities for students to show their understanding of the new concept received from learning period (brain-based learning principles one, nine and twelve)
Assess	Brain-compatible Assessment		- is process-oriented and multi-modal and provides detailed feedback - is an ongoing activity in which teachers gather information about student learning in multiple ways (rubrics, observation, self-evaluation, portfolio, term projects and all in-class activities)

Phase	Step		Major Activity
	Summative Assessment		- evaluating student learning, skill acquisition and academic achievement at the end of an assigned instructional period - Yes → Next Concept - No → Feedback

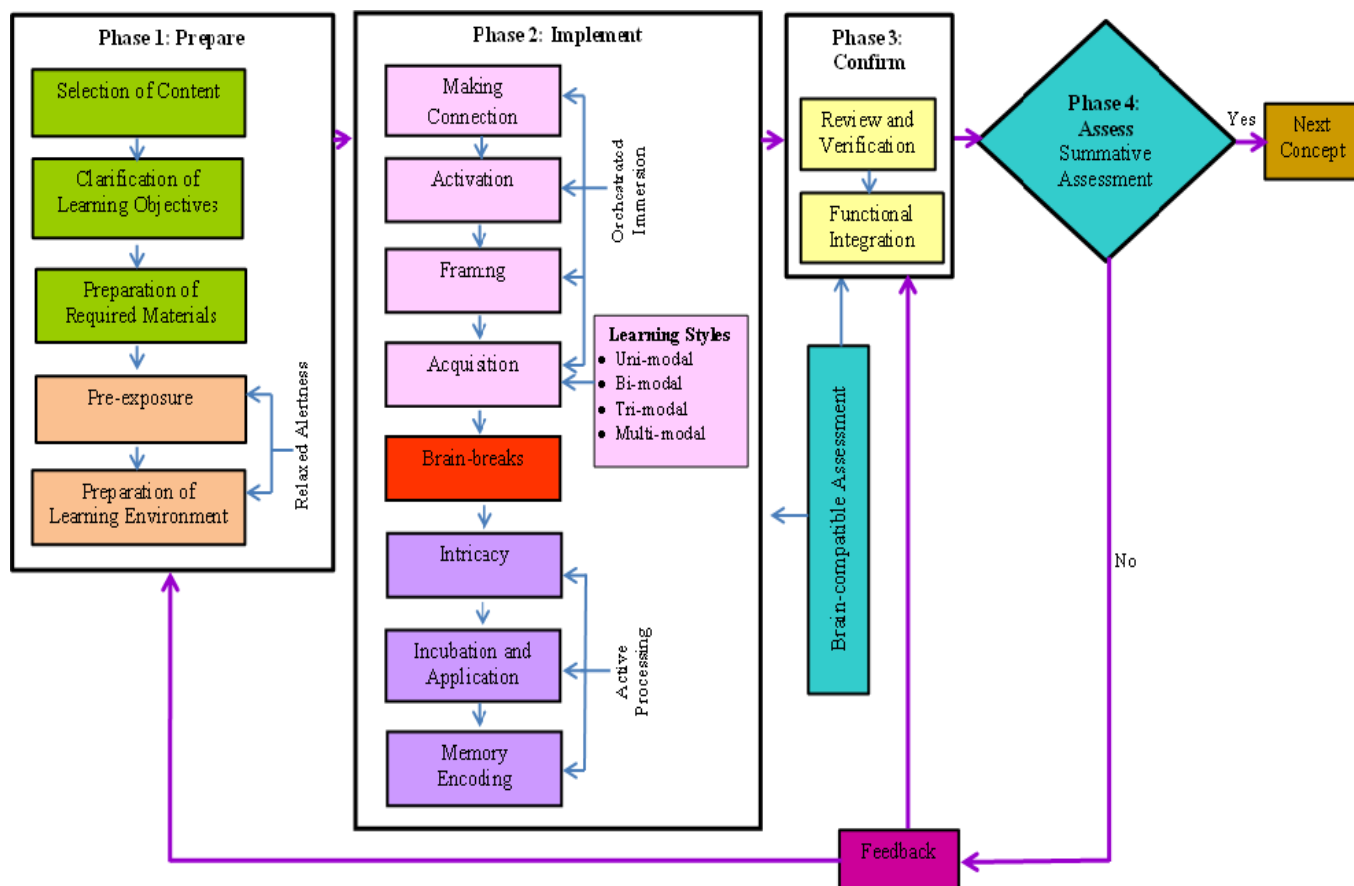


Figure 1 Brain-based Learning Model for Teaching Middle School Science

Methods

Research design, population and sample size, instruments and analysis of data are discussed in this section.

Research Design

To carry out the research, explanatory sequential (QUAN → qual) design, one of the mixed methods research designs, was used. The research design for the current study is illustrated in Figure 2.

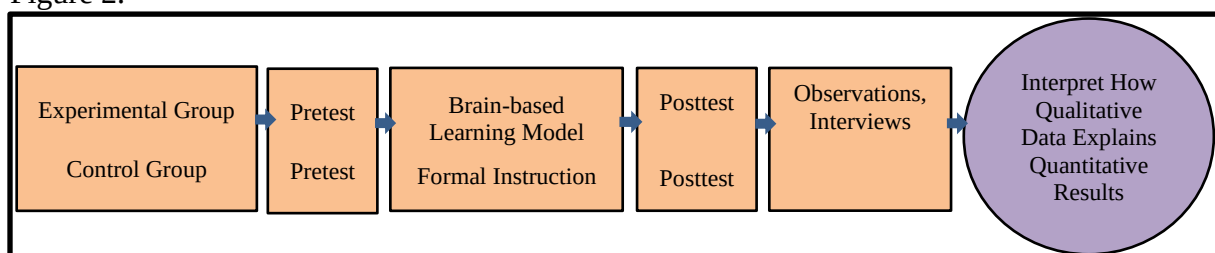


Figure 2 Research Design for the Current Study

Source: Adapted from Mills and Gay, (2016), p. 446.

In the quantitative phase of the study, nonequivalent control group design, one of the quasi-experimental designs, was used. In the qualitative phase, case study research design was used.

Population and Sample Size

Simple random sampling was used in the quantitative study. The population and sample size for the quantitative study are shown in Table 2.

Table 2 Population and Sample Size for Quantitative Study

Region	District	Township	School	No. of Population	No. of Sample
Mandalay	Maharaungmyay	Chanayetharsan	No. (5), BEHS, Chanayetharsan	108	108
	Aungmyaytharsan	Aungmyaytharsan	No. (20), BEHS, Aungmyaytharsan	165	109
	Meikhtila	Meikhtila	No. (1), BEHS, Meikhtila	228	115
	Yamethin	Pyawbwe	No. (1), BEHS, Pyawbwe	220	111
	Total			721	443

For qualitative study, purposive sampling was used to select participants. The population and sample size for the qualitative study are depicted in Table 3.

Table 3 Population and Sample Size for Qualitative Study

Selected Township	Name of School	No. of Participants for Observation		No. of Participants for Interview	
		Teacher	Students	Teacher	Students
Chanayetharsan	No. (5), BEHS, Chanayetharsan	1	54	1	4
Aungmyaytharsan	No. (20), BEHS, Aungmyaytharsan	1	55	1	4
Meikhtila	No. (1), BEHS, Meikhtila	1	58	1	4
Pyawbwe	No. (1), BEHS, Pyawbwe	1	55	1	4
Total		4	222	4	16

Instruments

For quantitative study, pretest, posttest and attitude questionnaire were used. As qualitative research instruments, observation checklists and interview questions were used.

Analysis of Data

Quantitative data were analyzed by using one-way analysis of covariance (ANCOVA), Pearson product-moment correlation and multiple regression. Qualitative data were analyzed by descriptive statistics and thematic analysis.

Findings

The findings of this study are discussed as quantitative research findings and qualitative research findings.

Quantitative Research Findings

In an attempt to answer the first research question, one-way analysis of covariance (ANCOVA) was used to analyze the data from posttest. According to the selected research design, the two intact groups from each school were assigned as the experimental group who receive instruction with brain-based learning model and the control group who receive formal instruction. Analysis of covariance is used to explore differences between groups while statistically controlling for an additionally (continuous) variable. ANCOVA is handy when it is unable to randomly assign the participants to the different groups, but instead have had to use existing groups (Pallant, 2013). The ANCOVA results of pretest scores on science knowledge in four selected schools are presented in Table 4.

Table 4 Analysis of Covariance (ANCOVA) Results for Pretest Scores on Science Knowledge in Four Selected Schools

School	Group	N	M	SD	MD	F	p
School 1	EG	54	21.74	0.48	0.07	0.55	.459 (ns)
	CG	54	21.67	0.55			
School 2	EG	55	21.53	0.74	0.25	2.90	.091 (ns)
	CG	54	21.28	0.79			
School 3	EG	58	20.66	0.69	-0.04	0.13	.721 (ns)
	CG	57	20.70	0.71			
School 4	EG	55	19.49	0.66	0.08	0.43	.514 (ns)
	CG	56	19.41	0.63			

Note. School 1 = No. (5), Basic Education High School, Chanayetharsan; School 2 = No. (20), Basic Education High School, Aungmyaytharsan; School 3 = No. (1), Basic Education High School, Meikhtila; School 4 = No. (1), Basic Education High School, Pyawbwe.

EG = Experimental Group; CG = Control Group. ns = not significant.

According to Table 4, there was no significant difference in the pretest mean scores between the experimental and control groups in four selected schools. It can be interpreted that the students in the experimental and control groups could be assumed to have similar science knowledge prior to the treatment.

The analysis of covariance results of posttest scores on science achievement in four selected schools are presented in Table 5.

Table 5 Analysis of Covariance (ANCOVA) Results for Posttest Scores on Science Achievement in Four Selected Schools

School	Level	Group	N	Unadjusted M	Adjusted M	MD	F	p
School 1	Remembering	EG	54	11.91	11.90	0.10	2.14	.147 (ns)
		CG	54	11.80	11.80			
	Understanding	EG	54	11.26	11.25	0.78	65.46	.000***
		CG	54	10.46	10.47			

School	Level	Group	N	Unadjusted M	Adjusted M	MD	F	p
	Applying	EG	54	10.80	10.78	0.80	97.38	.000***
		CG	54	9.96	9.98			
	Analyzing	EG	54	9.96	9.95	0.38	17.14	.000***
		CG	54	9.56	9.57			
	Total	EG	54	43.93	43.88	2.06	152.31	.000***
		CG	54	41.78	41.82			
School 2	Remembering	EG	55	10.89	10.86	-0.01	0.02	.884 (ns)
		CG	54	10.83	10.87			
	Understanding	EG	55	11.44	11.38	0.97	93.11	.000***
		CG	54	10.35	10.41			
	Applying	EG	55	10.67	10.63	0.71	72.76	.000***
		CG	54	9.87	9.92			
	Analyzing	EG	55	9.82	9.76	0.57	31.25	.000***
		CG	54	9.13	9.19			
School 3	Remembering	EG	58	10.14	10.14	0.09	2.06	.154 (ns)
		CG	57	10.05	10.05			
	Understanding	EG	58	10.69	10.70	0.69	97.95	.000***
		CG	57	10.02	10.01			
	Applying	EG	58	9.91	9.93	0.84	91.86	.000***
		CG	57	9.11	9.09			
	Analyzing	EG	58	9.16	9.16	0.85	85.88	.000***
		CG	57	8.32	8.31			
School 4	Remembering	EG	55	10.07	10.07	0.03	0.17	.683 (ns)
		CG	56	10.04	10.04			
	Understanding	EG	55	10.69	10.68	0.70	74.40	.000***
		CG	56	9.96	9.98			
	Applying	EG	55	9.80	9.79	0.63	43.14	.000***
		CG	56	9.14	9.16			
	Analyzing	EG	55	9.09	9.07	0.86	47.34	.000***
		CG	56	8.20	8.21			
	Total	EG	55	39.65	39.60	2.21	182.93	.000***
		CG	56	37.34	37.39			

Note. EG = Experimental Group; CG = Control Group. ns = not significant. *** $p < .001$.

The results in Table 5 showed that at the remembering level questions, there was no significant difference between the experimental group and control group on posttest scores of science achievement in four selected schools. Therefore, it can be interpreted that formal instruction could improve students' remembering of science knowledge similarly with brain-based learning model. But at the understanding, applying and analyzing level questions, there was a significant difference between the experimental group and control group on posttest scores of science achievement in four selected schools. Therefore, it can be interpreted that brain-based learning model significantly enhanced students' understanding of science concepts, students' ability to apply learned science concepts in other similar conditions and to dissect science knowledge and see its relationships.

Relationship between Students' Science Achievement and their Attitudes towards Learning with Brain-based Learning Model: In an attempt to answer the second research question, Pearson product-moment correlation coefficient (r) was used. The correlation results are shown in Table 6.

Table 6 Correlation between Students' Science Achievement and their Attitudes towards Learning Science with Brain-based Learning Model

Variable	Science Achievement	Learning Environment	Learning Materials	Teaching-Learning Process	Assessment
Science Achievement	1	.649**	.690**	.700**	.587**
Learning Environment		1	.588**	.495**	.452**
Learning Materials			1	.540**	.552**
Teaching-Learning Process				1	.484**
Assessment					1

Note. **Correlation is significant at the 0.01 level (2-tailed).

According to the results in Table 6, there was a moderate, positive correlation between students' science achievement and their attitudes towards learning science with brain-based learning model: learning environment ($r = .649$, $n = 222$, $p < .01$), assessment ($r = .587$, $n = 222$, $p < .01$). There was a strong, positive correlation between students' science achievement and their attitudes towards learning science with brain-based learning model: learning materials ($r = .690$, $n = 222$, $p < .01$), teaching-learning process ($r = .700$, $n = 222$, $p < .01$). Therefore, it can be interpreted that the stronger attitudes students have towards learning science with brain-based learning model, the higher their science achievement.

Regression Analysis of Predictions of Students' Attitudes towards Learning with Brain-based Learning Model for their Science Achievement: In an attempt to answer the third research question, multiple regression analysis was used. Table 7 shows the results of the regression for predicting science achievement.

Table 7 Regression Analysis Summary for the Variables Predicting Science Achievement

Variable	B	β	t	R	R ²	Adj R ²	F
Science Achievement	4.167		2.054*	.828	.686	.680	118.495***
Predictor Variables							
Learning Environment	.340	.244	4.964***				
Learning Materials	.333	.266	5.026***				
Teaching-Learning Process	.299	.360	7.498***				
Assessment	.223	.156	3.264**				

Note. Constant = Dependent variable: Science Achievement

* $p < .05$. ** $p < .01$. *** $p < .001$.

The summary table (Table 7) shows that the multiple correlation coefficient (R), using all the predictors simultaneously is .828 ($R^2 = .686$) and the adjusted R^2 is .680. It means that 68% of the variance in science achievement can be predicted from learning environment, learning materials, teaching-learning process and assessment of brain-based learning model. In predicting students' science achievement, the best predictor was teaching-learning process ($\beta = .360^{***}$, $p < .001$), the second predictor was learning materials ($\beta = .266^{***}$, $p < .001$), the third predictor was learning environment ($\beta = .244^{***}$, $p < .001$) and the last predictor was assessment ($\beta = .156^{**}$, $p < .01$) of brain-based learning model.

Based on these regression findings for learning environment, learning materials, teaching-learning process and assessment of brain-based learning predicting science achievement, the regression equation can be defined:

$$SA = 4.167 + .340 X_1 + .333 X_2 + .299 X_3 + .223 X_4$$

where: SA = Science Achievement

X1 = Learning Environment

X2 = Learning Materials

X3 = Teaching-learning Process

X4 = Assessment

The multiple regression model of predicting students' attitudes towards learning science with brain-based learning model for their science achievement obtained from applying regression analysis is shown in Figure 3.

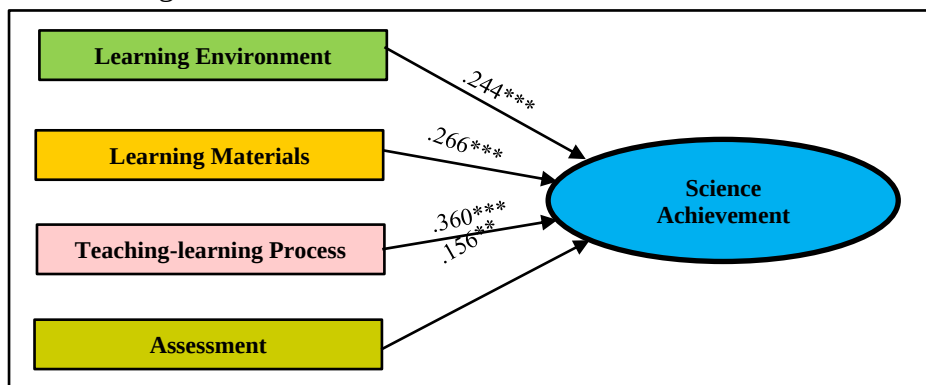


Figure 3 Multiple Regression Model of Predicting Students' Attitudes towards Learning Science with Brain-based Learning Model for Science Achievement

According to the results from this regression findings, there is no multicollinearity problem and the assumptions of linearity, normality and equality of variance are all met. Therefore, it can be interpreted that the multiple regression model predicting students' attitudes towards learning science with brain-based learning model for science achievement is stable, good and quite respectable.

Qualitative Research Findings

The results from observation checklists and interview are as follows.

Findings from Observation Checklist for Teachers: According to the observation results, it can be interpreted that teachers who taught the experimental groups were not familiar with the steps of brain-based learning model at the beginning but they were able to implement all these steps well in later chapters.

Findings from Observation Checklist for Students: From the results of observations, it can be interpreted that students were not much familiar with the steps of brain-based learning model in earlier lessons but they were able to participate well in all steps of the teaching-learning process in later lessons.

Findings from Science Teachers' Interview: Based on the thematic analysis of teachers' interview data, there are three main themes: attitudes towards brain-based learning model, teaching-learning process of brain-based learning model and impact of brain-based learning model. From the results, it can be interpreted that teachers have positive attitudes towards applying brain-based learning model in teaching middle school science.

Findings from Students' Interview: Based on the thematic analysis of students' interview data, there are three main themes: attitudes towards learning with brain-based learning model, teaching-learning process of brain-based learning model and impact of brain-based learning model. From the results, it can be interpreted that students have positive attitudes towards learning middle school science with brain-based learning model.

Discussion

Regarding one-way analysis of covariance (ANCOVA) results of posttest scores, it can be interpreted that the use of brain-based learning model had a significant effect on science achievement in the cognitive level. The research findings are in line with the results of Saleh (2011), Akyurek and Afacan (2013), and Bada and Jita (2023) who found that there was a significant difference between experimental groups and control groups favoring brain-based learning. Students who receive instruction with brain-based learning model gain much science knowledge, have a deep understanding of science concept, apply this concept in similar contexts and real-life experience, divide the learned concepts into different parts, identify the causes and solve problems with evidence. This may be due to the fact that using enriched learning activities can support students' understanding, creating contexts and questions that relate to real-life experiences can give opportunities to apply their learned concepts, and having opportunities to show their understanding at functional integration step can improve their analytical skills.

The results of Pearson product-moment correlation revealed that there was a statistically significant relationship between the four dimensions of students' attitudes towards learning with brain-based learning model with their science achievement. It can be interpreted that students have stronger attitudes towards learning science with brain-based learning model, they achieve

higher in learning science. In the study conducted by Bruke and Williams (2008), it was found out that the students who are much better motivated for learning both get more successful and tend towards the thinking skills. According to Kara (2010), positive beliefs of students towards obtaining knowledge support their efforts to learn a subject.

The results of multiple regression analysis indicated that the best predictor for students' science achievement was teaching-learning process, the second predictor was learning materials, the third predictor was learning environment and the last predictor was assessment of brain-based learning model. Therefore, it can be interpreted that students who have high positive attitude towards learning environment, learning materials, teaching-learning process and assessment have high science achievement. According to Cetin (2006), attitude is a tendency which is attributed to individuals and creates ideas, feeling and behaviors about an object in an orderly manner.

Suggestions

Based on the findings of the research, a few suggestions can be made for teachers, students and school administrators to be effective teaching and learning science at the middle school level in using brain-based learning model.

Suggestions for Middle School Science Teachers: The results of posttest scores revealed that students who learn with brain-based learning model performed significantly better in learning science than those who do not. From observations, it was found that teachers implement brain-based learning model productively by providing various learning activities in teaching middle school science. Aljorani (2008) indicates that enrichment of teaching, with the varied activities and techniques, can meet the needs and interests of students. This enrichment can also develop positive attitudes and self-confidence of the learners which in turn helps them involve in the activities of teaching situations. It helps students have more relaxation, active processing and improve achievement. Therefore, it is suggested that teachers should prepare and use varieties of learning activities with multiple experiences to reach preferences of every student in the class.

Suggestions for Middle School Students: The results of posttest scores indicated that students who learn science with brain-based learning model have better achievement in science than those who do not. The observation and interview results also revealed that participating in the brain-based learning process has an advantage of improving science achievement. Therefore, it is suggested that students should participate actively in teaching-learning activities. Active participation in learning activities can help students better understand the material being taught. When students ask questions or share their ideas, they can clarify concepts they may have been confusing before. It can lead to better retention of information and develop critical thinking skills. As class participation requires students to analyze information and form opinions based on evidence, it can help develop lower-order thinking skills as well as higher-order thinking skills which are valuable in many areas of life.

Suggestions for School Administrators: From interviews, it was found that teachers have positive attitudes towards applying brain-based learning model in teaching science. Developing partnerships with other schools to share knowledge and instructional practices could facilitate teachers' and students' efforts in understanding how the brain functions. Providing professional support in helping teachers understand the brain and how students learn, will guide instructional practices that liberate students to seek the power within themselves and the world beyond.

Therefore, school administrators should provide opportunities to hold meeting or workshops for professional development of science teachers.

Recommendations

It is assumed that this study has contributed to the improvement of teaching and learning science at the middle school level. However, this research is not perfect and somewhat limited in scope. Based on the research findings, some recommendations can be provided for further research studies. This study was conducted with the sample schools from Mandalay Region. Therefore, further studies should be conducted in other states and regions in Myanmar with larger samples. As this study was limited to physics and biology concepts of science, further studies should be investigated with other science concepts such as chemistry concepts. In this study, the impact of brain-based learning model was explored by the evidence of students' science achievement. Further studies can be carried out to develop problem-solving ability, critical thinking ability, science processing skills, metacognitive skills, reasoning skills and creativity. This study was conducted by using explanatory sequential mixed methods research design and therefore, further studies can be conducted with different research designs to collect more reliable data.

Conclusion

Nowadays, learner's learning to learn, making effort for learning and high desire towards it are important focal points. In this context, it is one of the important roles of teachers to support the learners for developing positive attitudes towards learning and fulfilling their needs in learning. Brain-based learning model motivates student engagement in learning that leads to achievement in science for each individual student. The results of this study revealed that students learning with brain-based learning model performed significantly better than those who are taught with formally. Teachers and students have positive attitudes towards teaching and learning science with brain-based learning model. As teachers provide a stimulating learning environment that is both challenging and relaxing, students see the connections between the learned concepts and its practical applications, in order to better understand the knowledge and skill.

Brain-based learning model can be used to reduce the amount of rote memorization required since it helps students access and use more effective types of memory storage retrieval. It helps students to recognize patterns and then make connections between prior knowledge and new knowledge to be integrated in the brain's long-term memory storage areas. The significant contribution of brain-based research in education is the synoptic essence of Khin Zaw (1993) who pointed that the human brain seemingly possesses at least two unique capabilities: multimodal processing and multi-channel communication. The human brains perform processing functions sometimes uni-modally, sometimes bi-modally, but most of the time, or generally, they do so in a multiple mode. It can be assumed that brain-based learning model based on the theories and assumptions of brain-based research has a significant contribution in teaching science at the middle school level.

Acknowledgements

First and foremost, we would like to express our sincere appreciation to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector, Yangon University of Education) and Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education) for their administrative support and permission to carry out this study successfully. And we would like to express our immense gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education) and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) for granting us the permission to undertake this study successfully. We would also like to express special thanks to Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Sagaing University of Education) for her continuous encouragement throughout this study.

References

- Akyurek, E., & Afacan, O. (2013). Effects of brain-based learning approach on students' motivation and attitudes levels in science class. *Mevlana International Journal of Education (MIJE)*, 3(1), 104-119.
- Aljorani, Y. (2008). *Teaching design according to brain-based learning and its impact on the achievement of 9th grade students in biology and development of their scientific thinking* (Unpublished doctoral dissertation). University of Baghdad, Iraq.
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C., & Norman, M. K. (2010). *How learning works: 7 Research-based principles for smart thinking*. San Francisco: Jossey-Bass.
- Armstrong, D. G., Henson, K. T., & Savage, T. V. (1989). *Education: An introduction* (3rd ed.). New York: Macmillan Publishing Company.
- Bada, A., & Jita, L. (2023). Effect of brain-based teaching method on secondary school physics students' retention and self-efficacy. *Journal of Technology and Science Education*, 13(1), 276-287. <https://doi.org/10.3926/jotse.1629>
- Burke, L., & Williams, J. M. (2008). Developing young thinkers: An intervention aimed to enhance children's thinking skills. *Thinking Skills and Creativity*, 3, 104-124.
- Cetin, S. (2006). Establishment of the profession of teaching attitude scale. *G. U. Journal of Industrial Arts Faculty*, 18, 28-37.
- Collette, A. T., & Chiappetta, E. L. (1989). *Science instruction in the middle and secondary schools* (2nd ed.). New York: Macmillan Publishing Company.
- Dhiman, O. P. (2007). *Foundations of education*. New Delhi: A.P.H. Publishing Corporation.
- Jensen, E. (2008). *Brain-based learning* (2nd ed.). California: Corwin Press.
- Kara, A. (2010). The development of the scale of attitudes towards learning. *Electronic Journal of Social Sciences*, 9(32), 49-62.
- Khin Zaw, Dr. (1993). *Sequential/multiple capta processing in the human brain*. MPhil/MEd Course Research Reference. Yangon: Yangon University of Education.
- Khin Zaw, Dr. (2001). *Theoretical pedagogy: Ontology*. PhD Programme Course Material. Yangon: Yangon University of Education.
- Killen, R. (2016). Foundations for effective teaching and learning. In K. McGregor (Ed.), *Effective teaching strategies: Lessons from research and practice* (7th ed.). Victoria, Australia: CENGAGE Learning.
- Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). New Jersey: Pearson Education Ltd.
- Ministry of Education (MOE). (2016). *National education strategic plan, 2016-21 summary*. Myanmar: The Government of the Republic of the Union of Myanmar.
- Ozmon, H. A., & Craver, S. M. (1986). *Philosophical foundations of education* (3rd ed.). London: A Bell & Howell Company.
- Pallant, J. (2013). *A step by step guide to data analysis using IBM SPSS: SPSS survival manual* (5th ed.). Australia: Griffin Press.
- Rehman, A., & Haider, K. (2013). The impact of motivation on learning of secondary school students in Karachi: An analytical study. *Educational Research International*, 2(2), 139-147.

- Saleh, S. (2011). The effectiveness of the brain-based teaching approach in enhancing scientific understanding of Newtonian physics among form four physics instruction. *International Journal of Environmental & Science Education*, 7(1), 107-122.
- Siddiqui, M. H. (2009). *Advanced educational psychology*. New Delhi: A.P.H. Publishing Corporation.
- Slavkin, M. L. (2004). *Authentic learning*. Toronto: Scarecrow Education.
- Wint Zaw Htet. (2020). Basic education curriculum reforms in Myanmar and the role of social studies. *The Journal of Social Studies Education in Asia*, 9, 37-45.

THE IMPACT OF INTERACTIVE MULTIMEDIA-BASED INSTRUCTION ON TEACHING OF SCIENCE IN MYANMAR EDUCATION DEGREE COLLEGES

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Abstract

The main purpose of this study is to investigate the impact of interactive multimedia-based instruction in teaching of science in Myanmar Education Degree Colleges. Pretest-posttest control group design, one of the true experimental designs was used. The research instruments were pretest, posttest, learning materials including lesson plans and attitude questionnaires for student teachers. By using the simple random sampling method, four Education Degree Colleges from Mandalay and Sagaing Regions were selected. The participants of the study were selected from Year 1 Semester 1 student teachers of four selected Education Degree Colleges in Myanmar. In research findings, the findings of overall teaching of science achievement showed that the experimental groups who received interactive multimedia-based instruction with the proposed instructional design were significantly higher than the control groups who did not. In addition, the positive attitudes towards interactive multimedia-based instruction increases after the treatment and there was a significant difference in the attitudes of student teachers towards the interactive multimedia-based instruction before treatment (Time 1) and after treatment (Time 2). Therefore, the research findings proved that the proposed instructional design of interactive multimedia-based instruction contributes a positive impact on teaching of science in Teacher Education Sector.

Keywords: Media, Interactive Multimedia, Instruction, Interactive Instruction, Multimedia-based Instruction

Introduction

Today, education encounters challenges in all aspects of social, economic and cultural life of an individual. Scarcity of trained technical and skillful teachers in education system is one of the challenges. Therefore, the teachers need to learn to handle the modern teaching technology and multimedia to make their teaching styles to be smooth and effective (Wang, Fong & Kwan, 2009).

To improve the educational productivity, the teachers should keep in touch with the mainstream of multimedia within the education system, try to develop traditional techniques and using new teaching methods. The mainstream of the technological media in education is called multimedia which leads to infinite applications of computer technologies. The concept of this multimedia technology came into effect with appearance of sound cards, compact disks, use of digital cameras and then the video clips which made computer an essential educational tool in the world (Bartlett & Strough, 2003).

Purpose of the Research

The main purpose of this research is to investigate the impact of interactive multimedia-based instruction in teaching of science in Myanmar Education Degree Colleges.

The specific objectives of this study are as follows;

1. To compare the teaching of science achievement of the student teachers who receive interactive multimedia-based instruction and those who do not receive it.

*Third Prize (2024)

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2. To compare the attitudes of the student teachers towards the interactive multimedia-based instruction before treatment and after treatment.
3. To offer suggestions for the improvement of teaching of science based on the results of the study.

Research Hypotheses

1. There is a significant difference in the teaching of science achievement of the student teachers who receive interactive multimedia-based instruction and those who do not receive it.
2. There is a significant difference in the attitudes of the student teachers towards the interactive multimedia-based instruction before treatment and after treatment.

Definition of Key Terms

Multimedia: Multimedia is defined as the combination of multiple technical resources for the purpose of presenting information represented in multiple formats via multiple sensory modalities (Alessi & Trollip, 2001).

Interactive Multimedia: Interactive Multimedia is the presentation that incorporates with some combination of media while the user controls the delivery of that presentation and participates rather than observes (Bartlett & Strough, 2003).

Instruction: Instruction is considered as teaching with the integration of both method and media (Conati & VanLehn, 2000).

Interactive Instruction: *Interactive instruction* is defined as instructing whereby the teachers and the students involve actively in *learning* process by the ways of regular teacher-student interaction, student-student interaction, use of audio-visuals, and hands-on demonstrations (Marsh, Griffin & Lowrie, 2008).

Multimedia-based Instruction: The teaching learning process based on the multimedia materials created by the teacher (Shao, 2012).

Review of Related Literature

Nature of Multimedia in Education

Multimedia is multisensory; it engages the senses of the students. Multimedia can be defined in a variety of ways, but the term “multimedia” refers to a web-based interactive computer-mediated application that includes various combinations of text, sound, still images, audio, video, and graphics. Multimedia is also interactive; it enables both the student and the teacher to control the content flow of information (Becta, 2004).

Multimedia presentations are most effective when the different types of media support one another as teaching strategies which enhance students’ learning. A well-developed multimedia can do more than good. The potential pedagogical value and rationale for using multimedia in classroom is given below:

1. To raise interest level: multimedia raises the interest of the student in learning and they appreciate a variety of media.
2. To enhance understanding: multimedia materials boost students’ comprehension of complex topics of science.
3. To increase memorability: multimedia leads to better encoding and easier retrieval which confirms for long-term memory.

Principles of Interactive Multimedia

- (1) The coherence principle advises designers to avoid the use of unnecessary words, sounds or graphics. Superfluous or irrelevant text, sound and graphics will require unnecessary processing and use of cognitive resources.
- (2) The spatial contiguity principle advises designers to put text and graphics related to that text near each other in instructional message designs. The classic example of text on one page of a book and the figure being described by that text on a different page of that book causes unnecessary extraneous processing.
- (3) The temporal contiguity principle advocates synchronizing audio and video in presentations. Presenting audio before video or video before audio, or video and audio that are not in sync confuses and distracts learners.
- (4) The redundancy principle states that on-screen text is distracting when audio and graphics are also used. Learners can be distracted by the redundancy of focusing and refocusing between the text and narrations when graphics are presented with text and that text is read verbatim by a narrator. It is less distracting for a narrator not to read the on-screen text word-for-word.
- (5) The signaling principle states that essential content can be highlighted to draw the learner's attention to it. Signaling can be used to cue learners to important content and can be highlighted text, the use of bold or italics or visuals of an instructor pointing to specific content on a whiteboard.
- (6) The worked sample principle states that a step-by-step demonstration can help reduce complexity when problem-solving. Giving students an example to follow when working through similar problems gives them guidance to refer to and focuses their essential processing.
- (7) The segmenting principle states that a continuous complex presentation should instead be broken down into shorter more manageable chunks. Complex content can be simplified by breaking that complexity down into easier components.
- (8) The pretraining principle suggests that key, unfamiliar terminology and definitions be given and discussed before an instructional unit. Similar to segmenting, students can be prepared for learning by first presenting them with and discussing key concepts and definitions.
- (9) The modality principle suggests the use of audio rather than on-screen text during video, animations or presentations. Presenting on-screen text with graphics only utilizes the visual processing capabilities of learners while using graphics with narration is more efficient as it utilizes both the learner's visual and auditory processing capabilities.
- (10) The personalization or voice principle advocates the use of a more conversational tone when narrating visuals as opposed to a formal, academic tone. A friendly narrative tone fosters social presence which enhances motivation for learning.
- (11) The embodiment principle suggests the use of human-like gestures when including on-screen agents in multimedia designs. The human-like gestures and personifications enhance the perception of virtual social presence and also increases learner motivation.

- (12) The multimedia principle suggests presenting relevant graphics with text rather than just text. Static or dynamic graphics combined with text can often communicate more effectively and efficiently than just text alone by presenting concepts and principles as a visual schema.
- (13) The engagement principle suggests that instructors and teachers actively involve students by asking them questions during presentations. Students will learn better when actively involved in a discussion vice passively listening to a lecture (Gagne, et. al., 2005).

Application of Multimedia in Education

The word “Media” is the plural of “Medium” that means “form of communication.” In Latin, Medium means “Between”. This term refers to anything that carries information between a source and a receiver. Therefore, the role of media between the source and receiver is very important to deliver the message that needed to be delivering. The purpose of media is to facilitate communication and learning. Thus, there are six basic categories of media:

- (1) Text,
- (2) Audio,
- (3) Visuals,
- (4) Video,
- (5) Manipulates (Objects), and
- (6) People.

The most commonly used media in learning is “text.” Text is an alphabetical character that may be displayed in any format, such as books, posters, chalk and white board, computer screen and many more. The next commonly used media is “audio.” This includes anything which can be heard, such as a person’s voice, music, mechanical sounds, noise, and many more. Third is “visuals”. This medium is regularly used to promote learning. These include diagrams on posters, drawings on a board, photographs, graphics in a book, cartoons, and so on. Other type of media is “video.”

Therefore, with regard to the type of sense, the information can be obtained as given below:

1. Auditory: sources of knowledge which provides information by listening.
2. Visual: sources of knowledge which provides information by watching.
3. Kinesthetic: sources of knowledge which provides information by movement.
4. Olfactory: sources of knowledge which provides information by smelling.
5. Taste: sources of knowledge which provides information by tasting.

These are media that shows motion and movement like DVD, Videotape, computer animation, and so on. Manipulative and the last media is “people.” These may be teachers, students, or subject-matter experts. People are critical to learning. Students learn from teachers, other students and adults. Therefore, computer has been found to help and improve student learning. It also has been found to be better than using books, teachers, films, or other more traditional methods (Alessi & Trollip, 2001).

Meaningful Learning with Multimedia

Mayer (2012) argues that meaningful learning from words and pictures happens when the learner engages in five cognitive processes. These processes are as follows.

1. selecting relevant words for processing in verbal working memory
2. selecting relevant images for processing in visual working memory
3. organizing selected words into a verbal model
4. organizing selected images into a pictorial model
5. integrating the verbal and pictorial representations with each other and with prior knowledge.

These cognitive processes in working memory determine which information is attended to or selected, which knowledge is retrieved from long term memory and integrated with new the information to construct new knowledge and ultimately, which bits of new knowledge are transferred to long-term memory. Knowledge that is constructed in working memory is transferred to long-term memory through the process of encoding (Mayer & Gallini, 1990).

Method

In this study, pretest-posttest control group design, one of the true experimental designs was used.

Subjects: By using the simple random sampling method, four Education Degree Colleges from Mandalay and Sagaing Regions were selected. The participants of this study were selected from Year 1 Semester 1 student teachers of four selected Education Degree Colleges in Myanmar.

Instrumentation: As research instruments, pretest, posttest, and attitude questionnaires for student teachers were used.

Procedure

Pilot testing for lesson plan, pretest, posttest and questionnaires was held one week ahead of the main study with 30 student teachers and three teacher educators at Katha Education Degree College. Based on the findings of the pilot test, internal consistency reliability of the pretest, posttest and questionnaires were determined by the Cronbach's alpha. The Cronbach's alpha internal consistency reliability of the pretest, posttest and questionnaires are (0.736), (0.774) and (0.833) respectively.

Then, on 13 May 2022, the main study was conducted in four Education Degree Colleges. Firstly, pretest was administered to both groups to evoke the initial levels. The allocated time for the pretest is 90 minutes and the given marks is 50 marks.

The experimental groups received a new treatment and the control groups did not receive. The treatment duration is 12 weeks. At the end of the treatment period, all selected student teachers from two groups had to sit for posttest. The allocated time for this posttest is also 90 minutes and the given marks is 50 marks.

Analysis of the Data

Independent samples *t*-test, Wilcoxon Singed Rank Test and Spearman's rho correlation were used to analyze the data obtained from the pretest, posttest and attitude questionnaires. The findings and interpretations based on the data obtained will be discussed.

Findings

The collected data were analyzed in order to get the accurate results and make appropriate interpretations.

Findings of Independent Samples *t* test on the Pretest Scores in the Four Selected Education Degree Colleges (EDCs)

The mean scores of pretests in the four selected Education Degree Colleges are as follows.

Table 1. Results of Independent Samples *t* test on the Pretest Scores in the Four Selected Education Degree Colleges (EDCs)

Education Degree College	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
EDC 1	Experimental	38	38.45	5.248	2.37	1.327	36	.188 (ns)
	Control	38	36.08	3.900				
EDC 2	Experimental	34	27.44	3.202	1.41	1.434	32	.145 (ns)
	Control	34	26.03	4.764				
EDC 3	Experimental	33	29.18	2.493	1.15	1.457	31	.285 (ns)
	Control	33	28.03	3.795				
EDC 4	Experimental	29	26.86	3.136	1.03	1.061	27	.209 (ns)
	Control	29	25.83	4.209				

Note. ns = not significant

The results presented in Table 1 shows that there were no significant differences between the pretest scores of the experimental groups and control groups in all Education Degree Colleges before they are treated.

Based on the results of pretest, Figure 1 is illustrated as the comparison of pretest mean scores of the experimental groups and control groups in the four selected Education Degree Colleges.

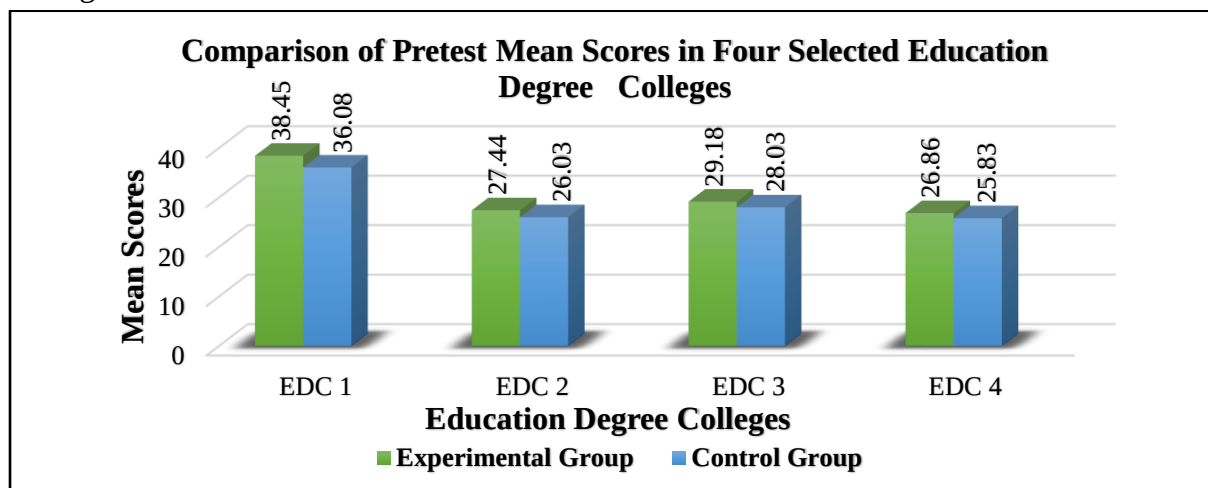


Figure 1. Comparison of Pretest Mean Scores in Four Selected Education Degree Colleges

Results of Independent Samples *t* test on the Posttest Scores in EDC 1

The following Table 2. shows the results of independent samples *t* test for posttest scores on teaching of science in EDC 1.

Table 2. Results of Independent Samples *t* test on the Posttest Scores in EDC 1

Level	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
Knowledge	Experimental	38	6.92	0.784	1.84	3.713	36	.000***
	Control	38	5.08	2.186				
Comprehension	Experimental	38	7.11	0.798	2.08	8.182	36	.000***
	Control	38	5.03	2.552				
Application	Experimental	38	3.45	0.50	0.76	4.102	36	.000***
	Control	38	2.68	0.989				
Analysis	Experimental	38	11.11	1.886	6.55	5.773	36	.000***
	Control	38	4.55	3.351				
Synthesis	Experimental	38	8.26	0.446	4.74	2.999	36	.000***
	Control	38	3.53	1.390				
Evaluation	Experimental	38	7.13	1.319	3.13	3.986	36	.001**
	Control	38	4.00	0.735				
Overall	Experimental	38	42.89	1.783	21.45	6.287	36	.000***
	Control	38	21.45	6.950				

Note. ** $p < .01$. *** $p < .001$.

Results of Independent Samples *t* test on the Posttest Scores in EDC 2

The following Table 3. shows the results of independent samples *t* test for posttest scores on teaching of science in EDC 2.

Table 3. Results of Independent Samples *t* test on the Posttest Scores in EDC 2

Level	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
Knowledge	Experimental	34	6.71	1.115	2.53	5.231	32	.000***
	Control	34	4.18	1.242				
Comprehension	Experimental	34	3.65	0.49	1.33	4.525	32	.000***
	Control	34	2.32	1.8				
Application	Experimental	34	3.41	0.70	0.65	3.884	32	.000***
	Control	34	2.76	0.43				
Analysis	Experimental	34	8.53	0.71	2.94	5.212	32	.000***
	Control	34	5.59	1.02				
Synthesis	Experimental	34	8.03	0.87	2.71	4.584	32	.000***
	Control	34	5.32	1.15				
Evaluation	Experimental	34	7.00	1.26	1.56	8.833	32	.000***
	Control	34	5.44	1.21				
Overall	Experimental	34	42.35	2.23	14.91	6.396	32	.000***
	Control	34	27.44	3.20				

Note. *** $p < .001$.

Results of Independent Samples *t* test on the Posttest Scores in EDC 3

The following Table 4. shows the results of independent samples *t* test for posttest scores on teaching of science in EDC 3.

Table 4. Results of Independent Samples *t* test on the Posttest Scores in EDC 3

Level	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
Knowledge	Experimental	33	7.09	0.723	3.03	2.919	31	.000***
	Control	33	4.06	0.788				
Comprehension	Experimental	33	3.70	0.467	0.82	3.986	31	.000***
	Control	33	2.88	0.331				
Application	Experimental	33	3.76	0.435	0.76	3.235	31	.000***
	Control	33	3.00	0.000				
Analysis	Experimental	33	9.12	1.083	1.06	6.751	31	.000***
	Control	33	8.06	0.704				
Synthesis	Experimental	33	7.76	1.001	3.27	5.114	31	.000***
	Control	33	4.48	1.278				
Evaluation	Experimental	33	6.79	1.111	2.21	7.332	31	.000***
	Control	33	4.58	1.119				
Overall	Experimental	33	41.76	2.450	14.70	9.368	31	.000***
	Control	33	27.06	2.221				

Note ****p*<.001.

Results of Independent Samples *t* test on the Posttest Scores in EDC 4

The following Table 5. shows the results of independent samples *t* test for posttest scores on teaching of science in EDC 4.

Table 5. Results of Independent Samples *t* test on the Posttest Scores in EDC 4

Level	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
Knowledge	Experimental	29	6.90	0.673	0.38	5.611	27	.339 (ns)
	Control	29	6.28	1.360				
Comprehension	Experimental	29	3.45	0.506	0.59	3.335	27	.000***
	Control	29	2.86	0.351				
Application	Experimental	29	3.07	0.704	0.48	7.425	27	.004**
	Control	29	2.59	0.501				
Analysis	Experimental	29	9.14	1.125	1.07	3.223	27	.000***
	Control	29	8.07	0.704				
Synthesis	Experimental	29	6.14	1.481	1.79	5.221	27	.000***
	Control	29	4.34	1.289				
Evaluation	Experimental	29	7.34	1.078	1.07	6.568	27	.010*
	Control	29	4.55	1.152				
Overall	Experimental	29	38.76	1.958	7.35	8.127	27	.000***
	Control	29	26.90	2.226				

Note. ns = not significant, **p*<.05. ***p*<.01. ****p*<.001.

Figure 2. shows the comparison of overall posttest mean scores among the four selected Education Degree Colleges.

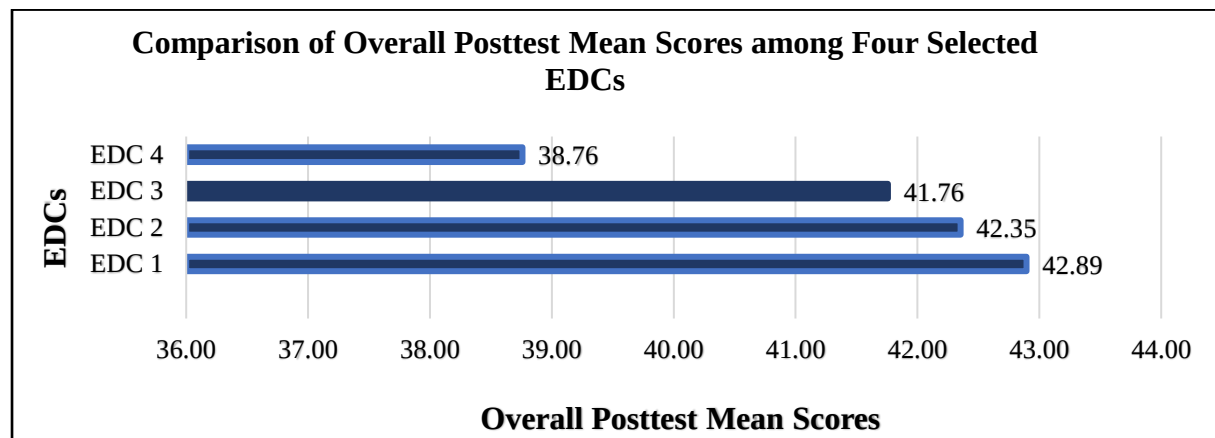


Figure 2. Comparison of Overall Posttest Mean Scores among Four Selected EDCs

The results illustrated in Figure 2 shows that EDC 1 performed better than all of the other EDCs. Therefore, it can be interpreted that the use of interactive multimedia-based instruction with the proposed instructional design had the greatest contribution to overall teaching of science achievement in EDC 1.

Table 6. shows Wilcoxon Signed Rank Test Results for student teachers' attitudes towards the interactive multimedia-based instruction before treatment (Time 1) and after treatment (Time 2).

Table 6. Wilcoxon Signed Rank Test Results for Student Teachers' Attitudes

EDC	N	Dimensions	Before Md	After Md	Z	Asymp Sig (2-tailed) <i>p</i>	<i>r</i>
EDC 1	38	D1	36	48.5	-5.376	.001**	.36
		D2	37	48.5	-5.339	.005**	.21
		D3	36.5	48	-5.304	.007**	.55
		D4	36	47.5	-5.383	.000***	.42
		D5	34.5	47	-5.378	.000***	.21
EDC 2	34	D1	37	48	-5.055	.003**	.61
		D2	35	47.5	-5.066	.001**	.45
		D3	36.5	48	-5.090	.000**	.21
		D4	35	47.5	-5.063	.005**	.55
		D5	35.5	48	-5.076	.002**	.36
EDC 3	33	D1	38	46	-4.882	.004**	.57
		D2	36	48	-5.016	.000***	.61
		D3	37	48	-5.000	.021*	.42
		D4	36	48	-4.943	.040*	.22
		D5	35	49	-5.018	.000***	.21
EDC 4	29	D1	34.50	47	-4.709	.031*	.56
		D2	32	46	-4.707	.000***	.61
		D3	33.50	45	-4.707	.020*	.32
		D4	29.50	47	-4.706	.310 (ns)	.33
		D5	31	46	-4.609	.225 (ns)	.48

EDC	N	Dimensions	Before Md	After Md	Z	Asymp Sig (2-tailed) <i>p</i>	<i>r</i>
Overall	134	D1	37	48	-9.982	.000***	.21
		D2	32	48	-10.032	.000***	.33
		D3	34	48	-10.016	.000***	.59
		D4	32	48	-10.001	.000***	.52
		D5	32	48	-10.015	.000***	.38

Note: D1 = General Attitudes towards Using Multimedia, D2 = Using Multimedia in Instruction, D3 = Benefits of Using Interactive Multimedia-based Instruction, D4 = Barriers in Using Interactive Multimedia-based Instruction, D5 = Perceived Support for Using Interactive Multimedia-based Instruction, Md = Median, ns = not significant, *** $p < .001$, ** $p < .01$, * $p < .05$

In the four selected Education Degree Colleges, Wilcoxon Signed Rank Test revealed a significant difference dealing with total attitudes towards dimension 1, dimension 2, dimension 3, dimension 4 and dimension 5 between before treatment (Time 1) and after treatment (Time 2). The median score on the attitudes towards dimension 1 increased from before treatment (Md = 37) to after treatment (Md = 48) and ($p = .000$, $p < .001$). The median score on the attitudes towards dimension 2 increased from before treatment (Md = 32) to after treatment (Md = 48) and ($p = .000$, $p < .001$). The median score on the attitudes towards dimension 3 increased from before treatment (Md = 34) to after treatment (Md = 48) and ($p = .000$, $p < .001$). The median score on the attitudes towards dimension 4 increased from before treatment (Md = 32) to after treatment (Md = 48) and ($p = .000$, $p < .001$). The median score on the attitudes towards dimension 5 increased from before treatment (Md = 32) to after treatment (Md = 48) and ($p = .000$, $p < .001$). It can be interpreted that the positive attitudes towards five dimensions increase after the treatment and there was a significant difference in the attitudes of student teachers towards the interactive multimedia-based instruction before treatment (Time 1) and after treatment (Time 2) in the four selected Education Degree Colleges.

To examine the correlation between student teachers' attitudes towards interactive multimedia-based instruction and overall teaching of science achievement in the four selected Education Degree Colleges, Spearman's rho correlation was used.

Table 6. Correlation between Student Teachers' Attitudes and Overall Teaching of Science Achievement

	OSA	D1	D2	D3	D4	D5
OSA	1	.584**	.622**	.681**	.655**	.649**
D1		1	.611**	.617**	.532**	.913**
D2			1	.490**	.299**	.372**
D3				1	.470**	.726**
D4					1	.995**
D5						1

Note. **. Correlation is significant at the 0.01 level (2-tailed). OSA = Overall Science Achievement, D1 = General Attitudes towards Using Multimedia, D2 = Using

Multimedia in Instruction, D3 = Benefits of Using Interactive Multimedia-based Instruction, D4 = Barriers in Using Interactive Multimedia-based Instruction, D5 = Perceived Support for Using Interactive Multimedia-based Instruction

According to the results presented in Table 6, overall teaching of science achievement of student teachers was significantly correlated with the attitudes towards interactive multimedia-based instruction in all dimensions.

Discussion

The application of the interactive multimedia for instruction is an instructional situation in which the student teachers are given control to review the learning material in their own space and their own individual interests, needs, and cognitive processes. The basic objective of interactive multimedia material is not to replace the role of the teacher educator but to change the teacher educator's role entirely. As such, multimedia must be extremely well designed and sophisticated enough to mimic the best teacher, by combining its design with the various elements of the cognitive processes and the best quality of the technology. With today's multimedia courseware, once a program has been designed and built in with the appropriate response, it should be flexible and permit change and alteration. Although multimedia as a tool cannot replace hands-on learning, it can enhance and strengthen the impact of activities in the science classroom in Education Degree Colleges.

According to the research findings, there is a significant difference in the teaching of science achievement of the student teachers who receive interactive multimedia-based instruction and those who do not receive in all four selected Education Degree Colleges. There is a significant difference in the attitudes of the student teachers towards the interactive multimedia-based instruction before treatment and after treatment. Moreover, overall teaching of science achievement of student teachers was significantly correlated with the attitudes towards interactive multimedia-based instruction in all dimensions.

Suggestions

The student teachers in Education Degree Colleges are the prospective teachers to lead the Education System in the future of Myanmar. According to Sicilia (2005), science teachers should be efficient, quick, and must have practical knowledge in subject and most important is to be able to answer all how things relate, what the scientific facts are and why things happen. Science teacher educators must be full of curiosities and should prepare to answer all problems. Most important thing is mastery in the subject, confidence and compassion.

It is suggested that student teachers in Education Degree Colleges should be able to try effective science teachers who are proficient in subject matter, pedagogical skills and technological skills through interactive multimedia-based instruction.

The Teacher Education Institutions should equip student teachers with a number of theoretical and practical experiences on the duties of the professional teachers to determine the quality of prospective teachers to produce good citizens for the country. Another factor that can affect to implement interactive multimedia-based instruction is electricity supply, internet access and free Wi-Fi around the campus of Education Degree Colleges.

It is suggested that the future development of teacher education sector in Myanmar should be based on the concepts of cybernetics to regulate and control the process of Education Degree Colleges for producing qualified prospective teachers.

- (1) New science teaching approaches and techniques should be applied in various school levels: pre-school, primary school, middle school, high school and University level.
- (2) In this study, sample Education Degree Colleges were randomly selected from Mandalay Region and Sagaing Region. Further research study should be carried out in the rest of the States and Regions by using different participants for replication.
- (3) Since participants are Year 1 Semester 1 student teachers in Education Degree Colleges, further research should be carried out with Year 2, Year 3 and Year 4 student teachers of Education Degree Colleges.
- (4) Since the content areas are limited to Year 1 Semester 1 science course, further research should be carried out other science content areas in Education Degree Colleges.
- (5) This study was designed as pretest-posttest control group design; one of the true experimental designs as quantitative research, further research should be carried out with posttest-only control group design and Solom four-group design as well as other mixed methods research designs. Moreover, further research should be carried out with other qualitative designs such as ethnography, phenomenology, grounded theory, case study and critical studies.

Conclusion

According to Fang (2006), the term ‘multimedia,’ which is constituted by ‘multi’ means integrating many expression methods and ‘media’ which implies technical words such as computer, dialogue, and digital, has changed its meaning through the decades. The term multimedia can be defined as a platform that integrates analogue information in various forms such as text, images, and audio-visual materials to a single digitized data and relays them using several (multi) vehicles (media). It is a system that allows users the use of easy and high-speed information communication networks. Multimedia is the exciting combination of computer hardware and software that allows to integrate video, animation, audio, graphics, and test resources to develop effective presentations on an affordable desktop computer.

Acknowledgements

First of all, we would like to express our respectful gratitude to Dr. Kay Thwe Hlaing (Rector), Dr. May Myat Thu (Pro-Rector), Dr. Khin Khin Oo (Pro-Rector) and Dr. Nyo Nyo Lwin (Pro-Rector), Yangon University of Education for their permission to do this research. Then, I would like to express my heartfelt gratitude to Dr. Khin Mar Khine (Professor, Head of Department of Curriculum and Methodology, Yangon University of Education) for her expert guidance and suggestions.

References

- Alessi, S. M., & Trollip, S. R. (2001). *Multimedia for learning: Methods and development* (3rd ed.). Boston: Allyn.
- Bartlett, R. M., & Strough, J. (2003). Multimedia versus traditional course instruction in introductory social psychology. *Journal of Teaching of Science*, 6(1), 75-79.
- Becta, B. G. (2004). *British educational communications and technology*. Unpublished Master Thesis, Singapore.

- Conati, C., & VanLehn, K. (2000). Toward computer-based support of meta-cognitive skills: A computational framework to coach self-explanation. *International Journal of Artificial Intelligence in Education*, 11(8), 389–415.
- Fang, Z. (2006). Using multimedia and network technology to reform college English teaching in the teaching of New Horizon College English. *CELEA Journal*, 29(3), 111-114.
- Gagne, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (2005). *Principles of instructional design*. USA: Thomson Wadsworth.
- Marsh, K. R., Griffin, B. F., & Lowrie, D. J. (2008). Medical student retention of embryonic development: impact of the dimensions added by multimedia tutorials. *Anatomical Sciences Education*, 1(5), 252–257.
- Mayer, R. E. (2012). Introduction to multimedia learning. In R. E. Mayer (Ed.), *The Cambridge handbook of multimedia learning*. New York: Cambridge University Press.
- Mayer, R. E., & Gallini, J. K. (1990). When is an illustration worth ten thousand words? *Journal of Educational Psychology*, 82(4), 715-726.
- Shao, J. (2012). A Study of multimedia application-based vocabulary acquisition. *English Language Teaching*, 5(10), 202-207.
- Sicilia, C. (2005). *The challenges and benefits to teachers' practices in constructivist learning environments supported by technology*. Unpublished Master Thesis, McGill University, Montreal.
- Wang, F. L., Fong, J., & Kwan, R. C. (2009). *Handbook of research on hybrid learning models: Advanced tools, technologies, and applications*. USA: IGI Global.

A SYSTEMATIC REVIEW OF UNIVERSAL DESIGN FOR LEARNING IN INCLUSIVE EDUCATION

Kyaw Min Latt¹

Abstract

The Universal Design for Learning (UDL) framework is instrumental in supporting principles of student diversity within inclusive educational settings. This study carried out a systematic review of the literature, guided by specific research questions, with the aim of analyzing the content of seven international studies that adopted the UDL framework. The articles were selected from various databases and journals based on four key criteria: peer-reviewed publications, the provision of empirical results, a focus on the UDL as a primary framework, and publication dates between 2017 and 2023. Thematic analysis was employed to examine the data. The analysis revealed three central themes: UDL as an effective instructional strategy that addresses the diverse needs of all students, UDL's impact on promoting student achievement in learning, and challenges related to UDL implementation which hindered the effective implementation of the UDL. Implications for future research and recommendations for overcoming these barriers are also discussed. Findings indicated that UDL not only fosters academic success but also enhances student motivation and participation, particularly among those with special educational needs. However, teachers encounter key challenges, including rigid curricula, limited time, insufficient training, and inadequate access to technology. In the context of Myanmar, the adoption of UDL presents significant potential to create more inclusive classrooms.

Keywords: systematic review, universal design for learning, multiple means of representation, multiple means of action and expression, multiple means of engagement, inclusive education

Introduction

In recent years, inclusive education has become a central focus in modern schooling systems across the globe to provide equitable learning opportunities for all students, regardless of gender, ethnic and linguistic minority or family background, disability or learning difficulties, or any other feature in mainstream education (UNESCO, 2009). The focus on inclusivity has grown due to global education goals like the Sustainable Development Goals (SDGs), especially SDG 4, “*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*” (United Nations, 2018).

One instructional approach that has emerged as particularly promising in meeting the needs of diverse learners for inclusivity is the Universal Design for Learning (UDL) framework. The UDL is the deliberate design of instruction to meet the needs of a diverse mix of learners, providing all students with an equal opportunity to learn through flexible approaches, and distinguishing between the desired learning outcome and the means of achieving them (International Disability Alliance, 2021). The UDL framework operates on three core principles, as outlined by Meyer et al. (2014): multiple means of representation, which ensures that information is accessible to students through various formats and modalities; multiple means of action and expression, which allows students to demonstrate their learning in different ways; and multiple means of engagement, which recognizes the need to provide students with various ways to stay motivated and connected to the student's learning.

*Special Award(2024)

¹ Department of Basic Education (Headquarters), Nay Pyi Taw.

The UDL framework marks an important step toward inclusive education, providing educators and policymakers with strategies to create classrooms that meet the diverse needs of all learners. Despite the growing interest in the UDL, there remains a lack of comprehensive research examining both the effectiveness and the barriers to the application in inclusive classrooms as a systematic review. This study thus addresses this gap by conducting a systematic review of the literature, analyzing how UDL supports diverse learners, and identifying the challenges associated with its implementation.

Purpose

The main purpose of this paper is to study the systematic review of universal design for learning in inclusive education. The specific objectives of the study are as follows:

- (1) to examine how the UDL addresses the diverse learning needs of all students
- (2) to explore the key challenges faced in implementing the UDL in educational settings
- (3) to provide suggestions and recommendations for the effective integration of the UDL into Myanmar's inclusive education system

Research Questions

- (1) How does the UDL support the diverse learning needs of all the students in inclusive classrooms?
- (2) What are the key challenges in implementing the UDL in inclusive educational settings?
- (3) What specific recommendations can be made for integrating the UDL into Myanmar's inclusive education system based on empirical studies, policies, and current initiatives?

Definition of Key Terms

Systematic Review

A systematic review is a type of evidence synthesis which formulates research questions that are broad or narrow in scope, and identifies and synthesizes data that directly relate to the systematic review question (Nunn & Chan, 2020).

Universal Design for Learning

Universal Design for Learning (UDL) is an educational framework and approach that aims to provide all students with equal opportunities to learn by designing curriculum and instruction that are flexible and accessible to a wide range of learners, including those with diverse abilities, backgrounds, and learning styles (Priyadharsini & Mary, 2024).

Multiple Means of Representation

This principle involves offering learners various avenues for acquiring information and knowledge. By providing multiple ways of presenting content, such as visual aids, auditory explanations, and tactile experiences, educators can accommodate diverse learning styles and preferences (Kapil, Sujathamalini & Halder, 2024).

Multiple Means of Action and Expression

This principle focuses on providing learners with alternatives for demonstrating understanding and knowledge. By offering various means of expression, such as written assignments, oral presentations, artistic projects, or multimedia creations, educators can empower

students to showcase the learning in ways that best suit the strengths and abilities (Kapil, Sujathamalini & Halder, 2024).

Multiple Means of Engagement

This principle aims to tap into learners' interests, provide appropriate challenges, and foster motivation to learn. By offering diverse and stimulating learning experiences, educators can engage students emotionally and cognitively, fostering a positive and inclusive learning environment (Kapil, Sujathamalini & Halder, 2024).

Inclusive Education

Inclusive education is essential for providing high-quality education to all learners with and without disabilities in mainstream schools. Inclusive education offers flexible curricula, teaching, and learning methods adapted to different strengths, requirements, and learning styles. (United Nations Committee on the Rights of Persons with Disabilities [UNCRPD], 2016).

Review of Related Literature

Empirical Studies on the UDL Implementation in International Studies

The UDL is an educational approach that embraces areas related to the functioning of the biological education process, curriculum, methods, and educational aids (Meyer, Rose & Gordon, 2014, p. 3). The UDL is a framework that provides both theoretical and practical guidance for teachers to effectively address the diverse needs and interests of students in the classroom. The main purpose of this approach is to support the delivery of a curriculum that is completely accessible, meaningful, and a naturally challenging learning experience that meets the needs of every student (Centre for Applied Special Technology [CAST], 2018).

The UDL theory framework encompasses three core principles: multiple means of engagement to support affective learning (i.e., why we learn), multiple means of representation to support the ways in which we assign meaning to what we see and recognize (i.e., what we learn), multiple means of action and expression to support strategic ways of learning (i.e., how we learn) (Meyer, Rose & Gordon, 2014). Basically, the UDL encourages educators to create curricula and learning environments that are accessible to the broadest range of students by proactively eliminating barriers to learning from the beginning. Therefore, the emphasis is placed on adapting the learning environment, rather than focusing on individual students (Rose & Meyer, 2002).

A review of the literature revealed five recent key reviews focused on the UDL framework. Han and Lei (2024) conducted a scoping review of teachers' and students' beliefs regarding the UDL framework. The findings identified three key themes: UDL implementation, the prerequisites and benefits of adopting the UDL framework, and the challenges and barriers to the implementation. The study suggested that future research should explore students' perceptions of the UDL framework and examine how the UDL can enhance classroom participation and improve learning outcomes.

Almeqdad et al. (2023) conducted a systematic view of the literature and meta-analysis into the effectiveness of the UDL. The findings indicated that the research primarily focused on teachers and students participating in professional development programs or school interventions, often employing a one-group quantitative research design. The meta-analysis results also

highlighted specific trends and suggested that future research should explore how the UDL as a framework can influence aspects of school infrastructure and facilities, as well as how these factors impact the quality of life and social experiences within inclusive educational settings.

Oliveira et al. (2019) conducted a systematic review of the international literature on the UDL and inclusive education. The findings showed that most published studies emphasized theoretical concepts rather than practical applications. The limited empirical research available typically relied on questionnaires and interviews, often centered on training teachers to implement the UDL. The study also suggested that future studies should concentrate on the practical implementation of the UDL to evaluate the effectiveness in fostering inclusive classrooms.

Al-Azawei, Serenelli, and Lundqvist (2016) conducted a content analysis of peer-reviewed journal papers on the UDL published between 2012 and 2015. The findings suggested that the UDL is an effective approach for creating flexible learning environments and accessible content. However, the study suggested that further research is needed to confirm the positive impacts of the UDL across various educational settings and cultural contexts.

Roberts et al. (2011) conducted a systematic review of empirically based articles on the UDL in postsecondary education. The findings proved that there was insufficient concrete research on the application of the UDL in colleges and universities. The study also suggested that future research should focus on operationalizing the UDL principles and examining the impact on the educational outcomes of both students with and without disabilities.

Inclusive Education Policies in Myanmar

The Ministry of Education in Myanmar has recognized the need for inclusive education in the country and has developed policies and guidelines to promote it. Under the current government, the Ministry of Education has been working to create a more inclusive education system. The government has passed laws and policies to support the rights of children with disabilities and to ensure that they have equal access to education. The National Education Law (2014) supports an inclusive education agenda, by stating “special education program and services shall be established so that every school-aged child and youth, including those citizens who are disabled or who for whatever reason have not had a chance to study, can access their right to education in line with ‘Education for All’”.

In 2015, Myanmar ratified the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD), which promotes the right to education for all children (The Rights of the Persons with Disabilities Law, 2015). Since then, the government has taken a few steps towards inclusive education, such as allowing children with disabilities to enroll in mainstream schools. Ministry of Education (2016) launched the National Education Strategic Plan (NESP) (2016-2021) that aims to transform Myanmar's education system to be more inclusive, equitable, and relevant to the country's needs.

Moreover, the Ministry of Education (2021) launched NESP (2021-2030) and has identified the transformational shift as the high-level vision statement to describe the desired future state of Access and Inclusion in Myanmar in 2030. This transformational shift states that all school-going-age children will access, progress through and complete quality education, at least KG+9 in terms of the policies: no discrimination, no child left behind, and no dropouts.

Inclusive Education Initiatives in Myanmar

The government has established partnerships with international organizations and Non-governmental organizations (NGOs) to provide technical assistance and resources to enhance the delivery of inclusive education. The development of inclusive education in Myanmar is a work in progress, but the commitment and effort by the government and other stakeholders offer hope for a future where all students have access to quality education.

International organizations and NGOs have also played a significant role in promoting inclusive education in Myanmar. There are some NGOs in Myanmar such as Myanmar Council for Persons with Disabilities, Myanmar Independent Living Initiative, Burnet Institute, Catholic Relieve Service, The International Committee of the Red Cross, Save the Children, Voluntary Service Oversea, World Vision, Handicap International, The Leprosy Mission in Myanmar, Eden Centre for Disabled Children, Mary Chapman School for the Deaf, Yangon Education Centre for the Blind, and UNICEF (Hauschild & Htet, 2015).

Koistinen and Uke (2013) introduced the Eden Centre for Disabled Children (ECDC), an NGO in Myanmar for children with physical and intellectual impairments. With funding from Welthungerhilfe, an international NGO from Germany, ECDC was able to start an inclusive education project in 2007, with the aim of promoting and advocating for inclusive education in Myanmar. The project has worked to increase access of disabled children to mainstream schools in 10 townships in the Yangon Division. The work has focused on providing facilities and a barrier-free environment, and on raising awareness of disability and inclusion. The World Bank (2020) also provided inclusive access and quality education in Myanmar.

Research Methodology

This study used a systematic review methodology to synthesize scientific evidence to answer a particular research question in a way that is transparent and reproducible, while seeking to include all published evidence on the topic and appraising the quality of this evidence (Lame, 2019). A systematic review is also different from a traditional literature review, in that it identifies, selects, synthesizes, and evaluates only high-quality evidence through an explicit, rigorous, and particular process (Van Rooyen, Stewart & De Wet, 2013). The systematic review process developed by Zawacki-Richter, et al., (2020) was applied to conduct the current review. Figure 1 shows the systematic review process of the study.

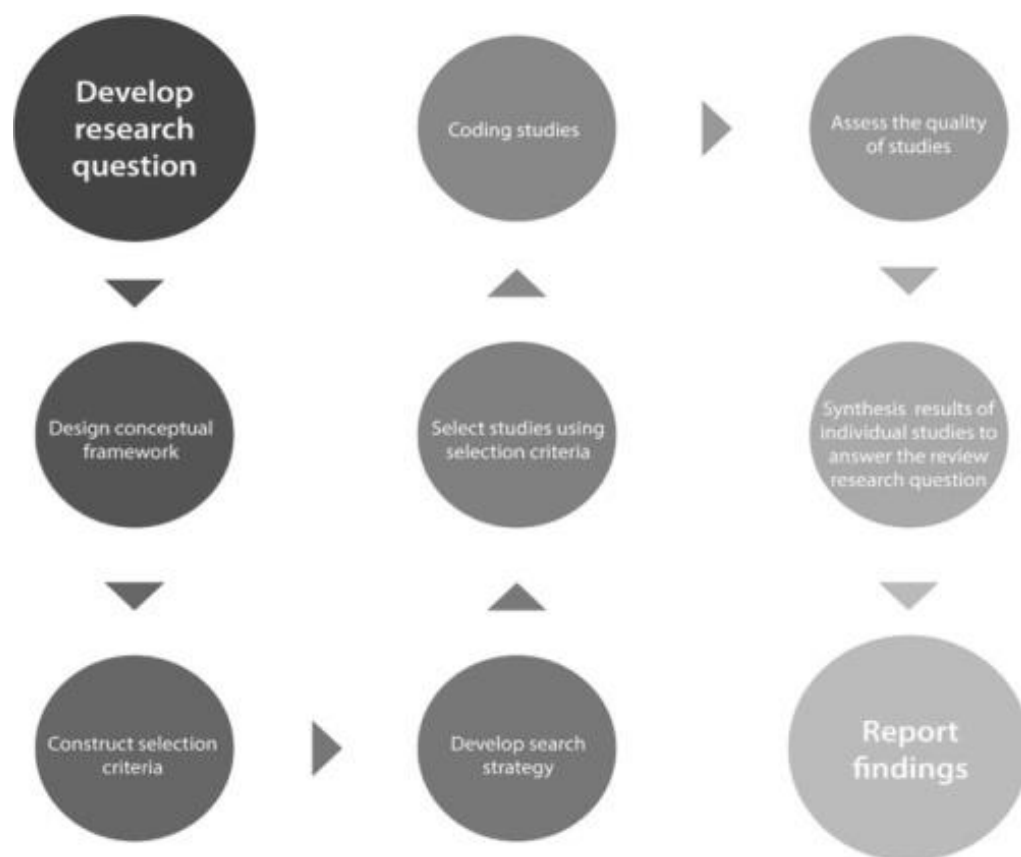


Figure 1 A Systematic Review Process

Source: From Zawacki-Richter, et al., (2020)

Procedure

For this study, a systematic review was conducted in order to evaluate and analyze all available evidence relevant to the objectives of the study objective. In order to locate high-quality publications, articles for review were identified by searching the Education Resources Information Center (ERIC) database, Google Scholar search engine, Semantic Scholar search engine, and researcher gate using key terms such as Universal Design for Learning or UDL, combined with either inclusive education or inclusive classrooms. Based on the publication of hundreds of articles, articles were selected in accordance with the inclusion and exclusion criteria.

Included and Excluded Studies

Before the process of searching, the inclusion and exclusion criteria should be considered. The articles were selected based on the following criteria: published in educational science and social science publications, employed both theoretical and empirical research (qualitative, quantitative, or mixed methods), and open access. The articles must be peer-reviewed papers and empirical studies. The publication date will be after 2017 written in English language. The decision was made to exclude universal design for learning articles that did not focus on the education field. Duplicate articles were removed after the articles. Figure 2 depicts the research strategy and the identified inclusion and exclusion criteria.

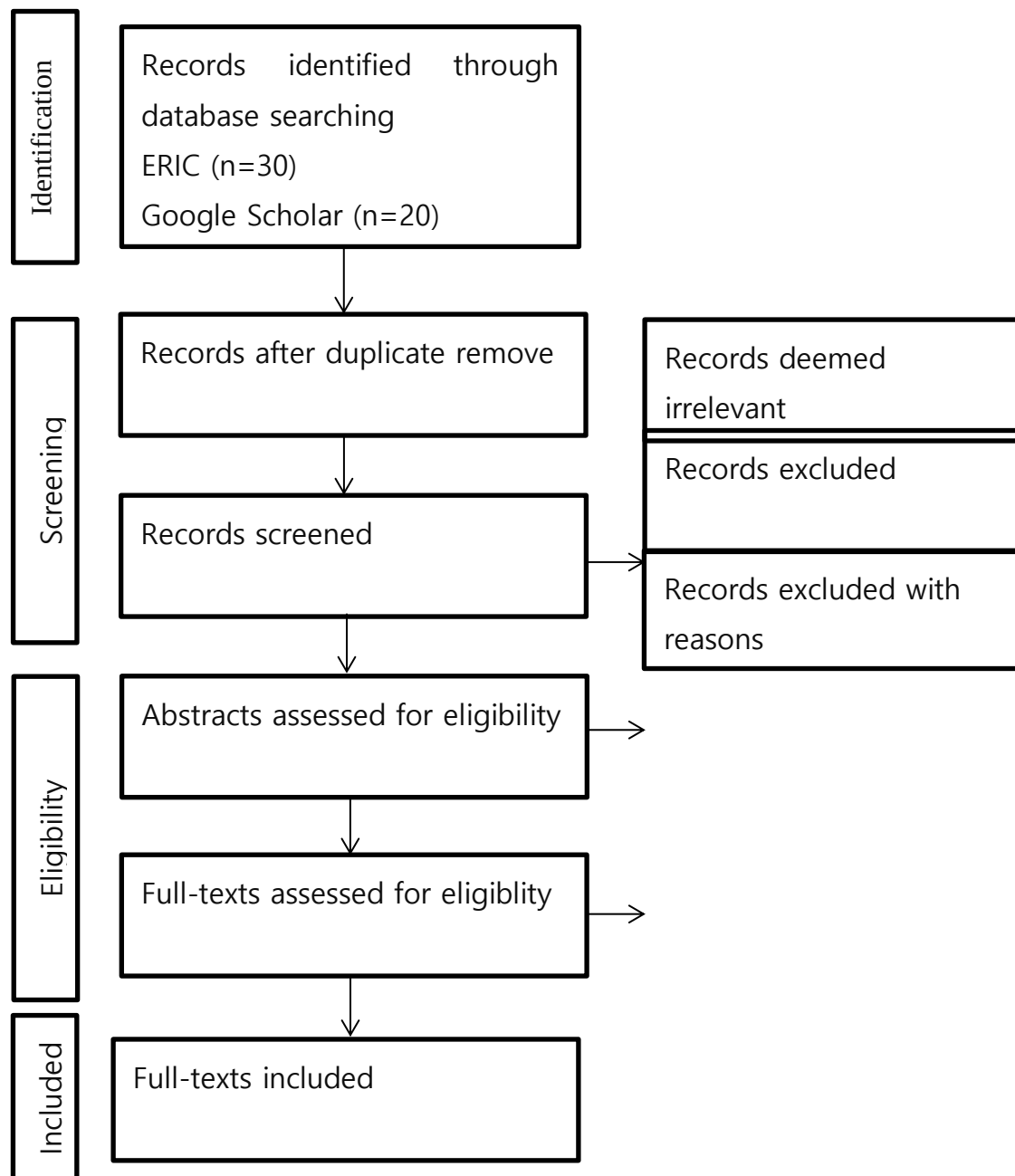


Figure 2 Flowchart of the inclusion criteria for selection of papers for analysis
Source: From Moher et al. (2010).

Data Analysis

Data from the selected articles was analyzed using a thematic analysis approach. Thematic analysis is proper to semantic review. A thematic analysis approach was used to “identify, analyze, and report patterns (or themes) within data” (Braun & Clarke, 2006, p. 79). In this study, six phases for doing thematic analysis recommended by Braun and Clarke (2006) were used. These are as follows.

Phase 1: Familiarizing yourself with your data

Phase 2: Generating initial codes

Phase 3: Searching for themes

Phase 4: Reviewing themes

Phase 5: Defining and naming themes

Phase 6: Producing the reports

Findings

Following the thematic analysis, codes, and categories were identified from the selected articles. These categories were then consolidated into three main overarching themes, which reflect the UDL framework in inclusive education: UDL as an effective strategy for addressing diverse student needs, UDL's impact on promoting student achievement in learning, and barriers to effective UDL implementation. Each theme is discussed separately in the following sections, ensuring alignment with the research questions.

UDL as an Effective Strategy for Addressing Diverse Student Needs

The UDL approach to teaching is based on three key principles: multiple means of representation, multiple means of action and expression, and multiple means of engagement. The UDL aims to meet the diverse needs of all learners by offering flexible and varied instruction. The results of Almumen's (2020) study illustrated how different teachers applied the principles of the UDL to enhance student representation, student action and expression, and student engagement in the classrooms.

For multiple means of representation, the teacher used multisensory techniques not only to support the students with dyslexia also to provide access for all students. By employing visual aids, audio recordings, tactile materials, and multimedia resources, the teachers provided various ways for the student to process and understand the material. This multisensory approach allowed the students, ultimately promoting inclusivity in the educational environment.

For multiple means of action and expression, the teacher implemented a hands-on approach by using laboratory tools. This was particularly beneficial for students with Attention-Deficit or Hyperactivity Disorder (ADHD), contributing at their own pace without the distractions of a traditional classroom environment. By incorporating technology, peer-mediated instruction strategy, and interactive activities allowed students, fostering an interactive learning environment. This approach not only promoted social interaction but also encourage active participation.

For multiple means of engagement, the teachers foster participation and collaboration among all students, including those with disabilities. Techniques such as role-playing, collaborative group tasks, and multisensory approaches were employed to address diverse learning needs. These methods promoted social interaction, peer support, and a deeper understanding of the material, leading to increased motivation and involvement in the learning process.

In the qualitative part of Yavuzarslan and Arslan's (2020) study, the students participating in the interview stated that UDL improved their attention, interest, cooperation, and self-regulation skills. The students also stated that the UDL supported the retention of knowledge, multiple representations of knowledge, and active participation lessons. Teachers expressed that the UDL practices would enhance support for individual differences in education, promote high efficiency, ensure equal opportunities, accommodate diverse learning styles, facilitate access to information, and improve the overall quality of education and self-expression skills (Bedir, 2022).

The UDL also revealed positive results across all educational levels. Teachers noted increased student interest, participation, and performance, particularly among those with both

special needs and adult learners. Adult Second Chance Schools (SCS) students with identified special educational needs also showed correspondingly greater interest, participation, and higher performance compared to previous courses in which conventional teaching was applied (Markou & Díaz-Noguera, 2022).

UDL's Impact on Promoting Student Achievement in Learning

Yuzlu and Arslan (2017) revealed that the UDL model significantly and positively enhanced high school students' academic achievements. The results showed that students in the experimental group, who received instruction based on UDL, outperformed the students in the control group in terms of English language academic achievement. Moreover, UDL had a substantial impact on students' success in the English course. The instructional approach utilized multiple means of representation, allowing information to be presented in various formats. Consequently, this diverse presentation likely contributed to the academic success of students in the experimental group, facilitating a deeper understanding and retention of the material.

The results of Alghamdy (2023) indicated a significant statistical difference between the post-test scores and the average scores of EFL students who were taught using the UDL compared to those taught using conventional methods for developing reading and vocabulary skills. This demonstrated that the UDL has a statistically significant effect on students' ability to acquire English reading and vocabulary skills. The study also highlighted that the UDL addresses diverse learner needs, enhances students' motivation to improve English skills, reduces barriers between students and teachers, fosters positive relationships among students, offers a range of teaching materials, and provides flexible assignment options.

Yavuzarslan and Arslan (2020) conducted a comprehensive study that highlighted the significant impact of the UDL on students' academic achievement and the attitudes towards mathematics courses. The findings indicated that the UDL served as a highly effective pedagogical approach in the context of mathematics courses. The study established that both the UDL and traditional curriculum-based teaching methods positively influence students' academic performance in mathematics. However, it was noteworthy that the UDL had a larger effect on increasing students' achievement in mathematics compared to conventional teaching strategies based on the curriculum.

Barriers to Effective UDL Implementation

Teachers in Greece face challenges when implementing the UDL in secondary schools. General education teachers struggled with rigid curricula, lack of time for lesson planning, lack of training, and limited access to technology. Special education teachers in secondary schools had fewer difficulties than general education teachers. The curriculum, the lack of modern technological equipment, and the teaching challenges served as obstacles to effective teaching. These issues hindered the smooth implementation of educational practices, including innovative methods like the UDL. Teachers in SCS have encountered fewer challenges in implementing the UDL due to the absence of a rigid curriculum. Instead, the curriculum is more flexible and serves as a guide, enabling the experiments with new teaching methods tailored to adult learners' needs. However, the educators still face some difficulties, including a lack of technological infrastructure and special educational conditions (Markou & Díaz-Noguera, 2022).

Even general secondary teachers who initially felt stressed about implementing the UDL reported personal satisfaction and fulfillment after the process. However, some noted that despite satisfaction, feelings of stress remained. This result was largely due to the insufficient knowledge of the subject and inexperience. In contrast, special and adult education teachers felt more satisfied during the lesson planning stage because these teachers were more familiar with similar situations (Markou & Díaz-Noguera, 2022). Teachers also expressed negative views about the UDL, teachers' lack of knowledge, inability to apply to all differences, additional financial burden, and the perception that it is effective in theory but challenging to implement in practice (Bedir, 2022). The results of Almumen (2020) also found that although teachers may have basic knowledge of the UDL, teachers need more training and practice to successfully address the needs of all students, including students with disabilities

Hills, Overend, and Hildebrandt (2022) also identified several barriers to implementing the UDL within educational institutions. Key challenges included an inconsistent with the faculty's understanding and implementation of the UDL, misconceptions regarding legally required accommodations for students with disabilities, and concerns about the time and effort needed to adapt teaching methods and materials. Participants also highlighted limited resources, such as inadequate opportunities for professional development on the UDL and insufficient institutional support. Additionally, some students expressed discomfort with accommodations that allowed the peers to demonstrate learning differently, further complicating UDL adoption efforts.

Discussion and Suggestion

The findings of this systematic review highlight the significant potential of the UDL to address the diverse learning needs of students in inclusive educational settings. By applying the three core principles of the UDL, multiple means of representation, action and expression, and engagement, teachers can create a more accessible and active learning environment. The evidence indicates that the UDL not only facilitates improved academic success but also enhances student motivation and participation, particularly among those with special educational needs. This aligns with the previous reviewed studies (Seok, DaCosta & Hodges, 2018; Almeqdad et al., 2023; Han & Lei, 2024).

However, teachers encounter many challenges in the implementation of the UDL. Key challenges are rigid curricula, lack of time, lack of knowledge, lack of training, and limited access to technology, insufficient knowledge of the subject, which hinder the ability to adopt the UDL effectively. The qualitative results reveal a tension of teachers between the UDL theoretical understanding and the practical realities of classroom implementation. While some teachers expressed satisfaction in the adoption of the UDL, teachers simultaneously highlighted feelings of stress and a need for further professional development. These results underscore the importance of addressing the infrastructural and institutional limitations that inhibit effective the UDL implementation in the classroom.

In the context of Myanmar, inclusive education is still in its early stages of development. Adopting UDL could significantly enhance Myanmar's capacity to create more inclusive classrooms by offering a flexible framework that accommodates the diverse needs of learners. The UDL principles, which promote multiple means of representation, action and expression, and

engagement, strengthen the commitment that all school-aged children will have equal access to quality education. By effectively addressing diverse learning needs, this inclusive approach, UDL, fosters an inclusive educational environment and ensures that every student can complete at least KG+9 in terms of the policies: no discrimination, no child left behind and no dropouts lay down by NESP (2021-2030).

Although the National Education Strategic Plans for 2016-2021 and 2021-2030 highlight the significance of inclusive education, supported by a confirmation statement from UNESCO (2021), its implementation also faces challenges, such as inadequate infrastructure, limited teacher training, and a lack of appropriate resources for students with disabilities. Many teachers in Myanmar have little experience or knowledge about teaching children with disabilities. They have not received adequate training in special education how to effectively teach and manage diverse classrooms. Teacher training and capacity building for inclusive education is particularly important. In Myanmar, teacher training colleges and education universities provide teacher education at different levels. However, it has been reported that none of the programs include courses or modules on inclusive education (UNESCO, 2021).

Conclusion

In conclusion, the UDL relies heavily on supportive policies and ongoing training for educators although it presents a promising framework for fostering inclusive education. To implement the UDL in inclusive education, educational institutions must invest in resources that enable teachers to meet the diverse learners' needs. By fostering a flexible environment, inclusive classrooms can maximize the benefits of the UDL, supporting all diverse learners to promote a more equitable education system. Future research should explore strategies for addressing the identified barriers to the UDL implementation.

Acknowledgements

I would like to extend my deepest gratitude to U Kyaw Swar Thwin, Director General at Department of Basic Education, Dr. Soe Myint Tun, Deputy Director General at Department of Basic Education and Dr. Ohmar Than, Director at the Department of Basic Education, for providing me with the opportunity to conduct this research. I am also sincerely thankful to my teacher, Dr. Wai Wai Oo, Professor and Head at Department of Curriculum and Methodology at Sagaing University of Education for her continuous guidance and support.

References

(Note. References denoted with an asterisk indicate the studies included in the systematic review.)

- *Alghamdy, R. Z. (2023). The Effect of Universal Design for Learning on the Proficiency of English as a Foreign Language Students' Acquisition of Reading and Vocabulary Skills. *Arab World English Journal*, 14 (2).
- Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2016). Universal Design for Learning (UDL): A content analysis of peer reviewed journals from 2012 to 2015. *Journal of the Scholarship of Teaching and Learning*, 16 (3), 39-56.
- *Almumen, H. A. (2020). Universal design for learning (UDL) across cultures: The application of UDL in Kuwaiti inclusive classrooms. *Sage Open*, 10 (4), 2158244020969674.
- Almeqdad, Q. I., Alodat, A. M., Alquraan, M. F., Mohaidat, M. A., & Al-Makhzoomy, A. K. (2023). The effectiveness of universal design for learning: A systematic review of the literature and meta-analysis. *Cogent Education*, 10 (1), 2218191
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
- *Bedir, G. (2022). Teachers' Views on the Practices of Universal Design for Learning. *International Journal of Curriculum and Instruction*, 14 (2), 1324-1342.

- Centre for Applied Special Technology (CAST). (2018). Universal design for learning guidelines version 2.2 CAST. National Centre on Universal Design for Learning. <https://udlguidelines.cast.org>
- Han, C., & Lei, J. (2024). Teachers' and Students' Beliefs Towards Universal Design for Learning Framework: A Scoping Review. *SAGE Open*, 14 (3), 21582440241272032.
- Hauschild, A. & Htet, Z. M. (2015). *Analysis of Inclusive Education in Myanmar*. Myanmar Education Consortium, Yangon.
- *Hills, M., Overend, A., & Hildebrandt, S. (2022). Faculty perspectives on UDL: Exploring bridges and barriers for broader adoption in higher education. *Canadian Journal for the Scholarship of Teaching and Learning*, 13 (1).
- International Disability Alliance [IDA] (2021). *Universal Design for Learning and its Role in Ensuring Access to Inclusive Education for All*. Retrieved from <https://www.internationaldisabilityalliance.org/>
- Kapil, Y., Sujathamalini, J., & Halder, T. (2024). Effectiveness of Universal Design of Learning for Students with Mild Intellectual Disabilities-A Review. *International Journal of Research and Review*. 11 (3): 271-280. <https://doi.org/10.52403/ijrr.20240335>
- Koistinen, M., & Uke, T. (2013). The journey towards inclusive education in Myanmar. EENET. Retrieved from <https://www.eenet.org.uk/enabling-education-review/enabling-education-review-2/eer-2/2-14/>
- Lame, G. (2019). Systematic literature review: An introduction. In *Proceedings of the design society: international conference on engineering design*. 1 (1), 1633-1642. Cambridge University Press
- *Markou, P., & Díaz-Noguera, M. D. (2022). Investigating the Implementation of Universal Design for Learning in Greek Secondary and Second Chance Schools through Teachers' Reflections Dayle Learning. *European Journal of Educational Research*, 11 (3), 1851-1863.
- Meyer, A., Rose, D. H., & Gordon, D. (2014). Universal design for learning: Theory and practice. CAST. <http://udltheorypractice.cast.org/>
- Ministry of Education. (2016). *National education strategic plan 2016-2021*: The Government of the Republic of the Union of Myanmar.
- Ministry of Education. (2021). *National education strategic plan 2021-2030*: The Government of the Republic of the Union of Myanmar.
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Prisma Group. (2010). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *International journal of surgery*, 8 (5), 336-341.
- National Education Law (2014). Parliamentary Law No. 41/2014. Retrieved from <https://www.myanmar-law-library.org/law-library/laws-and-regulations/laws/myanmar-laws-1988-until-now/union-solidarity-and-development-party-laws-2012-2016/myanmar-laws-2014/pyidaungsu-hluttaw-law-no-41-2014-national-education-law-burmese-and-english.html>
- Nunn, J. S. & Chang, S. (2020). What are systematic reviews?. *WikiJournal of Medicine*, 7 (1):5 DOI: 10.15347/WJM/2020.005
- Oliveira, A. R., Munster, D. P. E., van, M. D. A., & Gonçalves, A. G. (2019). Universal design for learning and inclusive education: a systematic review in the international literature. *Revista Brasileira de Educação Especial*, 25 (4), 675–690. <https://doi.org/10.1590/s1413-65382519000400009>
- Priyadharsini, V., & Mary, R. S. (2024). Universal Design for Learning (UDL) in Inclusive Education: Accelerating Learning for All. *Shanlax International Journal of Arts, Science and Humanities*, 11 (4), 145-150. <https://doi.org/10.34293/sijash.v11i4.7489>
- Roberts, K., Park, H., Brown, S., & Cook, B. (2011). Universal design for instruction in postsecondary education: A systematic review of empirically based articles. *Journal of Postsecondary Education and Disability*. <https://files.eric.ed.gov/fulltext/EJ941728.pdf>
- Rose, D.H., and Meyer, A. (2002). *Teaching every student in the digital age: Universal Design for Learning*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Seok, S., DaCosta, B., & Hodges, R. (2018). A systematic review of empirically based universal design for learning: Implementation and effectiveness of universal design in education for students with and without disabilities at the postsecondary level. *Open Journal of Social Sciences*, 6 (5), 171.

- The Rights of the Persons with Disabilities Law (2015). Parliamentary Law No. 41/2015. Retrieved from <https://myanmar-law-library.org/topics/myanmar-labour-health-and-safety-law/rights-of-the-persons-with-disabilities-law-2015.html>
- UNESCO (2009). *Policy Guidelines on Inclusion in Education*. Paris.
- UNESCO (2017). A guide for ensuring inclusion and equity in education. <https://unesdoc.unesco.org/ark:/48223/pf0000248254>
- UNESCO (2021). Inclusion. Retrieved from <https://education-profiles.org/eastern-and-south-eastern-asia/myanmar/~inclusion>
- United Nations Committee on the Rights of Persons with Disabilities [UNCRPD]. (2016). Convention on the rights of persons with disabilities: General comment No. 4 (2016): Article 24: Right to inclusive education.
- United Nations. (2018). The 2030 agenda and the sustainable development goals: An opportunity for Latin America and the Caribbean. https://repositorio.cepal.org/bitstream/handle/11362/40156/25/S1801140_en.pdf
- Van Rooyen, C., Stewart, R., & De Wet, T. (2013). Systematic review methodology for development: An example from microfinance. *Africanus*, 43 (1), 65-77
- World Bank (2020). Inclusive access and quality education project. Retrieved from <https://projects.worldbank.org/en/projects-operations/project-detail/P163389>
- *Yavuzarslan, H., & Arslan, A. (2020). *Usage of Universal Design for Learning in Mathematic Course*. *Psycho-Educational Research Reviews*. 9 (3).
- *Yuzlu, M. Y., & Arslan, A. (2017). The effect of Universal Design for Learning on the academic achievement and self-regulation skills of high school students in English Course. *Journal of Education and Practice*, 8, 18.
- Zawacki-Richter, O., Kerres, M., Bedenlier, S., Bond, M., & Buntins, K. (2020). *Systematic reviews in educational research: Methodology, perspectives and application* (p. 161). Springer Nature.

AN INVESTIGATION INTO THE EFFECTIVENESS OF THE INQUIRY-BASED COOPERATIVE LEARNING MODEL IN TEACHING HIGH SCHOOL CHEMISTRY

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Abstract

The main purpose of this study is to investigate the effectiveness of the inquiry-based cooperative learning model in teaching high school chemistry. The explanatory sequential design, one of the basic mixed method research designs was used in this study. the nonequivalent control group design was adopted for the quantitative study and the case study design was utilized for qualitative study. A total of (315) Grade Ten chemistry students in 2022-2023 Academic Year participated for this study and the intact two classes from each selected school were randomly assigned as experimental group and control group. The experimental groups received instruction with the inquiry-based cooperative learning model and the control groups received formal instruction. The pretest, posttest and students' attitude questionnaire were applied to collect quantitative data. In analyzing quantitative data, analysis of covariance (ANCOVA), Friedman Test and descriptive statistics were adopted. The observation checklist for teachers and interviews with the students and teachers were used for acquiring the qualitative data. The observation data were analyzed with descriptive statistics and the thematic analysis was applied for the interview data. Quantitative findings showed that the students from experimental groups exhibited better chemistry achievement than the students from control groups in all selected schools. There were improvements in the inquiry and cooperative learning skills of the students from experimental groups. Qualitative findings revealed that the teachers from experimental groups successfully implemented their teaching chemistry with inquiry-based cooperative learning model. The students and teachers exhibited positive and favourable attitudes in their teaching-learning processes with the inquiry-based cooperative learning model. Therefore, the inquiry-based cooperative learning model effectively contributed to the teaching of high school chemistry.

Keywords: Inquiry-based learning, cooperative learning, model, chemistry, inquiry-based cooperative learning

Introduction

Education must be concerned with developing the skills and attributes that will promote self-discipline, responsibility, self-expression and confidence. Classroom teaching and learning involve the interaction among teachers, pupils and the curriculum. In order to improve the effectiveness of students' learning, the teacher has to understand the ways in which an individual learns. Learning involves the integration of thinking, feeling, perceiving and behaving. According to Khin Zaw (2001a), through thought man can not only make some sound predictions of what the future is to bring but he can cope with new. That is why, the students' thinking ability should be emphasized in teaching science and so learning science is effective only when it develops rational thinking and learning abilities which form the basis of modern life.

Chemistry plays a major role in science education. Chemistry can prepare students to become scientifically literate citizens by equipping them with skills and understanding that are relevant and meaningful in their daily lives. Therefore, the teachers who teach science or chemistry at the basic education high school level must keenly strive to improve the quality of instruction and methodology in their teaching-learning processes.

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For effective chemistry teaching, the inquiry-based cooperative learning tends to ensure that each student actively engages in the instructional processes and achieves his or her quality learning, through social interaction with content of study; by critical reasoning; through discussions and exchange of ideas. The inquiry-based cooperative learning model will scaffold learning activities that support students' conceptual understanding. By applying this instructional model in teaching chemistry, the students can be mostly engaged in the instructional procedures, strengthened their scientific literacy and improved their self-confidence in learning chemistry.

Research Purpose

The main purpose of this study is to investigate the effectiveness of the inquiry-based cooperative learning model in teaching high school chemistry. The specific objectives are as follows:

1. to develop an inquiry-based cooperative learning model in teaching chemistry at the high school level.
2. to investigate the effects of the proposed model in teaching chemistry at the high school level.
3. to explore the attitude of students towards learning through inquiry-based cooperative learning model and that of teachers towards teaching through it.
4. to give suggestions for the improvement of high school chemistry teaching based on the results of the study.

Research Hypotheses

The research hypotheses of the study are described as follows:

- H1:** The chemistry students who receive learning with the inquiry-based cooperative learning model exhibit better achievement than those who do not.
- H2:** The chemistry students who receive learning with the inquiry-based cooperative learning model improve their inquiry and cooperative learning skills in their group work.
- H3:** The students who are taught with the inquiry-based cooperative learning model may have positive attitudes towards learning high school chemistry.
- H4:** The teachers who employ the inquiry-based cooperative learning model may have positive attitudes towards teaching high school chemistry.

Definition of Key Terms

The key terms of the study were described as follows:

Inquiry-based learning: Inquiry-based learning is a process where students formulate questions, investigate widely and then build new understandings, meanings and knowledge (Branch & Oberg, 2004).

Cooperative learning: Cooperative learning is a teaching strategy that organizes students to work together in small teams so that everyone can participate in a clearly assigned task or role which contributes to the learning of each member of the team and to the team as a whole (Kivunja, 2015).

Model: A model of teaching is a plan or pattern that can be used to design instructional materials and to guide instruction in the classroom and other settings (Joyce & Weil, 1980).

Chemistry: Chemistry is the study of the interactions of matter with other matter and with energy (Ball, 2011).

Operational Definition of the Study

Inquiry-based Cooperative Learning: Inquiry-based cooperative learning means an instructional strategy that organizes students to work together in small groups who actively engage in inquiry-based learning processes and then finally attain the desired learning outcomes.

Scope of the Research

This study is geographically restricted to Mandalay Region and Nay Pyi Taw Union Territory. For this study, the participants from the selected high schools were Grade Ten chemistry students and teachers in 2022-2023 Academic Year. This study deals with the methodology of high school chemistry teaching in Myanmar.

Review of Related Literature

Inquiry-based Cooperative Learning Model

The inquiry-based cooperative learning model is based mainly on the ideology of three educational philosophies: pragmatism, progressivism and constructivism. Furthermore, learning theoretical considerations of cognitive learning theory, cognitive development and constructivist theory, sociocultural theory social cognitive theory, taxonomy of learning and cybernetic perspectives are especially taken into account for the proposed model. There are five main components in this instructional model and the detailed descriptions of the proposed model are presented as follows.

I. Preparing Instruction

The following four steps for preparing instruction are included.

(a) Selecting content: The teacher selects the content that are mostly matched with the inquiry-based cooperative learning from Grade Ten chemistry textbook in 2021-2022 Academic Year.

(b) Identifying learning objectives: The learning objectives are described by applying the precise and observable behavior for each segment of instruction. The achievement of the learning objectives can be measured from the students' behavior through their inquiry-based cooperative learning activities and their achievement scores.

(c) Determining entering behavior: The purpose of this stage is to determine the students' entering behavior for organizing them into groups and prerequisite skills for the instruction. The students' background knowledge is interpreted by using the diagnostic assessment.

(d) Choosing instructional materials: The chemistry teacher selects the appropriate instructional materials in accordance with the learning objectives and the instructional model.

II. Organizing Groups

This component includes two steps in which students are managed to their respective groups for more learning cooperatively and communicatively.

(a) Grouping students: The heterogeneous groups of the students are organized in size from (4) to (6) group members by mixing as much as possible based on their academic abilities, gender and background knowledge.

(b) Assigning the different roles and tasks of the students: According to the tasks in their learning groups, the students are assigned including leader, presenter, recorder, observer, checker and timer.

III. Implementing Inquiry-based Cooperative Learning Procedures

There are the following seven steps in this instructional procedure.

(a) Encountering with the problem (or) puzzling situation: The students are introduced to new concepts or problems that are linked with the prior knowledge based on inquiry through questioning, demonstration, discussion, laboratory work and the use of mathematics in accordance with the nature of lesson topics under the monitoring and guidance of the teacher.

(b) Preparing and gathering data: The students and teachers prepare and gather data through some inquiry processes including, questioning and observing to obtain information or data about objects and events; measuring and classifying the collections of objects or events, using numbers for gathering mathematical data; communicating by constructing graphs and diagrams for expressing complex phenomena and inferring based on the observation and assumptions for collecting a bit of information about the objects and events in order to formulate the hypotheses and carry out investigation.

(c) Implementing the group investigations: The students implement the group investigation based on the preparation and gathering necessary data. The group members discuss their work in progress to exchange ideas and information, and to clarify, and integrate them. The teacher allows students to use the various types of experiments, including pencil-and-paper, and concrete experiments to test the hypothesis. They perform their tasks responsibly with the cooperative manner. The included inquiry process skills are formulating and testing hypotheses, predicting data, controlling variables, and experimenting the puzzling situation.

(d) Interpreting and organizing products (or) results: The students interpret their findings individually as well as by discussing with their group members and they also compare their respective findings with their problem. They organize the information they have collected and summarize it. Finally, the group prepares a report that integrates the answers they found.

(e) Presenting and sharing ideas and results: The group members determine the main idea of their investigation. The presenter in their group should clearly express their main ideas and findings. The students feel more confident in this stage.

(f) Applying the ideas and results: This stage can include the inquiry process skills, namely, making operational definition that is the students organize information they obtained during the above activities and try to explain the discrepancy for the selected content.

(g) Reflective process: In this stage, both the teacher and the students reflect on the learning process of the students and their product by discussing and asking the necessary questions to confirm the understanding and conceptualizing of the students for acquiring the main facts, ideas and concepts of chemistry.

IV. Summative Assessment

The teachers assess the students' daily practice by observing the tasks that the students carry out, by looking at what they write and make, and by considering how they respond to ask questions. At the end of the instructional process or of a period of learning, the summative assessment is used to evaluate student learning.

V. Providing Feedback

If the students cannot perform well in the assessment and cannot achieve the learning objectives, they will go to the stage of providing feedback and take the necessary feedback. If they can do well in the inquiry-based cooperative learning procedures and achieve the learning objectives, they will continue to learn the new contents.

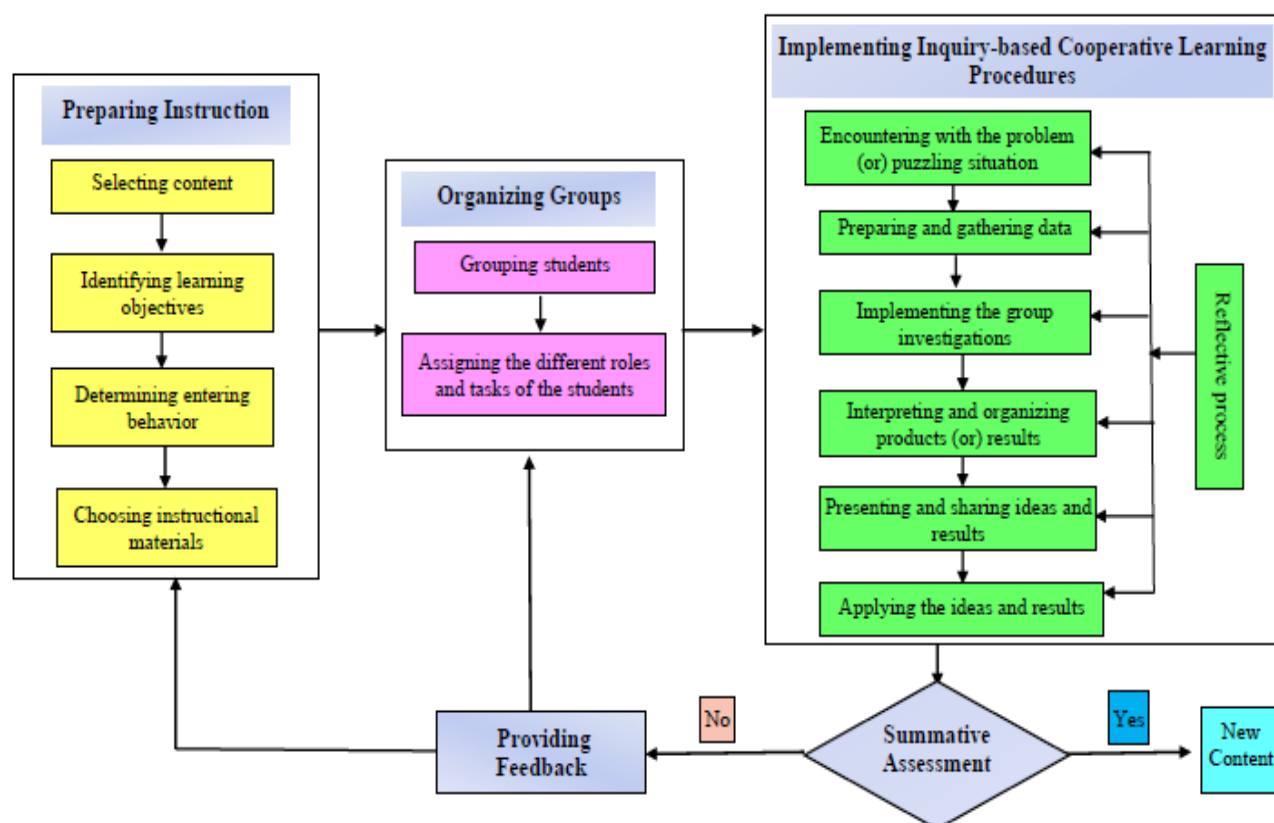


Figure 1. Inquiry-based cooperative learning model for teaching high school chemistry.

Research Method

For implementing the inquiry-based cooperative learning model in teaching Grade Ten chemistry, research design, population and sample, instruments, data analysis and research procedure are discussed as follows.

Research Design

Based on Mills and Gay (2016), the explanatory sequential design (QUAN → qual) was used for this study. In the quantitative study, the nonequivalent control group design was adopted to explore the effectiveness of the inquiry-based cooperative learning model. For qualitative study, the case study design was utilized to know the attitudes and opinions of the students and the teachers who participated in experimental groups.

Population and Sample Size

The intact classes were randomly selected as experimental groups and control groups, and the target sample size were chosen from the selected schools by using simple random sampling method. The selected schools and sample size are described in Table 1.

Table 1 Population and Sample Size for Data Collection

Name of School	No. of Population	No. of Sample		
		Experimental Group	Control Group	Total
• No. (5), Basic Education High School, Chanayetharsan	84	40	30	70
• Basic Education High School, Patheingyi	200	49	40	89
• No. (12), Basic Education High School, Ottarathiri, Nay Pyi Taw	125	35	40	75
• No. (18), Basic Education High School, Dekkhinathiri, Nay Pyi Taw	128	39	42	81
Total	537	163	152	315

Research Instruments

For investigating the effectiveness of the inquiry-based cooperative learning model in teaching chemistry, the instruments for quantitative study were pretest, posttest, group work assessment form and students' attitude questionnaire. For the qualitative study, observation checklist for teachers and the interview questions were constructed to know the attitudes and opinions of Grade Ten Chemistry teachers and students from the experimental groups.

Data Analysis

When the required data had been collected, data analysis was carried out. The analysis of covariance (ANCOVA) for the pretest and posttest scores, Friedman test for the group work assessment form, descriptive statistics for questionnaire and observation data, and the thematic analysis for the interview questions of teachers and students were utilized for this study.

Research Procedure

The inquiry-based cooperative learning model was developed and the lesson plans were constructed. The instruments were validated with seven academic and education experts. The pilot study was conducted with (34) Grade Ten chemistry students. The Kuder-Richardson 20 value obtained .85 for the reliability of the pretest. The reliability value of Cronbach's Alpha for the posttest and group work assessment form had .826 and .764. The interobserver or interrater reliability coefficient for observation checklist was obtained .844. The main study was conducted from September 2022 to December 2022. During treatment period, the experimental groups were taught Grade Ten chemistry with the inquiry-based cooperative learning model while control groups were taught with formal instruction.

Observation for the teachers and students' group work assessment from the experimental groups were conducted during the treatment periods. After administering the tests, the students from the experimental groups were requested to answer the attitude questionnaires. The reliability coefficient, Cronbach's Alpha value was .834 for students' attitude questionnaire. Then, the teachers and students from the experimental groups were selected by using random purposive sampling method for one-to-

one interviewing and all interview sessions were recorded. Finally, the collected quantitative and qualitative data were analyzed and interpreted according to the research design.

Findings

The findings of the quantitative and qualitative study are presented as follows.

Findings of Pretest

The data obtained from the pretest were analyzed by using analysis of covariance (ANCOVA) to determine whether there were significant differences between the group equivalence of the two selected groups for the selected schools. The results of the pretest for the respective selected schools are described in Table 2.

Table 2 Analysis of Covariance (ANCOVA) Results of Pretest in the Selected Schools

School	Group	n	M	SD	MD	F	p
S1	Experimental	40	34.85	6.070	5.62	14.814	.000***
	Control	30	29.23	6.004			
S2	Experimental	49	34.31	6.703	-0.16	0.013	.911(ns)
	Control	40	34.47	7.476			
S3	Experimental	35	37.23	4.947	4.28	10.446	.002**
	Control	40	32.95	6.316			
S4	Experimental	39	35.31	7.388	-0.21	0.024	.878 (ns)
	Control	42	35.52	5.152			

Note. S1 = No. (5), Basic Education High School, Chanayetharsan; S2 = Basic Education High School, Patheingyi; S3 = No. (12), Basic Education High School, Ottarathiri, Nay Pyi Taw; S4 = No. (18), Basic Education High School, Dekkhinathiri, Nay Pyi Taw.

ns = not significant. ** $p < .01$. *** $p < .001$.

The results described in Table 2 showed that there were significant differences between group equivalence of the two selected groups in S1 and S3. According to the results of S2 and S4, there were no significant differences between the pretest scores of the experimental group and those of the control group ($p > .05$) because they had the equal chemistry knowledge before treatment.

Findings of Posttest

In order to know whether or not the significant differences in chemistry achievement between the experimental and control groups, the posttest scores were analyzed by applying the analysis of covariance (ANCOVA) and the findings are presented as follows.

Table 3 Analysis of Covariance (ANCOVA) Results of Overall Posttest Means based on Effect Size for the Selected Schools

School	Group	n	Unadjusted Mean	Adjusted Mean	MD	F	p	Posttest Partial Eta Squared	Pretest Partial Eta Squared
S1	Experimental	40	38.88	39.15	8.44	31.31	.000** *	.319	.018
	Control	30	31.13	30.71					
S2	Experimental	49	39.51	39.49	19.48	84.68	.000**	.496	.014

School	Group	n	Unadjusted Mean	Adjusted Mean	MD	F	p	Posttest Partial Eta Squared	Pretest Partial Eta Squared
S3	Control	40	20.22	20.01	2.75	12.98	*	.153	.091
	Experimental	35	44.43	44.81					
S4	Control	40	42.40	42.06	4.25	9.69	.001**	.111	.009
	Experimental	39	42.56	42.62					
	Control	42	38.43	38.37			.003**		

Note. S1 = No. (5), Basic Education High School, Chanayetharsan; S2 = Basic Education High School, Patheingyi; S3 = No. (12), Basic Education High School, Ottarathiri, Nay Pyi Taw; S4 = No. (18), Basic Education High School, Dekkhinathiri, Nay Pyi Taw.

** $p < .01$. *** $p < .001$.

According to the obtained data based on Table 3, the comparison of overall posttest means for the selected schools is described in Figure 2.

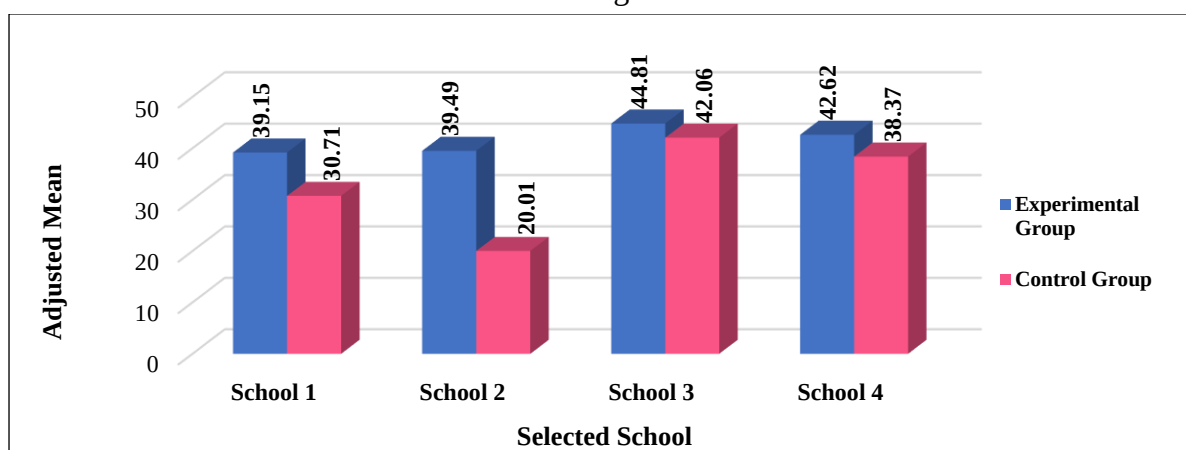


Figure 2. Comparison of overall posttest adjusted means on chemistry achievement in the selected schools.

According to the findings, it can be interpreted that there were no significant influences of pretest scores and other extraneous variables on the posttest scores of the students and Grade Ten chemistry teaching with the proposed model. The use of the inquiry-based cooperative learning model significantly supported the students' critical and judgmental thinking ability for improving their recalling, conceptualizing, applying, classifying and reasoning chemistry contents more than the formal instruction. Therefore, the inquiry-based cooperative learning model had well contribution to chemistry achievement in all selected schools.

Findings of Group Work Assessment

Group work assessment was applied to know the actual performance of the students and measure the improvement of the inquiry and cooperative learning skills of the experimental groups of the selected schools. Therefore, group work assessment was conducted three times at three different time periods (starting intervention (first time), during intervention (second time) and ending intervention (third time)). According to Pallant (2013), Friedman Test was applied to test their improvement.

Table 4 Friedman Test Results of Group Work Assessment Form of the Students for Classroom Inquiry and Cooperative Learning Skills

Skill	Mean Rank			Md (Median)			df	Chi-Square χ^2	p
	1 st Time (S)	2 nd Time (D)	3 rd Time (E)	1 st Time (S)	2 nd Time (D)	3 rd Time (E)			
CIS	1.29	2.21	2.50	16	17	17	2	6.87	.032*
CLS	1.43	1.71	2.86	15	17	18	2	8.62	.013*
Overall	1.29	1.86	2.86	31	34	36	2	8.86	.012*

Note. CIS = Classroom Inquiry Skills; CLS = Cooperative Learning Skills. S = Starting Intervention; D = During Intervention; E = Ending Intervention.

* $p < .05$.

Based on the obtained data from the Friedman test results, the following Figure 3 is presented.

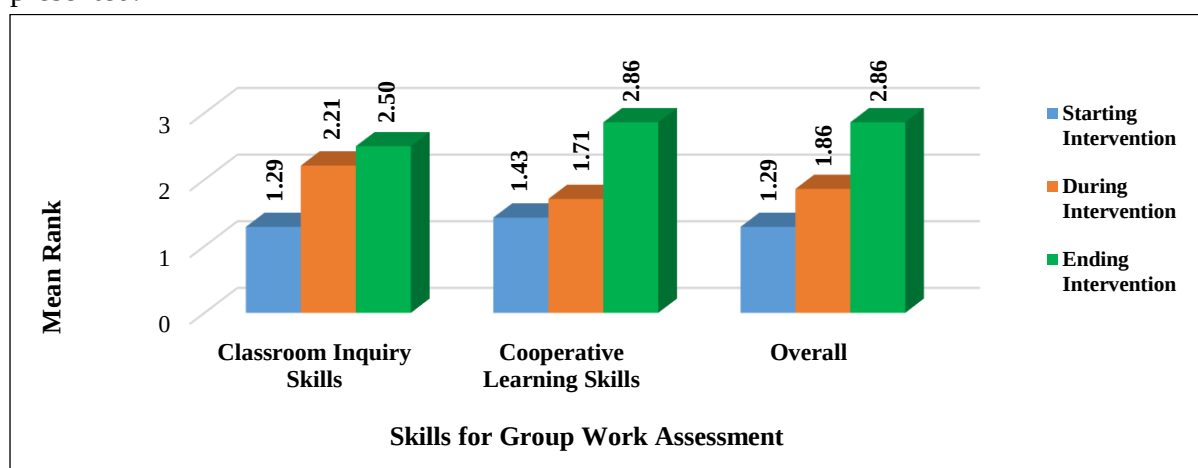


Figure 3. Illustration for comparison of mean rank results of group work assessment form

It was found that the overall results of the Friedman Test indicated that there were statistically significant in group work assessment scores across the three time points $\chi^2(2, n = 49) = 8.86, p < .05$. Additionally, inspection of the median values showed slightly increasing in group scores from the second week of intervention ($Md = 31$) to during intervention ($Md = 34$) and a further increase at the ending of intervention ($Md = 36$). Therefore, it was found that there was improvement in inquiry and cooperative learning skills by comparing the mean ranks and the median values of group work scores after intervention.

Findings of the Attitudes of Grade Ten Chemistry Students

The questionnaire was constructed to explore the attitudes and feelings of Grade Ten Chemistry students who were participated in the experimental groups. The questionnaire was mainly based on the inquiry-based cooperative learning model and some items were adapted from the attitude questionnaires of Kouros and Abrami (2006), and of DiBiase and McDonald (2015). This questionnaire was constructed as Five-point Likert scale from “strongly disagree” to “strongly agree” to indicate the attitudes towards each item.

Table 5 Responded Rates of Students' Attitudes towards Learning with the Inquiry-based Cooperative Learning Model

Statement	Percentage (%), n = 163				
	Strongly disagree	Disagree	Undecided	Agree	Strongly agree
More understand the nature and the relationships of chemistry.	3.2	1.8	14.7	65.0	15.3
Be able to improve the problem-solving abilities.	1.2	4.3	27.6	49.7	17.2
Be able to promote the practical investigative and interpersonal skills.	4.3	-	20.9	54.6	20.2
Identify the meanings of the lessons themselves from the inquiry-based cooperative learning experiences.	1.8	3.7	24.5	52.8	17.2
Like to improve optimistic attitude.	6.2	3.6	14.7	49.1	26.4
Like to obtain the dutiful habits for conducting the respective responsibility.	5.0	2.4	9.2	49.1	34.3
Enjoy applying the instructional aids and real-objects matched with the chemistry lessons.	3.1	3.7	13.5	47.2	32.5
Like to interactively reflect on the lessons together with teachers.	1.8	3.7	14.1	49.1	31.3
Become self-confident due to sharing information obtained from learning chemistry.	2.4	4.9	15.3	44.8	32.6
Unliked to noisily discuss and talk to each other among the group members.	17.8	14.7	10.4	31.3	25.8
Unliked to share the instructional aids with others.	26.3	25.2	9.2	23.3	16.0
Require a lot of time for sharing and presenting the lessons.	5.6	5.5	10.4	44.8	33.7
Have difficulty participating in reflective discussions together with the teacher.	12.8	25.2	19.1	28.2	14.7
Delay for asking questions concerned with lessons.	12.3	17.8	19.6	33.1	17.2
Unliked to wait for other students who did not understand the lessons.	25.7	17.8	22.7	21.5	12.3

Based on the findings, most of the students from the selected schools expressed that they had merits from learning chemistry through this inquiry-based cooperative learning model because they acquired the scientific inquisitive habits, logical problem-solving manner and self-confidence by sharing the learned materials. On the other hand, some students may be seemed that they have little satisfaction about the conditions of the classroom with this instructional model. However, they became patient in waiting for other academically weak students. The students can gradually acquire such positive attitudes as mutual understanding, empathy and patient among their classmates. It can be interpreted that the attitudes of the students were optimistic towards this instructional model.

Findings of Observation Checklist for Teachers

According to the performance of the teachers, three rating scales were referred to (1) stands for not observed which means that the observer did not observe the described behaviour during the instruction, (2) stands for observed occasionally which means that the observer observed the described behaviour once or twice during the instruction, (3) stands for observed frequently which means that the observer observed the described behaviour more than twice during the instruction. Based on (24) times for total observation, the obtained data were analyzed by using descriptive statistics and the findings are described in Table 6.

Table 6 Findings of Observation Checklist for Teachers in Using the Inquiry-based Cooperative Learning Model

Main Component	Descriptions of Observed Factors for Teacher	Percentage (%)		
		not observed	observed occasionally	observed frequently
Preparing Instruction	• Select chapters and topics matched with inquiry-based cooperative learning.	8.3	75.0	16.7
	• Define the learning objectives in terms of precise and observable behavior.	16.7	45.7	37.6
	• Determine the students' different background knowledge, abilities, and the prerequisite skills.	8.3	50.0	41.7
	• Choose the proper instructional materials based on the nature of the content and learning objectives.	12.5	54.2	33.3
Organizing Groups	• Manage the students into heterogeneous groups.	16.7	70.8	12.5
	• Assign the different roles and tasks of the students.	37.5	25.0	37.5
Implementing Inquiry-based Cooperative Learning Procedures	• Introduce new concepts or problems based on inquiry through questioning, demonstration, discussion, laboratory work, and the use of mathematics.	-	83.3	16.7
	• Encourage students to gather data through some inquiry processes including, questioning and observing, measuring and classifying, using numbers for gathering mathematical data; communicating and inferring.	-	54.2	45.8
	• Allow students to use the various types of experiments which include inquiry process skills such as formulating and testing hypotheses, predicting data, controlling variables, and experimenting with the problem.	16.7	50.0	33.3
	• Suggest the students interpret the results in acceptance or rejection of the hypothesis and organize major points of the lesson.	-	29.2	70.8
	• Organize the groups' plans for their presentations and manages the schedule.	8.3	66.7	25.0

Main Component	Descriptions of Observed Factors for Teacher	Percentage (%)		
		not observed	observed occasionally	observed frequently
Summative Assessment Providing Feedback	• Provide opportunities for students to express their learning with possible actions.	-	50.0	50.0
	• Reflect on the learning process by discussing and asking the necessary questions.	-	62.5	37.5
	• Assess with the paper and pencil test, and the direct observation of the teacher.	8.4	45.8	45.8
	• If necessary, the feedback, discussion, and explanation are provided and retaught by the teacher.	25.0	54.2	20.8

Based on the findings of observation checklists, the teachers from the experimental groups successfully conducted their instruction with the inquiry-based cooperative learning model, and the students systematically followed the instructions of the teachers.

Findings of Teachers' Interviews

The data obtained from interview were analyzed by using thematic analysis. Thematic analysis is a type of qualitative analysis. Thematic analysis is the process of identifying patterns or themes within qualitative data (Boyatzis, 1998). The interview data obtained from this qualitative study were analyzed according to the thematic analysis model of Miles and Huberman (1984) in which there were three link stages or 'streams', i.e., data reduction, data display and data conclusion-drawing/verifying. The findings obtained from teachers' interviews are presented in Table 7.

Table7 The Emerging Main Theme and Sub-theme from Teachers' Interviews

Sub-theme	Main Theme
• Preparing Instruction • Nurturing Curiosity and Inquiry • Supporting Conceptual understanding and Cooperative learning • Motivation • Creating Positive Classroom Conditions	Instructional experiences through the implementation of the inquiry-based cooperative leaning model
• Facilitation Skills • Collaboration and Communication Skills • Questioning Techniques • Assessment Strategies • Providing Feedback and Reflection	Pedagogical contributions of the inquiry-based cooperative learning model
• Instructional Time • Instructional Materials • Students' Individual Differences	Challenges for using the inquiry-based cooperative learning model

According to the main theme and sub-theme from teachers' interviews, it can be interpreted that they acquired the experiences of how to nurture the students' curiosity and inquiry habits based on their group investigation activities. Although they had the challenges in

their instruction with this proposed model, they could create positive classroom conditions that could also support the students' 21st century skills, such as collaboration, communication, critical thinking and problem-solving, creativity, innovation and citizenship.

Findings of Students' Interviews

The findings obtained from the students' interviews are presented in Table 8.

Table 8 *The Emerging Main Theme and Sub-theme from Students' Interviews*

Sub-theme	Main Theme
• Learning activities • Conceptual understanding • Satisfaction • Self-confidence	Experiences through the inquiry-based cooperative learning activities
• Effectiveness for Cognitive Skills • Effectiveness for Inquiry Skills • Effectiveness for Cooperative Learning Skills	Effectiveness of the inquiry-based cooperative learning model
• varying academic abilities • limit their opportunities to engage in practical application • restrict opportunities for them to engage in the learning activities • limit the opportunities for individualized attention and support	Difficulties of using the inquiry-based cooperative learning model

Based on the main theme and sub-theme from students' interviews, it can be interpreted that they had positive attitude towards their learning with this instructional model. Because they learn to appreciate and respect differences and strengthen their interpersonal skills by working with diverse group members from learning chemistry through the inquiry-based cooperative learning model. They acquired the sense of reflecting the feedback from peers and teachers on their work. Moreover, they agreed that they develop their reflective thinking skills and continuously strive for improvement by engaging in this process.

Discussion and Suggestions

After presenting the findings of the quantitative and qualitative studies, discussion and suggestions of the research are described in this section.

Discussion

The main purpose of this research is to investigate the effectiveness of the inquiry-based cooperative learning model in teaching high school chemistry. The discussion concerns to what extent the instructional model affects on teaching Grade Ten chemistry and what attitudes of the teachers and students are.

Hypothesis (1): The posttest was used to examine the impact of the inquiry-based cooperative learning model on the students' achievement. According to the findings of four selected schools, it was found that there were significant differences between chemistry achievement of the experimental groups and that of the control groups in all selected schools. The inquiry-based cooperative learning model had positive effects on the students' chemistry achievement in all selected schools. These findings are matched with the findings of Adiasti, Soetjipto and

Gipayana (2016) who conducted the implementation of inquiry learning by setting cooperative model type group investigation to enhance the activity and learning outcomes of the students.

Hypothesis (2): The group assessment was employed to measure the improvement of the inquiry and cooperative learning skills of the experimental groups from the selected schools. Based on the results of the Friedman Test of group work assessment form, there were improvements in inquiry and cooperative learning skills by comparing the mean ranks and the median values of group work scores across the three time periods in all selected schools. According to the findings from the group work assessment, the inquiry-based cooperative learning model can have a positive impact on the improvement of the students' inquiry and cooperative learning skills which take a vital role in their daily life situations and can support the increase of their 21st century skills.

Hypothesis (3): To know to what extent the qualitative findings explain and support the quantitative findings, the students' attitudes towards their learning chemistry through the inquiry-based cooperative learning model were explored by using the questionnaire survey and interview questions. The students were interested in chemistry subject by learning with inquiry-based cooperative learning model. Sometimes they struggled with adjusting to one another due to individual differences, available instructional time and resources. However, the inquiry-based cooperative learning model has a positive impact on their conceptual understanding or cognitive skills, inquiry and cooperative learning skills. They were able to develop their interpersonal skills and learn to recognize and value diversity. They had favourable attitudes about their leaning with inquiry-based cooperative learning model. These findings are in line with the results of Bilgin (2009) who studied that the effects of guided inquiry instruction incorporating a cooperative learning approach on university students' achievement of acid and bases concepts and attitude toward guided inquiry instruction.

Hypothesis (4): In order to know the teachers' attitudes towards their teaching chemistry through the inquiry-based cooperative learning model were discovered by applying observation checklist and interviews. They could scaffold their students for conceptualizing the basic chemistry concepts and give the opportunities and motivation of their students to cooperate in their learning activities. They had challenges concerning the available instructional time, materials and students' individual differences. However, this instruction model positively contributed to their instructional experiences and pedagogical skills. They had positive attitudes about their teaching with inquiry-based cooperative learning model. These findings can underpin and support the quantitative research findings.

Suggestions

For chemistry education to be effective in terms of promoting students' understanding of, and interest in chemistry, highly qualified chemistry teachers are necessary. Every chemistry teacher should encourage students to develop interest and meaningful learning by changing their methods of teaching to enhance the quality of instruction and learning of chemistry. From this view, the inquiry-based cooperative learning model for teaching high school chemistry was developed to support the effective and efficient instruction of chemistry and to actively and intellectually participate the students in their learning process.

To the teacher, the real work required of students is the thinking and learning involved in undertaking a task, and the task is often just a means to support that mental activity. In order to become deep and meaningful learners of chemistry, teachers should implement their instruction together with hands-on and mind-on learning activities to support the mental activities of the students in conceptual understanding of chemistry concepts. The students take a vital role in the teaching–learning process. Therefore, in order to have a sound foundation of chemistry concepts, the students must have an inquisitive mind and, have the learning abilities independently and cooperatively.

Khin Zaw (2001b) pointed out that learning is itself an active process of change; it is the process by which behaviour is developed or altered through practice or experience. Based on this idea, in the inquiry-based cooperative learning model, the students managed to encounter inquiry-based cooperative learning experiences and practices for obtaining the above-mentioned learning abilities and taking place learning chemistry systematically.

Conclusion

Education provides individuals with the opportunity to improve their lives, become successful members of their communities and actively contribute to national socio-economic development. The OECD Future of Education and Skills 2030 project pointed out that in the education sector, some changes are already emerging. The schools aspire to operate with a curriculum that recognizes the need for interdependence and broadens the goals of education to include education for citizenship (Organization for Economic Co-operation and Development, 2019).

In order to match these conditions of the education system, these inquiry-based cooperative learning procedures can prepare both the teachers for teaching activities and the students for learning activities in order to achieve the demands of 21st century skills and be gradually consistent with the requirements of current educational changing views.

Therefore, it is concluded that the inquiry-based cooperative learning model is effective for teaching high school chemistry. The degree and/or level of its effectiveness is of course dependent on the individual teacher's capacity to optimally control the cycle of classroom learning activities. This in turn points to another responsibility for pedagogues utilizing the inquiry-based cooperative learning model — the professional obligation to observe teacher neutrality. Hence, the researcher would like to conclude with the final surmise that the inquiry-based cooperative learning model will reach maximal effectiveness if and when teachers can exercise optimum class control and appropriate pedagogic neutrality, the two most crucial and/or basic controversies in the long history of modern education.

Acknowledgements

Special thanks go to Dr Than Than Myint, Director General, Department of Education Research, Planning and Training, Dr Khin Thidar, Deputy Director General, Department of Education Research, Planning and Training, and Dr Aye Aye Win, Deputy Director General, Department of Education Research, Planning and Training for their kindly permission to submit this research paper in this seminar.

We are profoundly grateful to Dr Myat Myat Thaw, Rector, Sagaing University of Education, Dr Khin Hnin Yee, Pro-Rector, Sagaing University of Education and Dr Cho Kyi Than, Pro-Rector, Sagaing University of Education for their valuable management and administrative support for this research study.

We would like to pay my deepest gratitude to Dr Khin Zaw, Rector (Retired), Yangon University of Education and Dr Soe Than, Professor Emeritus, Professor and Head (Retired) of Curriculum and Methodology Department, Sagaing University of Education for their precious guidance and invaluable insights for this study.

References

- Adiasti, N., Soetjipto, B. E., & Gipayana, M. (2016). The Implementation of inquiry learning with setting cooperative model type group investigation to enhance activity and learning outcomes for the fifth-grade students. *IOSR Journal of Research & Method in Education*, 6(3), PP. 46-50.
- Ball, D. W. (2011). *Introduction to chemistry*. Bilgin, I. (2009). The effects of guided inquiry instruction incorporating a cooperative learning approach on university students' achievement of acid and bases concepts and attitude toward guided inquiry instruction. *Scientific Research and Essay*, 4(10), pp. 1038-1046.
- Bilgin, I. (2009). The effects of guided inquiry instruction incorporating a cooperative learning approach on university students' achievement of acid and bases concepts and attitude toward guided inquiry instruction. *Scientific Research and Essay*, 4(10), pp. 1038-1046.
- Boyatzis, R.E. (1998). *Transforming qualitative information: thematic analysis and code development*. London: Sage Publications.
- Branch, J., & Oberg, D. (2004). *Focus on Inquiry. A teacher's guide to implementing inquiry-based learning*. Edmonton, AB: Alberta Education.
- DiBiase, W., & McDonald, J. R. (2015). Science teacher attitudes toward inquiry-based teaching and learning. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas*, 88(2), 29-38.
- Joyce, B., & Weil, M. (1980). *Models of teaching* (2nd ed.). New Jersey: Prentice-Hall Inc.
- Khin Zaw, Dr. (2001a). *Pedagogical technology I: Cybernetical education*. PhD Program Course Material. Yangon Institute of Education, Myanmar.
- Khin Zaw, Dr. (2001b). *Theoretical pedagogy I: Ontology*. PhD Program Course Material. Yangon Institute of Education, Myanmar.
- Kivunja, C. (2015). *Teaching, learning and assessment: Steps towards creative practice*. South Melbourne, Victoria: Oxford University Press.
- Kouros, C., & Abrami, P. C. (2006). *Attitudes toward small group learning*. Centre for the Study of Learning and Performance. Concordia University, Montreal, Canada.
- Miles, M. B. & Huberman, A. M. (1984). *Qualitative data analysis: A sourcebook of new methods*. California: SAGE publications Inc.
- Mills, G.E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). Harlow: Pearson Education.
- Organization for Economic Co-operation and Development. (2019). *OECD future of education and skills 2030: OECD learning compass 2030*. A Series of Concept Notes.
- Pallant, J. (2013). *A step-by-step guide to data analysis using IBM SPSS* (5th ed.). Melbourne: Allen & Unwin.

THE CORRELATION BETWEEN STUDENTS' READING HABITS AND THEIR WRITING ABILITY

Nang Toe Toe Lwin¹ and Nant Rosalin²

Abstract

This study intended to investigate the correlation between students' reading habits and writing ability in descriptive text. The sample was comprised of 494 (247 males and 247 females) undergraduate students from respective course years in University for the Development of the National Races of the Union, UDNr. The Reading Habit Indicator Questionnaire (RHIQ) developed by Hidayati (2021) and Writing Ability Test (WAT) were used as the research instruments in conducting the study. The descriptive statistics, independent samples *t*-test, one way ANOVA and Post Hoc (Tukey HSD) and Spearman's rho correlation were computed in order to explore the reading habits and writing ability of students according to gender and course year as well as to investigate the correlation between them. Based on the results, most of the students have good reading habits and excellent writing ability. According to gender, there was no significant difference between reading habits of students. However, there was a significant difference between writing ability of students by gender. Moreover, there were significant differences between students' reading habits and writing ability by course year. It can be concluded that there was a positive correlation between reading habits and writing ability of students ($r_s = .241$).

Keywords: Reading, Reading Habits, Writing, Writing Ability

Introduction

In Myanmar, the education governments have enacted English to be taught from the kindergarten upwards. Up to now, English is taught as a foreign language with a purpose of training young children to acquire knowledge through reading books written in English and to be able to express themselves in English. The four language skills; listening, speaking, reading and writing, are essential for all language learners. Moreover, these four language skills can be divided into two important skills: receptive and productive. Listening and reading are belonged to receptive skills and speaking and writing are involved in productive skills. There were some assumptions of interaction between receptive and productive skills that the more the listening, the more the speaking and the more the reading, the more the writing. The interlink between written language of reading and writing has an impact in learning, especially in language learning.

The role of reading activity cannot be ignored in the improvement of learning. Reading activities are essential for students as students can get information from reading and enlarge their thinking by reading, thereby students become enrich their own knowledge. In addition, it can be supposed that reading ability is the interpretation of the writer's thought. Reading activities can be thought to be closely related with writing activities as writing activity is an activity of expressing ideas, thoughts and desires in the form of written symbols. According to Linawih and Winardi (2020), writing is not only the process of arranging the alphabets into words or sentences, but it is also about expressing people's idea in the written text. Lianingsari (2022) stated that writing skill is a person's skill in expressing feelings, experiences and ideas. Krashen (2004) stated that writing style does not originate from actual writing experience, but rather from reading. It was concurred that the individuals who read more create the more elevated amount of

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proficiency. In accordance with the above-described factors, the researcher was interested in conducting the study entitled with “The Correlation between Students’ Reading Habits and Their Writing Ability”.

Statement of Research Problem

Ministry of Education (2016) mentioned that major changes in the area of teacher education and management are needed to improve the quality of teaching, learning, infrastructure and management in teacher education institutions, educational colleges, universities of education and the University for the Development of National Races of the Union (UDNR). Hence, this study intends to fill in the gap by investigating the correlation between reading habit and their writing ability of undergraduate students in UDNR.

Purpose of the Research

The purpose of this research is to investigate the correlation between reading habits and writing ability of students from University for the Development of the National Races of the Union (UDNR).

Specific Objectives

The specific objectives are as follows:

1. To find out the reading habits and writing ability of English of undergraduate students in UDNR
2. To identify whether there are any significant differences in students’ reading habits of English according to gender and course year
3. To explore whether there are any significant differences in students’ writing ability of English according to gender and course year
4. To examine whether there is any significant correlation between reading habits and writing ability of undergraduate students in UDNR

Research Questions

To achieve the above objectives, research questions are identified as follows:

1. How are the reading habits and writing ability of English of undergraduate students in UDNR?
2. Are there any significant differences in English reading habits by gender?
3. Are there any significant differences in English reading habits by course year?
4. Are there any significant differences in English writing ability by gender?
5. Are there any significant differences in English writing ability by course year?
6. Is there any relationship between reading habits and writing ability of English of undergraduate students in UDNR?

Definition of Key Terms

Reading

Reading is a fluent process of readers combining information from a text and their own background knowledge to build meaning (Nunan, 2003).

Reading Habit

Reading habit refers to behavior which expresses the likeness of reading and tastes of reading (Sangkaeo, 1999).

Writing

Writing is a skill that is grounded in the cognitive domain. It involves knowledge, comprehension, application and synthesis of new knowledge (Khalifa, 2016).

Writing Ability

Writing ability is the skill of putting together what they think or what they want to say using words, which is who read is able to know their thoughts, ideas, feeling and what they want to convey with grammatical rules, punctuation, composition and methods. (Khalisa, 2018)

Scope of the Study

The participants of the study were undergraduate students (Second Year, Third Year, Fourth Year and Fifth Year students) of 2023-2024 academic year in UDNR.

Review of Related Literature

Model of Reading

Aebersold and Mary Lee (1997, cited in Muawanah, 2014) illustrated the model of reading based on bottom-up theory and top-down theory.

(a) Bottom-up Theory

The bottom-up theory primarily depends on the information presented in the text. Readers begin reading with pre-reading strategies such as processing information, recognize the graphic stimuli, recognize words and link to their background knowledge and predict the next sentence. In the bottom-up theory, readers must identify a complex of linguistic signals such as letters, morphemes, syllables, words, phrases, grammatical clues, discourse markers; and from all those signals, the readers come to conclusion.

(b) Top-down Theory

Top-down theory is the opposite of the bottom-up reading. The readers use higher level skills such as draw the meaning by linking of their background knowledge instead of focusing on letter, sound and word. Then the readers make prediction on what they read and adjust their reading process until they come to the end of the paragraph. In the similar way, it can be suggested that readers put emphasis on the general picture of the text and look for the important information by linking prior knowledge and then decide to come across the text or not.

Indicators of Reading Habits

According to Gaona and González (2011 as cited in Fitri, 2020), there are some indicators of reading habit.

- (a) **Books Read and Reading Frequency:** *Books read means a specific estimate of the number of books that individual read during some sort of time. It is also the number of many books that the students have read. Reading frequency is used to measure students' reading frequency in their spare time.*

- (b) Attitude Toward Reading is described as an individual's feeling of reading. This allows students to accept or resist reading situations (Rosli, Razali, Zamil Noor & Baharuddin, 2018 as cited in Fitri, 2020).
- (c) Time Spent on Academic Reading is the time the individual reports devoting to read books on his or her subjects of study.
- (d) Time Spent on Non-Academic Reading is the time that the student claims to commit to reading books that are not directly related to his / her study subjects.
- (e) Motivation in Family Environment is frequently reported by the individual when buying books, suggesting books, and reading family interest.
- (f) Motivation in Academic Environment: In the academic environment, motivation is the level that the student reports on the teacher's promoting literature in the classroom.

Correlation Between Reading Habits and Writing Ability

Reading habit helps the student to maximize their ability in gaining academic purpose. To support, Kiester and Kiester (cited in Muawanah, 2014) stated that it has long been recognized that in the process of learning, the reading habits of students play an important role in their academic performance. Similarly, Gilbert and Rollick (cited in Muawanah, 2014) proposed that good reading habits significantly enhance academic performance of the pupils. Reading itself not only has many advantages, but also can improve writing ability, it is because writing and reading have a close interrelationship in learning, especially in learning a language. Most people start to learn a language through written language; reading and writing. Reading and writing are interconnected as they depend on information representations, cognitive processed, environments, and contextual constraints that are identical and similar. Moreover, habits for reading are viewed as a significant effect on the success of students' writing ability, while writing ability itself is the result of a good reading habit process. According to the above-detailed description, the contribution of reading activities cannot be ignored in the process of writing.

Previous Related Study

The relevant information and consistent previous related study was described to support the present research.

The study of Aprilia (2021) with the title of "The Correlation Between Students' Reading Habit and Their Ability of Writing Narrative Text Thesis, English Education Study Program, Department of Tadris, Faculty of Tarbiyah and Tadris, State Institute of Islamic Studies (IAIN) Bengkulu" was conducted with a sample of (70) using purposive sampling method, correlational design and quantitative method. The questionnaire developed by Cesar, Gaona and Gonzalez (2010) was applied and found that there was a very low correlation between students' reading habit and writing ability as the correlation coefficient resulted by using Spearman's rho analysis was 0.136.

Research Method

Research Design

Cross-sectional survey research, correlational design and the quantitative method were used in this study to measure the relationship between the two variables of reading habits and writing ability of undergraduate students in UDNR.

Population and Sample Size

All the participants in the study were undergraduate students in UDNR by using a simple random sampling according to gender and course year. The total number of the participants are (494); the number of Second Year students are (125) and that of Third Year students are (106) and then number of Fourth year students are (137) as well as number of Fifth year students are (126).

Instruments

In order to measure the students' reading habits, Reading Habits Indicators Questionnaire developed by Hidayati (2021) was used. Writing Ability Test in English Language was developed. The questionnaire includes (30) five-point Likert items with six indicators: books read and reading frequency, attitude toward reading, time spent on academic reading, time spent on non-academic reading, motivation in the academic environment and motivation in the family environment. Writing Ability Test was used to find out students' writing ability of English language. Pilot test was taken to find the reliability of the questionnaire and Writing Ability Test which was done with the sample of (70) undergraduate students in UDNR. After pilot testing, the reliability analysis was computed. The reliability coefficient (Cronbach's alpha) of the Reading Habits Indicators Questionnaire was .787 and that of Writing Ability Test was .747.

Procedure

In order to get the essential concept of this study, related literature was reviewed through articles, journals and many other relevant books and previous researches related to this study from internet source and library. Two instruments were prepared for this study after observing the related literature. Reading Habits Indicators Questionnaire developed by Hidayati (2021) was translated into Myanmar Version. Writing Ability Test was developed by the researcher. After preparing the instruments, experts' judgement reviews were conducted for expert validity by educational experts from University for the Development of the National Races of the Union (UDNR) and Sagaing University of Education (SUOE). Then pilot test was conducted with a sample of (70) undergraduate students in UDNR. Based on pilot test result, some items were modified to adapt to the students' understanding. Then, the survey was conducted in November, 2023. After accomplishing the data collection procedure, the collected data were analyzed using Microsoft Office Excel (2019) and Statistical Package for Social Sciences (SPSS) version 27.0 (Pallant, 2011). At last, the research findings were interpreted and also suggestions and recommendation of the study were given as well as writing the research report was done.

Findings

Descriptive Statistics of Reading Habits of Students

In order to find out students' reading habits, descriptive statistics was computed by using data resulted from student respondents to reading habits indicators questionnaire.

Table 1 Descriptive Statistics of Reading Habits of Students

Variable	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Reading Habits	494	95.81	17.360	42	143

Table 1 shows that the mean score of the reading habits of student respondents is 95.81 and its standard deviation is 17.36. Then, percentages of levels of students' reading habits were computed.

Table 2 Percentages of Levels of Students' Reading Habits

Level of Reading Habits	Score (x)	Number of Students	Percentage (%)
High Level	$x \geq 113.17$	81	16
Moderate Level	$78.45 < x < 113.17$	330	67
Low Level	$x \leq 78.45$	83	17
Total		494	100

Table 2 indicates that the number of students who possess high level of reading habits was 81, that of moderate level was 330 and then low level was 83. Then the percentages of high, moderate and low levels of reading habits of students were 16%, 67% and 17% respectively. Thus, it can be concluded that two-thirds of students approximately have a moderate level of reading habits. Figure 1 illustrates the percentages of levels of reading habits of students in order to get clear visual presentation.

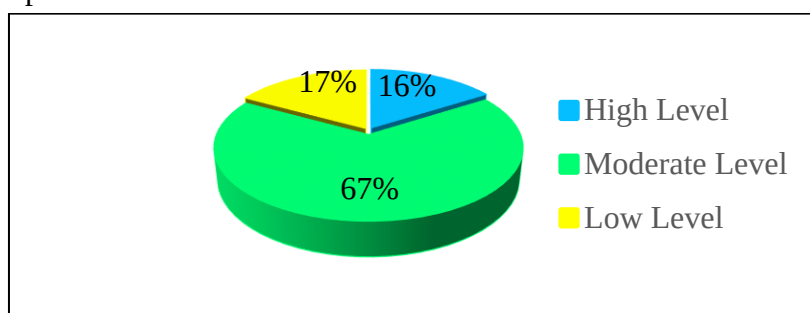


Figure 1. Percentages of levels of reading habits of students

Descriptive Statistics of Reading Habits of Students in Each Indicator

The descriptive statistics of items in each indicator was computed to determine the minimum, maximum and mean scores and standard deviation for each indicator.

Table 3 Descriptive Statistics of Reading Habits of Students in Each Indicator

Indicator of Reading Habits	N	Min	Max	M	SD
Books read and Reading frequency (BRRF)	494	5	24	13.91	3.298
Attitude toward reading (ATR)	494	5	25	16.19	3.283
Time spent on academic reading (TAR)	494	7	25	16.38	3.372
Time spent on non-academic reading (TNR)	494	7	25	17.10	3.355
Motivation in the academic environment (MAE)	494	7	25	17.82	3.395
Motivation in the family environment (MFE)	494	5	25	14.41	4.324

In accordance with Table 3, it can be examined that the mean score of motivation in the academic environment was the highest and that of books read and reading frequency was the lowest. It can be suggested that most of teachers provide motivation in students' learning and also in reading. But most of students are unable to read different kinds of books and also not frequently read books. The mean comparison of each indicator is shown in Figure 2.

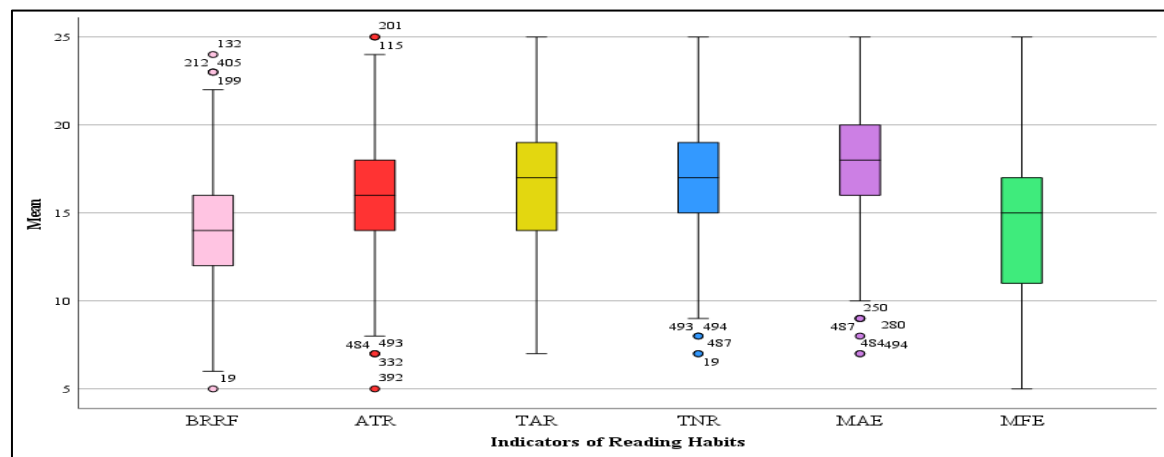


Figure 2. Mean comparison of each indicator

Descriptive Statistics for Reading Habits of Students by Gender

In order to analyze the difference in reading habits of students by gender, independent samples *t*-test was applied. Table 4 describes the comparison of means between male and female students.

Table 4 *t* value for Reading Habits of Students by Gender

Indicator of Reading Habits	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Books read and Reading frequency (BRRF)	Male	247	14.00	3.469	.178	.600	492	.549 (ns)
	Female	247	13.82	3.123				
Attitude toward reading (ATR)	Male	247	16.09	3.285	-.206	-.699	492	.485 (ns)
	Female	247	16.30	3.284				
Time spent on academic reading (TAR)	Male	247	16.23	3.230	-.300	-.987	492	.324 (ns)
	Female	247	16.53	3.509				
Time spent on non-academic reading (TNR)	Male	247	17.00	3.293	-.202	-.670	492	.503 (ns)
	Female	247	17.20	3.420				
Motivation in the academic environment (MAE)	Male	247	17.95	3.373	.267	.874	492	.382 (ns)
	Female	247	17.68	3.419				
Motivation in the family environment (MFE)	Male	247	14.08	4.311	-.668	-1.720	492	.086 (ns)
	Female	247	14.75	4.320				

Note. ns= not significant

According to the result of independent samples *t*-test shown in Table 4, it can be observed that there was no statistically significant difference in reading habits between male and female students ($p > .05$). The result revealed that male students are as fair as female students in reading habits. The mean comparisons of reading habits of students are illustrated in Figure 3.

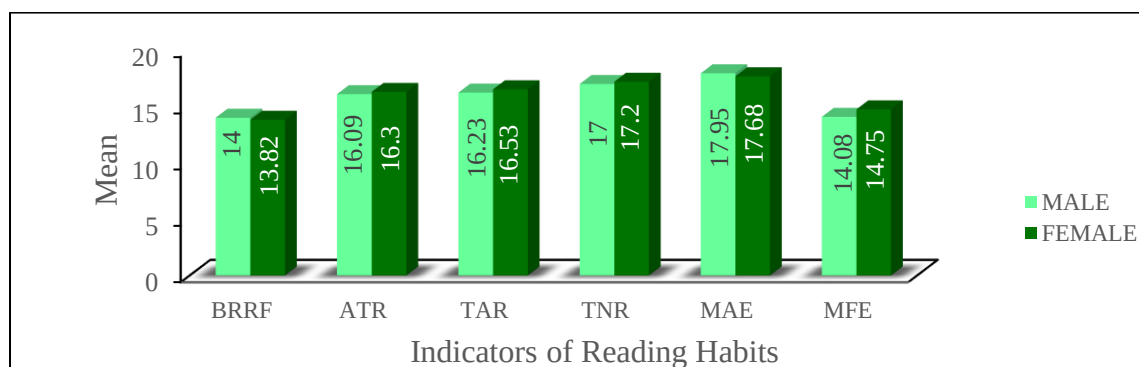


Figure 3. Mean comparisons of reading habits of students by gender

Descriptive Statistics of Reading Habits of Students by Course Year

The mean scores and standard deviation of reading habits of students by course year was illustrated in Table 5.

Table 5 Descriptive Statistics of Reading Habits of Students by Course Year

Indicator of Reading Habits	Course Year	<i>n</i>	<i>M</i>	<i>SD</i>
Books read and Reading frequency (BRRF)	Second Year	125	13.38	3.136
	Third Year	106	13.15	3.416
	Fourth Year	137	15.20	3.225
	Fifth Year	126	13.66	3.060
Attitude toward reading (ATR)	Second Year	125	15.47	3.702
	Third Year	106	16.15	3.014
	Fourth Year	137	17.27	3.095
	Fifth Year	126	15.77	2.980
Time spent on academic reading (TAR)	Second Year	125	15.96	3.322
	Third Year	106	15.75	3.280
	Fourth Year	137	18.01	3.148
	Fifth Year	126	15.55	3.154
Time spent on non-academic reading (TNR)	Second Year	125	16.30	3.510
	Third Year	106	16.70	3.166
	Fourth Year	137	18.64	3.029
	Fifth Year	126	16.55	3.174
Motivation in the academic environment (MAE)	Second Year	125	17.75	3.963
	Third Year	106	17.28	3.045
	Fourth Year	137	18.69	3.127
	Fifth Year	126	17.39	3.195
Motivation in the family environment (MFE)	Second Year	125	13.30	4.314
	Third Year	106	13.59	4.068
	Fourth Year	137	16.27	4.151
	Fifth Year	126	14.20	4.122

According to the descriptive statistics results described in Table 5, the mean scores of fourth year students were definitely higher than those of second year, third year and fifth year

students in most of indicators of reading habits. Visual presentation of mean comparisons of reading habits of students by course year is demonstrated in Figure 4.

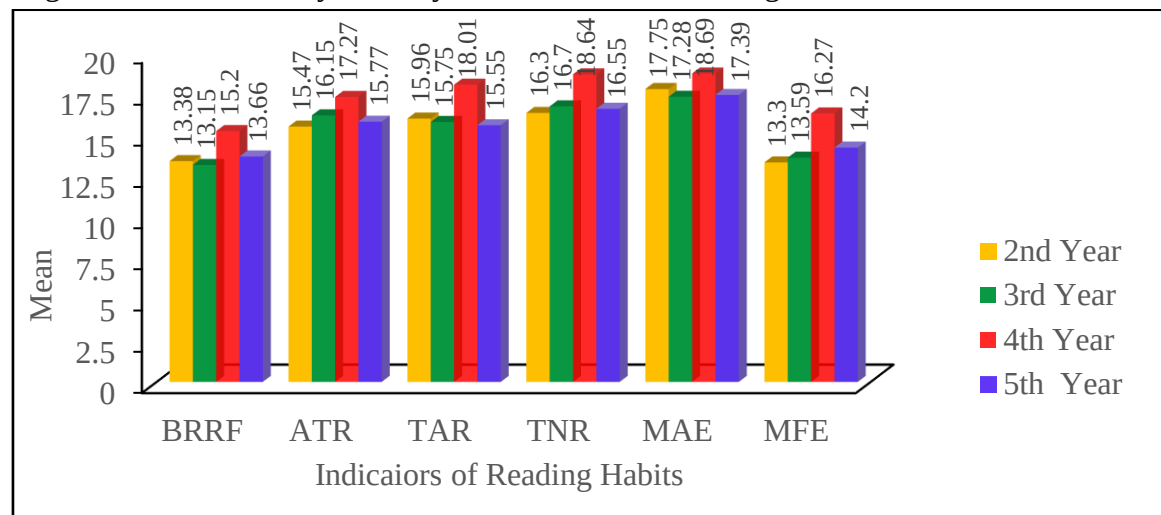


Figure 4. Mean comparisons of reading habits of students by course year

In order to analyze whether there were significant differences in reading habits of students by course year or not, One-Way ANOVA analysis was computed (see Table 6).

Table 6 ANOVA Results of Reading Habits of Students by Course Year

Indicator of Reading Habits		Sum of Squares	df	Mean Square	F	p
Books read and Reading frequency	Between Groups	334.201	3	111.400	10.853	.000***
	Within Groups	5029.516	490	10.264		
	Total	5363.717	493			
Attitude toward reading	Between Groups	246.661	3	82.220	7.953	.000***
	Within Groups	5066.070	490	10.339		
	Total	5312.731	493			
Time spent on academic reading	Between Groups	516.846	3	172.282	16.586	.000***
	Within Groups	5089.608	490	10.387		
	Total	5606.453	493			
Time spent on non-academic reading	Between Groups	462.260	3	154.087	14.842	.000***
	Within Groups	5087.076	490	10.382		
	Total	5549.336	493			
Motivation in the academic environment	Between Groups	157.334	3	52.445	4.650	.003**
	Within Groups	5526.270	490	11.278		
	Total	5683.603	493			
Motivation in the family environment	Between Groups	705.278	3	235.093	13.532	.000***
	Within Groups	8512.652	490	17.373		
	Total	9217.929	493			

Note. **The mean difference is significant at the 0.01 level.

***The mean difference is significant at the 0.001 level.

Table 6 describes that there were significant differences in all indicators of reading habits in terms of course year based on the results of One-way ANOVA analyses. Hence, Post Hoc Test was executed by using Tukey HSD test. Moreover, to be able to interpret the detailed level of significance.

Table 7 Results of Post Hoc Test (Tukey HSD) Multiple Comparisons of Reading Habits of Students by Course Year

Indicator of Reading Habits	Course Year (I)	Course Year (J)	MD (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Books read and Reading frequency	Fourth Year	Second Year	1.828	.396	.000*	.81	2.85
		Third Year	2.053	.414	.000*	.99	3.12
		Fifth Year	1.546	.395	.001*	.53	2.57
Attitude toward reading	Fourth Year	Second Year	1.798	.398	.000*	.77	2.82
		Third Year	1.119	.416	.037*	.05	2.19
		Fifth Year	1.500	.397	.001*	.48	2.52
Time spent on academic reading	Fourth Year	Second Year	2.055	.399	.000*	1.03	3.08
		Third Year	2.260	.417	.000*	1.19	3.33
		Fifth Year	2.467	.398	.000*	1.44	3.49
Time spent on non-academic reading	Fourth Year	Second Year	2.346	.399	.000*	1.32	3.37
		Third Year	1.944	.417	.000*	.87	3.02
		Fifth Year	2.095	.398	.000*	1.07	3.12
Motivation in the academic environment	Fourth Year	Third Year	1.403	.434	.007*	.28	2.52
		Fifth Year	1.297	.415	.010*	.23	2.37
Motivation in the family environment	Fourth Year	Second Year	2.974	.516	.000*	1.65	4.30
		Third Year	2.676	.539	.000*	1.29	4.07
		Fifth Year	2.072	.514	.000*	.75	3.40

Note. *The mean difference is significant at the 0.05 level.

According to Post Hoc Test (Tukey HSD) results, fourth year students were statistically and significantly different from second year, third year and fifth year students according to books read and reading frequency, attitude toward reading, time spent on academic reading, time spent on non-academic reading and motivation in the family environment. However, there was a significant difference between fourth year students and third year and fifth year students in the motivation in the academic environment. It can be deduced that fourth year students have good English reading habits among selected undergraduate students.

Descriptive Statistics of Writing Ability of Students

With the use of descriptive statistics, the minimum, maximum, mean scores and standard deviation was described in Table 8.

Table 8 Descriptive Statistics of Writing Ability of Students

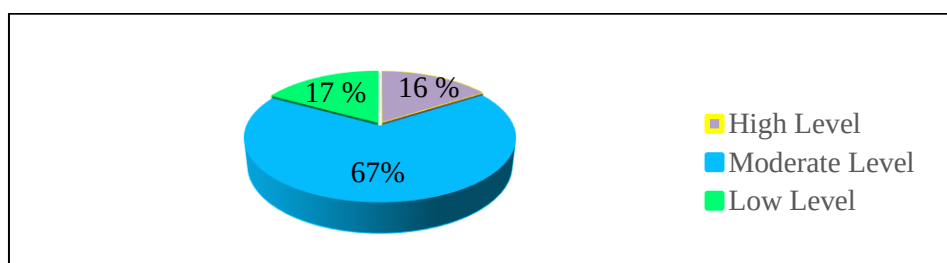
Variable	<i>n</i>	Min	Max	<i>M</i>	<i>SD</i>
Writing Ability	494	13	48	36.41	6.533

As Table 8 shows, students' writing ability has the mean ($M = 36.41$) and standard deviation ($SD = 6.533$). Students got 48 marks as the maximum score and 13 as the minimum in their writing ability. Then, percentages of levels of students' writing ability were computed.

Table 9 Percentages of Levels of Students' Writing Ability

Level of Writing Ability	Score (x)	Number of Students	Percentage (%)
High Level	$x \geq 42.943$	79	16
Moderate Level	$29.877 < x < 42.943$	332	67
Low Level	$x \leq 29.877$	83	17
Total		494	100

Table 9 points that the number of students who possess high level of writing ability was 79, that of moderate level was 332 and finally low level was 83. Then the percentages of high, moderate and low levels of reading habits of students were 16%, 67% and 17% respectively. Hence, it was concluded that two-thirds of students have a moderate level of writing ability. Percentages of levels of writing ability of students was illustrated in Figure 5.

**Figure 5.** Percentages of levels of students' writing ability

Descriptive Statistics of Writing Ability of Students by Gender

In order to analyze the difference in writing ability of students by gender, independent samples *t*-test was applied. Table 10 describes the comparison of means between male and female students.

Table 10 *t* value for Writing Ability of Students by Gender

Variable	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Writing Ability	Male	247	35.77	5.949	-1.279	-2.185	492	0.029*
	Female	247	37.05	7.022				

Note. *The mean difference is significant at the 0.05 level.

Table 10 shows that there was a significant difference in writing ability between male and female students at 0.05 level ($p = .029$). And, it can be deduced that female students have good English writing ability than the male students. Graphic presentation for mean comparisons of writing ability of students is presented in Figure 6.

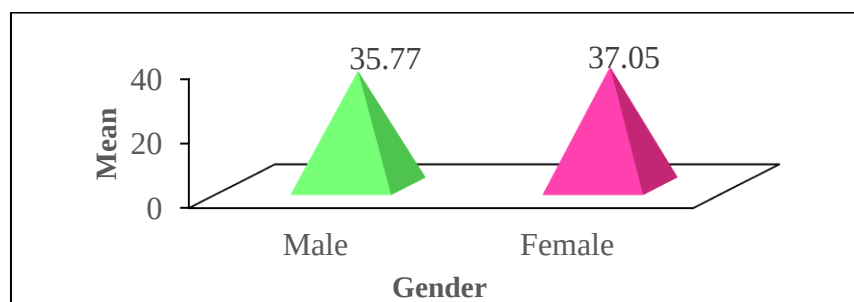


Figure 6. Mean comparisons of students' writing ability by gender

Descriptive Statistics of Writing Ability of Students by Course Year

The mean scores, standard deviations, number of participants, minimum and maximum scores of writing ability of students in terms of course year are illustrated in Table 11.

Table 11 Descriptive Statistics of Writing Ability of Students by Course Year

Variable	Course Year	<i>n</i>	<i>Min</i>	<i>Max</i>	<i>M</i>	<i>SD</i>
Writing Ability	Second Year	125	13	45	31.89	7.631
	Third Year	106	14	47	37.52	5.612
	Fourth Year	137	15	46	38.47	5.407
	Fifth Year	126	19	48	37.71	4.941

As described in Table 11, the mean score of fourth year students was the highest ($M = 38.47$) in the writing ability of students. And it can also be observed that the mean scores of third year and fifth year students was almost equal. But second year students' writing ability scores were the lowest ($M = 31.89$). It can be assumed that fourth year students have good English writing ability as most of fourth year students are proficient in English among the selected undergraduate students. Visual presentation was illustrated in Figure 7.

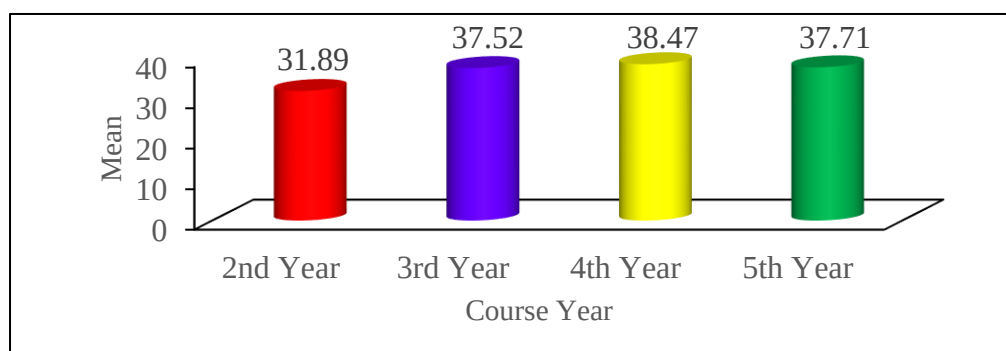


Figure 7. Graphic presentation of students' writing ability by course year

Then One-Way Analysis of Variance (ANOVA) was computed to find out whether there was a significant difference in writing ability of students from different years or not. The results of the analysis are presented in Table 12.

Table 12 ANOVA Results of Writing Ability of Students by Course Year

Variable		Sum of Squares	df	Mean Square	F	p
Writing Ability	Between groups	3484.632	3	1161.544	32.422	.000***
	Within groups	17554.769	490	35.826		
	Total	21039.401	493			

Note. ***The mean difference is significant at the 0.001 level.

Writing ability of students was found statistically significant difference by course year and Post Hoc Test (Tukey HSD) multiple comparisons procedure was applied (see Table 13).

Table 13 Results of Post Hoc Test (Tukey HSD) Multiple Comparisons of Writing Ability of Students by Course Year

Variable	Course Year (I)	Course Year (J)	MD (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Writing Ability	Second Year	Third Year	-5.631	.790	.000*	-7.67	-3.59
		Fourth Year	-6.586	.740	.000*	-8.49	-4.68
		Fifth Year	-5.826	.756	.000*	-7.77	-3.88

Note. ***The mean difference is significant at the 0.05 level.

As the Pos Hoc Test (Tukey HSD) results, there was a significant difference between second year students and third year students, between second year and fourth year students and between second year and fifth year students in writing ability at the 0.05 level. It can be assumed that second year students are the junior students in university level and they started getting in touch with different kinds of English text.

Findings for the Correlation Between Students' Reading Habits and Writing Ability

The correlation between reading habits and writing ability of students was investigated using Spearman rho correlation. The results are shown in Table 14.

Table 14 Correlation Between Students' Reading Habits and Writing Ability

		Reading Habits	Writing Ability
Reading Habits	Spearman's rho correlation	1	.241***
	Sig. (2-tailed)		< .001
	n	494	494
Writing Ability	Spearman's rho correlation	.241***	1
	Sig. (2-tailed)	< .001	
	n	494	494

Note. ***Correlation coefficient is significant at the 0.001 level (2-tailed).

As shown in Table 14, there was a significant, weak and positive correlation between reading habits and writing ability of undergraduate students ($r_s = .241$, $p < .001$). It can be assumed that the reading habits have a positive effect on the writing ability of students.

Conclusion

Discussion

The first research question was “How are the reading habits and writing ability of English of undergraduate students in UDNR?”

According to the result of descriptive statistics of levels of reading habits, most students in UDNR have the moderate level (67%) of reading habits and only few students possess high (16%) and low (17%) levels of reading habits. It can be said that two-thirds of undergraduate students in UDNR have good English reading habits. The proficiency of language skills of undergraduate students, especially their reading skill, would be at the intermediate level and they would be able to use English efficiently for both academic and professional purposes.

With regard to the result of mean comparison of each indicator of reading habits, it can be concurred that undergraduate students in UDNR are motivated by teachers and teachers took care about the learning of students as they are prospective teachers and they would apply their knowledge in their teaching profession. However, most of students seem to do online reading rather than books, and reading frequency of students is low as there are many cocurricular activities for students to do in their daily lives.

Be in harmony with the descriptive statistics of students' writing ability, the percentage of students who have high level of writing ability was 16%, for moderate level was 67% and for low level was 17%. It can be supposed that two-thirds of students in UDNR are proficient in English writing as they are well-trained and practiced in English writing. Moreover, English language competition is always held to improve the language proficiency of students.

The second research question was “Are there any significant differences in English reading habits of students by gender?”

In accordance with the independent samples *t*-test results, there were no significant differences in reading habits of students by gender. Therefore, it can be concluded that both male and female students almost equally have good habits in English reading. All students have the same effort in language learning, especially in reading, as English is the instructional medium at the university level. Moreover, it may be convinced that most of the undergraduate students in UDNR are interested in language learning and fond of reading.

The third research question was “Are there any significant differences in English reading habits of students by course year?” According to One Way ANOVA analyses results, there were statistically significant differences between fourth year students and other students (second year, third year and fifth year students) at the 0.05 level. It can be deduced that fourth year students have good attitude toward English reading and they frequently read many kinds of books written in English as they are well-trained and get enough practice in reading. They are also motivated by teachers and educators and also supported by families as they are expected to be proficient in language acquisition. However, most of fifth year students started a preparation for their profession and challenges that they can face after graduating. Then, second year students

have just started their university lives and initiated their reading habits. As third year students have just selected their specialized subjects, their interest was higher only in their specialized subjects.

The fourth research question was “Are there any significant differences in English writing ability of students by gender?”

In accordance with the independent samples *t*-test result, there was a significant difference in writing ability of students by gender at the 0.05 level. It can be supposed that female students have greater effort in productive skills, especially in writing as they perform better in language acquisition. Although both male and female students have the same proficiency level of reading, most of the male students are hesitant in producing and sharing information they had even known. Unlike male students, female students prefer sharing information and have efficiency in demonstrating what they know and also what they want to. Moreover, female students are more accurate and intelligent in learning grammar and vocabularies as well as mechanics. On the other hand, male students can interpret the theme of the paragraph but female students can organize the sequence of the paragraphs well and also the content. Therefore, it may be said that female students are proficient in English writing ability.

Next, the fifth research question was “Are there any significant differences in English writing ability of students by course year?”

According to ANOVA analysis of writing ability of students by course year, there were significant differences between second year students and third year students, between second year students and fourth year students, and also between second year students and fifth year students at the level of 0.05. But there were no significant differences in writing ability among third year, fourth year and fifth year students. It may be said that third year, fourth year and fifth year students are proficient in English as they are well-trained and also get enough practice in language learning. As writing is a way to develop individual perspective in written form, second year students are too young to communicate with others in a written way and also to express their opinions, thoughts and feelings. Moreover, in writing descriptive text, they might encounter some difficulties such as punctuation, sentence structures, grammar constructions and so on, but other senior students are familiar with different types of texts and have enough practice to overcome such difficulties and have experience because of the English competition.

Finally, the sixth research question was “Is there any relationship between reading habits and writing ability of undergraduate students in UDNR?”

According to the Spearman rho correlation coefficient results between reading habits and writing ability of students in UDNR, it can be concluded that students' reading habits positively and significantly correlate with writing ability ($r_s = .241$), and thus reading habits become one of the factors in developing language skills. In interpretation of the findings, it may be concluded that reading habits influence the writing ability of students and students who have good reading habits are proficient in English writing. This result of the study is also supported by Aprilia (2021) who found that there was a very low positive correlation between students' reading habits and their writing ability.

Suggestions

For Teachers- They should motivate students to read, create comfortable environment for them to read and provide different kinds of books and texts, allow students to read non-academic books in their leisure time, need to recommend books that are consistent with students according to their age group in order to get knowledge and apply in their practical lives. Reading frequency of students should be checked to perceive whether students have good reading habits or not. They also have to correct the misbehavior of students while reading and instill positive attitude toward reading.

For Students- They should learn how to improve their reading habits and they need to perceive the importance of reading habits to their writing skills as well as their critical thinking skills. Then they should also be aware that writing is not an easy skill and try to learn to develop their writing ability in various ways so that their language learning will be efficient and effective.

Recommendations

Based on the results of this study, the following recommendations for further studies were made:

1. Although this research is limited to undergraduate students in UDNR only, further studies may be conducted in all specialized subject groups from different universities in all educational regions.
2. With regard to the present study, six indicators were used to explore the reading habits of students, so more concrete and relevant indicators or dimensions of reading habits including interview questions and coping with second language learners should be applied.
3. In order to conduct a study about reading habits, libraries are recommended to be at par with international standard and also provided with updated and modern books.
4. In testing the writing ability of students, the study is limited to descriptive text only. Hence, different types of texts should be allowed to write in the paragraph level. Furthermore, various grammar patterns and structures should be used in sentence level, so that students' writing ability could be evaluated that in what kinds of text and to what extent students are proficient in.
5. As the data obtained in the study were self-reported data and analyzed with quantitative method, more studies using both quantitative and qualitative method (mixed method) should be carried out so as to study the reading habits of students.

Conclusion

The study was conducted to explore students' reading habits, writing ability and investigate the correlation between these two variables of undergraduate students in UDNR by using simple random sampling technique. In addition, the study found out the gender differences and course year differences in reading habits and writing ability of students.

The result of the study revealed that the reading habits of undergraduate students in UDNR were positively correlated with their writing ability. The results and findings of the study were consistent with Aprilia (2021) that there was a very low significant correlation between reading habits and writing ability. The results of the study also pointed out that the correlation between students' reading habits and their writing ability is very low. It can be concluded that students' writing ability can be influenced by the texts they have read as there are different types

of genres in writing and also generic structure in writing descriptive text. Moreover, students have to apply knowledge, vocabularies and grammar patterns they have learned while they're reading. Students need to realize the importance of reading habits in promoting their writing ability.

Although language acquisition seems to be difficult, the students will be able to learn it easily with the help of good habits. Habits help the students to become effective and efficient language learners. If students keep reading English books, magazines, novels or stories, it will help their writing skills. By frequently reading English books, students become notice grammar patterns, sentence structures and organization of text, different types of text and enrich vocabularies and mechanics as well as uses of English language. As students usually get ideas, information and experience from reading activity, reading habits are regarded as the most influential factor in writing. That's why most of good readers become good writers.

Acknowledgement

First of all, we would like to express our special thanks to our parents and all teachers in our life. We would like to express our respectful thanks to U Aung Thaik Tun (Rector, University for the Development of the National Races of the Union- UDNR), Dr. Moe Moe (Pro-Rector, Academic, UDNR), Daw Nant Rosalin (Retired Professor, Head of Department of Methodology, UDNR), Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Saging University of Education, SUOE), Daw Tin Myo Latt (Lecturer, Department of Methodology) for their guidance and good will in assessing our research study and invaluable comments and suggestions.

References

- Aprilia, A. (2021). *The correlation between students' reading habit and their ability of writing narrative text* (Bachelor's thesis, State Institute for Islamic Studies (IAIN) Bengkulu, Indonesia). Retrieved from <http://repository.iainbengkulu.ac.id/7266/1/SKRIPSI%20ANITA%20APRILIA%20BAB%2015%20TERBARU.pdf>
- Fitri, N. (2020). *Factors influencing good English reading habit (An investigation of EFL students' perception)* (Bachelor's thesis, Universitas Islam Negeri Ar Raniry, Banda Aceh). Retrieved from <https://repository.arraniry.ac.id/id/eprint/13184/1/Nurul%20Fitri,%20150203060,%20PBI,%20FTK,%20085213902724.pdf>
- Hidayati, I. L. (2021). *A study on students' reading habit at state senior high school 6 Pekanbaru* (Bachelor's thesis, State Islamic University of Sultan Syarif Kasim Riau, Pekanbaru, Indonesia). Retrieved from <https://repository.uinsuska.ac.id/50843/2/TESES%20IKA%20LISNA%20HIDAYATI.pdf>
- Khalifa, R. M. (2016). *The effectiveness of using think-pair-share strategy on developing eleventh graders' writing skills in Rafah governmental schools* (Master's thesis, Al-Azhar University-Gaza, Gaza, State of Palestine). Retrieved from <https://www.alazhar.edu.ps/arabic/He/files/20120391.pdf>
- Khalisa, N. (2018). *The correlation between students' reading habit and their writing ability* (Bachelor's thesis, Ar-Raniry State Islamic University, Darussalam, Dhaka, Banda Aceh). Retrieved from <https://repository.ar-raniry.ac.id/id/eprint/6565/1/Nurul%20Khalisa.pdf>
- Krashen, S. D. (2004). *The power of reading: Insight from the research* (2nd ed.). Portsmouth, NH: Heineman. Retrieved from http://www.sdkrashen.com/content/books/the_power_of_reading.pdf
- Lianingsari. (2022). *The correlation between reading interest and writing ability of the year eleventh students of senior high school in Madrasah Aliyah (MA) Bustanul Ulum Bulugading Jember* (Bachelor's thesis, University Islam Negeri, Kiai Haji Achmad Siddiq Jember, Indonesia). Retrieved from <http://digilib.uinkhas.ac.id/14974/1/SKRIPSI%20LIANINGSARI%20WATERMARK.pdf>
- Linuwih, E. R., & Winardi, Y. K. (2020). *The influence of reading habit on students' writing skill*. *Anglo-Saxon: Jurnal Ilmiah Program Studi Pendidikan Bahasa Inggris*, 11(1), 37-47. Retrieved from www.jurnal.unrika.ac.id

[Ministry of Education. \(2016\). National education strategic plan 2016-21 summary.](#)

- Muawanah, S. (2014). *The relationship between students' reading habit and their reading comprehension* (Bachelor's thesis, Syarif Hidayatillah Jakarta State Islamic University, Banten, Indonesia). Retrieved from <https://repository.uinjkt.ac.id/dspace/bitstream/123456789/32720/1/samrotul%20muawanah%20watermark.pdf>
- Nunan, D. (2003). *Practical English language teaching* (1st ed.). NY10020, New York: McGraw-Hill. Retrieved from file:///C:/Users/Admin/Desktop/searching%20topics/Practical_English_Language_Teaching_pdf.pdf
- Pallant, J. (2011). *SPSS survival manual: A step by step guide to data analysis using the SPSS program* (4th ed.). Berkshire, UK: Allen & Unwin.
- Sangkaeo, S. (1999, August 20-28). *Reading habit promotion in ASEAN libraries. Paper presented at the 65th IFLA Council and General Conference*, Bangkok, Thailand. Retrieved from <https://origin-archive.ifla.org/IV/ifla65/papers/091-114e.htm>

THE EFFECTIVENESS OF PROJECT-BASED LEARNING IN TEACHING BIOLOGY AT HIGH SCHOOL LEVEL

May Thet Soe¹ and Tin Myo Latt ²

Abstract

The main purpose of the study was to investigate the effectiveness of project-based learning in teaching biology at Basic Education High School Level. An experiment was conducted with 70 Grade 10 students from No. 1 Basic Education High School, Amarapura and 69 Grade 10 students from No. 2 Basic Education High School, Amarapura of 2023-2024 Academic Year. In this study, one of the Quasi-Experimental Designs, “Nonequivalent Control Group Design” was used. Students are divided into two groups: experimental and control groups. Experimental groups were provided with project-based learning and control groups were provided with ITPR procedure. Pretest, posttest and survey questionnaire are used as instrumentations. Pretest was conducted to know the basic biological knowledge between control groups and experimental groups. According to the result of pretest mean scores, it was found that there was a significant difference between control and experimental groups in both selected schools. Therefore, posttest mean scores were analyzed by using analysis of covariance (ANCOVA) to determine whether there are significant differences between experimental groups and control groups according to the Bloom’s taxonomy of cognitive domain. The result of posttest mean scores indicated that there were no significant differences between experimental group and control group in terms of remembering level. However, there were significant differences between two groups in terms of understanding, applying, analyzing and evaluating levels and overall biology achievement scores. Moreover, to interpret students’ attitude towards project-based learning, questionnaire was used. According to the students’ responses of questionnaire, students had positive attitude towards project-based learning. The study suggested that project-based learning is exactly a harmonious teaching method for hands-on biology activities.

Keywords: project-based learning, biology, biology achievement

Introduction

The world today is rapidly and continuously changing in every field and every phase. In this dramatic changing world, education is no exception. As children grow up in an increasing technological and scientific world, they all desire learning by practice rather than transforming theory and information. As a result, teaching methodology plays an important part and every biology teacher should try to meet methodology that can affect positively in biology teaching. Teachers should choose the correct methods and techniques in optimizing students’ participation in the class for a more meaningful learning process by realizing the importance of Biology. Therefore, a sense of innovation is needed in the teaching and learning of Biology to increase the quality of education.

Now, Myanmar government is doing education reforms by implementing long-term and short-term plans including a new National Education Strategic Plan (NESP) during the period 2016-2021 with the vision of creating an education system that will generate a learning society capable of facing the challenges of the Knowledge Age (Wint Zaw Htet, 2020). Therefore, teachers in Myanmar should try to meet the latest, modest teaching methods in order to catch the aims of new curriculum. Various teaching strategies can be applied to get the needs of 21st century skills and all-round development of students.

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Project-based learning is more relevant to students and increases students' motivation and interest to complete the task. Moreover, project-based learning is more effective in a wide variety of subject area including mathematics, science, economics and history (Bender, 2012). This study therefore investigated the effectiveness of project-based learning in teaching Biology at high school level.

Statement of the Problem

The new basic education curriculum should have greater focus on learning concepts, problem-solving processes and understanding of basic principles and reasons behind the knowledge (NESP, Ministry of Education, 2016). However, many teachers still used lecture method and it can lead to minimize students' creation, critical thinking, problem solving and reasoning. Besides, students emphasized rote-learning because of exam-oriented system. According to the updated curriculum reform, the importance of teaching and learning at school is increasing, likewise in biology teaching. Biology is a scientific and practical subject. The subject matter can be effective only if students can learn practically rather than deliver information. Therefore, hands-on, creative and innovative teaching methods are needed to increase with good acceleration. Project-based learning can be the solution to this problem because it emphasizes learning by doing and decreases rote learning.

Purpose of the Study

The aim of this study is to investigate the effectiveness of project-based learning in teaching biology at high school level. The specific objectives are as follows:

1. To compare the biology achievement between students who are taught by project-based learning and those who are taught by ITPR procedure
2. To compare the biology achievement between students who are taught by project-based learning and those who are taught by ITPR procedure in terms of cognitive level
3. To offer related discussion and recommendations for improving biology teaching and learning based on result of the study

Research Questions

1. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure?
2. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure in terms of remembering level of learning?
3. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure in terms of understanding level of learning?
4. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure in terms of applying level of learning?
5. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure in terms of analyzing level of learning?

6. Is there any significant difference between biology achievement of the students who are taught by project-based learning and those who are taught by ITPR procedure in terms of evaluating level of learning?
7. What kind of attitude do the students develop towards project-based learning?

Definition of Key Terms

Definition of key terms are presented as follows:

Project- Project is a piece of work involving careful study of a subject over a period of time, done by school or college students (Hornby, 2010)

Project-Based Learning- Project-based learning can be defined as an in-depth learning focusing on real-world problems and challenges that engages students who work as a team through meaningful activities resulting in an end product (Simpson, 2011)

Biology-Biology is the scientific study of the life and structure of plants and animals (Hornby, 2010)

Biology achievement-Biology performance of students as measured by the grades taken from the Biology Achievement Test (BAT) used in the study (Ozkan, 2003)

Scope of the Study

The following points are the scope of the study;

1. This study is geographically restricted to B.E.H.S 1 and B.E.H.S 2 in Amarapura Township in Mandalay Region.
2. Participants in the research are Grade-10 biology students from the selected high schools in (2023-2024) Academic Year.
3. The topic for the study is “Chapter 5 Continuation of Life: Reproduction in Fungi and Plants” in Grade10 Biology Textbook.

Significance of the Study

Since the current national curriculum and national education plan places a strong emphasis on lifelong learning, learner-centered approaches and communicative competence should be used in the meaningful way. It is vital to investigate a change in the way that biology is taught and how students can learn biology more effectively. Teachers today are under incredible pressure to cover all of the content standards in the curriculum and increase students’ achievement, and they wonder how project-based learning fits into that imperative (Bender, 2012). Thus, this study attempts to introduce project-based learning as a teaching method. The results of the study will provide valuable contributions in the field of education. Hopefully, the result will also provide an insight into the nature of project-based learning and other relevant teaching techniques that can enhance students’ achievement in teaching biology. This study sets an aim to inform teachers, especially biology teachers, the ways and means of project-based learning. And then, for students, they will attain communication and collaboration skills by learning and doing together, creative thinking skills by sharing and caring one another. To sum up, this study expects to be a little support in moving effective biology teaching.

Review of Related Literature

Importance of Biology

There are numerous indications of the importance of biology. Biology is primarily concerned with studying life. In addition, it offers a thorough scientific explanation of how all

living and nonliving things interact with one another. Their structures and functions are associated with one another in their respective environments (Ministry of Education [MOE], 2019). Over the nineteenth centuries, biological sciences such as botany and zoology became increasingly professional scientific disciplines (LibreTexts, 2023). Biological knowledge contributes to agriculture, diet, health and hygiene. Biology, therefore, can play an important role and essential part for all human's existence, convenience and achieving socio-cultural change.

Effective Teaching Methods in Teaching Biology

Biology is a process of ordering and classifying, of formulations, explanations and hypothesis through experiments. To learn science is to do science. For teaching of biology, an appropriate method is needed. Teaching of biology gains significant importance. Some methods are more of teacher centered and some are more of student centered. It is up to a teacher's discretion to choose the method which is most suitable for a certain topic in a certain class (Rajan, 2012). Therefore, in choosing teaching method, teacher has a chance to choose any of the method of teaching according to his knowledge, interest, experience and selecting content area. Rather than using a single method for all topics, using the combination of methods can be more effective. The purpose of learner-centered approach is to develop the learner's skills and abilities in independent way. Examples of effective learner-centered teaching methods in biology are laboratory method, concept mapping, problem solving method, project method and discovery learning. Among them, project-based learning integrates knowing and doing. Students can not only learn knowledge but also apply what they know to solve authentic problems. Thus, it can be effective teaching method in teaching biology.

Project-Based Learning (PBL)

The project-based learning (PBL) has been part of the educational practice approximately at the beginning of the 1980s and it was greatly influenced by the communicative approach. Project-based learning was first introduced by John Dewey at the end of 1890.

Project-based learning may be defined as using authentic, real-world projects, based on highly motivating and engaging question, task, or problem, to teach students academic content in the context of working cooperatively to solve the problems. Project-based learning increases motivation to learn, teamwork, and collaborative skills, it is now recommended as a 21st century teaching technique (Cole & Wasburn-Moses, 2010, cited in Bender, 2012).

Project-based learning highlights giving students concrete experiences in order to fulfill the objectives of a lesson. It includes integrated skills, and point toward authentic, real-world purposes. It emphasizes the psychomotor aspects of learning by involving physical action. Through action, students are drawn into a utilization of multiple skills (Brown & Lee, 2015, p-50). Actually, project-based learning is a learner-centered instruction and increase student's autonomy, investigation, collaboration, communication and reflection.

Theoretical Framework of Project-Based Learning

Project-based Learning (PBL) is one of the constructivist teaching strategies and is getting more and more common in science education (Frank & Barzilai, 2004, cited in Kızıkan & Bektaş, 2017).

From a constructivist perspective, learning is an individual process. Learners constructs new ideas by linking experience what already knows. A fundamental assumption of

constructivism is that learners interact with the physical and/or social environment and learn new things. Thus, constructivism extends the theory of project-based learning. Especially, Piaget's and Vygotsky's constructivist theories equivalent to learning theory of PBL.

Piaget constructivism is concerned with knowledge that focuses on the individual and psychological sources of learning. Piaget views learning as the process of exploration and discovery; experience influences thinking and thinking in its turn influences knowledge. Piaget further refers to four stages of cognitive development that all humans go through: The sensorimotor stage, the pre-operational stage, the concrete operational stage, and the formal operational stage.

In fact, a child's development is influenced by social and culture directly or indirectly. Vygotsky, while seeing a role for maturation, believed that it was children's interaction with others that most strongly influenced the levels of conceptual understanding they could reach (Vygotsky, 1978, cited in Muijs & Reynolds, 2011). In determining a child's overall development level, it should be considered two aspects of development levels. The first is the actual level and the second is the potential level. Vygotsky noticed and named the distinction between these two levels as zone of proximal development (ZPD). Vygotsky (1930) defined zone of proximal development (ZPD) as the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers.

Constructivism suggested how learners can construct new knowledge and concept based on the experience of oneself or help of others. Moreover, it is based on an action and hands-on learning experience while dealing with real-world problem. Therefore, project-based learning (PBL) is very much related with this conception.

Characteristics of Project-based Learning

According to Thomas (2000), PBL has five key characteristics as follow.

- **Projects related to the curriculum.** The target contents through the projects that students are taught had a link to the curriculum.
- **A driving question related to target content.** Questions, problems or topics must "drive" or lead to the target contents.
- **Constructive investigation.** Projects must allow students to investigate the topic to build up new knowledge or skills related to the target content through inquiry, planning, exploring, decision-making, problem-solving, and reporting the findings.
- **Autonomy.** PBL projects should allow considerable amount of time for students to work on their own. Students are responsible for completing their projects under the supervision of their teacher. They have a chance to decide on their own and create a new one.
- **Real-life application.** Topics, tasks, products or performances that the students are assigned to make a project should encounter or use in real life situations.

Phases of Project-Based Learning

These well-designed phases are originally based on Stoller's ten-step PBL framework and adapted by Kalabzova in 2015. Project work is divided into four major phases which are: preparation phase, realization phase, presentation phase and finally evaluation phase.

(a) Preparation Phase

The preparation phase is gradually recorded into a logical framework form and covers: selecting the purpose, determination of the educational aims, selecting the final product, creating a general structure and timeline, forming teams and producing the final written framework. Teachers should launch the project with an “entry event” that arouses students’ interest and initiates their questioning. Learners form teams into heterogenous groups. Students had the autonomy to select the topic and students should be allowed the “Voice and Choice” in products depending on student’s interest, style of learning, experience or creativity.

(b) Realization Phase

This phase covers stages of launching project work; planning and realizing concrete activities along with project finishing. It consists of: information gathering cycle and information processing cycle. In information gathering cycle, teachers prepare and carefully scaffold various tasks to promote students understanding of the content material along with the progress of critical thinking skills. In information processing cycle, students practice how to categorize, make comparison, identify, analyze, organize and compile the useful information for completion of the project.

(c) Presentation Phase

Students present the final outcome on the bases of initial decisions and standards. Stoller describes this stage as Information reporting cycle, where teachers create activities helping students successfully present the final project outcomes. In this phase, students finalize or present tangible outcome and teacher prepares students for the strategy demands of finalizing and presenting tangible outcome.

(d) Evaluation Phase

PBL assessment does not concern only the final product, in fact, students are assessed throughout the process of PBL, which stresses formative assessment and accepts the necessity of final summative assessment. Formative assessment is generally desired for giving feedback throughout the process of creating projects, while summative assessment provides students with the overall degree of their performance at the end of the course (Markham et al., 2003, cited in Simpson, 2011).

Research Method

Design of the Study

In this study, it was not possible to assign individual participants to group randomly. Quasi-experimental design can be used when it is not feasible to use a true-experimental design (Mills & Gay, 2019).

Table 1 Experimental Design

Group	No. of Students		Pretest	Treatment	Posttest
	BEHS 1	BEHS 2			
Experimental	36	33	T 1	Project-based learning	T2
Control	34	36	T 1	ITPR method	T2

Note. T1= Biology Knowledge Test, T2= Biology Achievement Test

Both groups were randomly assigned and administered by a pretest at the beginning of the study. After that the experimental groups were taught with project-based learning and control groups were taught with conventional method of teaching in both selected schools. After being taught, all groups received a posttest. According to this procedure, this design is a nonequivalent control group design.

Population and Sample Size

This study was geographically restricted to Amarapura Township, Mandalay Region. The required sample schools were randomly selected. The sample schools were BEHS 1, Amarapura and BEHS 2, Amarapura. At BEHS 1, (70) students were selected from the population of (108) Grade 10 students in (2023-2024) Academic Year. In the same way, (69) students were selected from the population of (83) Grade 10 students at BEHS 2, Amarapura (See Table2).

Table 2 Population and Sample Size

Sample of School	Number of Population	Sample Size
BEHS 1, Amarapura	108	70
BEHS 2, Amarapura	83	69
Total	191	139

Instruments

Three instruments: (1) a pretest and its marking scheme, (2) a posttest and its marking scheme and (3) questionnaire to measure the effectiveness of project-based learning were used in this study. In pretest, 1 mark each for (15) items of True/False, 1 mark each for (15) items of multiple choice, 1 mark each for (10) items of selecting picture and 2 marks each for (5) items of short questions are included. In posttest, questions are constructed based on five levels of Bloom's taxonomy of cognitive domain, namely, remember, understand, apply, analyze, and evaluate. The posttest questions consist of 1 mark each for (10) items of True/False, 1 mark each for (10) items of multiple choice, 1 mark each for (10) items of completion items, 2 marks each for (4) items of short questions and 4 marks each for (3) items of short questions. The allocated time was 1:30 hours and given marks were 50marks for both pretest and posttest. The content area was restricted in Chapter 5, Reproduction in Fungi and Plants from the Grade 10 biology textbook. Questionnaire for students' attitude towards project-based learning was developed by Taha (2021). In this questionnaire, ten items included and five-point Likert-scale was used. The students rated their response by assigning 1 to strongly disagree, 2 to disagree, 3 to undecided, 4 to agree and 5 to strongly agree.

Procedure

For gathering the essential concept of this research, the related literature was accumulated. The lesson plans for the experimental groups and control groups were prepared. Pretest and posttest were constructed. Content validity was determined by expert judgment. The pilot study was conducted with a sample of 20 students from Practicing High School, UDNR. After that Grade-10students from No.1 Basic Education High School, Amarapura and Grade 10 students from No.2 Basic Education High School, Amarapura were selected. In each school, students are divided into experimental and control groups. All students are provided pretest. Then, experimental groups were provided with project-based learning and control groups were

provided with ITPR procedure. The treatment is conducted in November, 2023 and last one month. The collected data was computed by using SPSS and interpreted the result.

Data Analysis

The data were analyzed by using inferential statistics such as independent samples *t* test and analysis of covariance, ANCOVA to determine whether there were significant differences between the experimental and control groups. And then, to examine the attitude towards project-based learning, descriptive statistics was used.

Research Findings

Findings of Students' Basic Biology Knowledge on the Pretest

First of all, the pretest for both experimental and control groups was tested to examine whether or not the equivalency on their basic biology knowledge between two groups before treatment period. Pretest scores were analyzed by using independent samples *t* test. The result can be seen in Table 3 and Figure 1.

Table 3 The Results of *t* test on the Pretest Scores

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>p</i>
BEHS 1	Experimental	36	37.36	4.09	8.62	6.870	.000***
	Control	34	28.74	6.15			
BEHS 2	Experimental	33	31.03	4.76	3.47	2.608	.011*
	Control	36	27.56	6.15			

Note. BEHS 1= No.1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

* $p < .05$. *** $p < .001$.

The result revealed that there were significant differences between experimental group and control group in both selected schools. Therefore, it can be interpreted that there was imbalance biological knowledge between two groups of both selected schools. Therefore, pretest scores should be considered as a covariate in analyzing the posttest score. So, the posttest scores were analyzed by using analysis of covariance, ANCOVA. Graphic presentation is illustrated in Figure1.

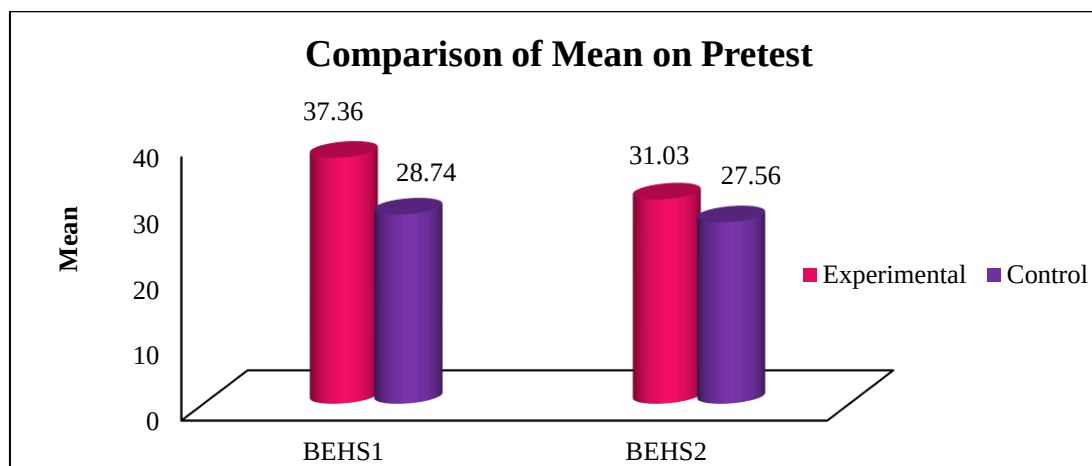


Figure 1. The comparison of means for students' basic biology knowledge on the pretest.

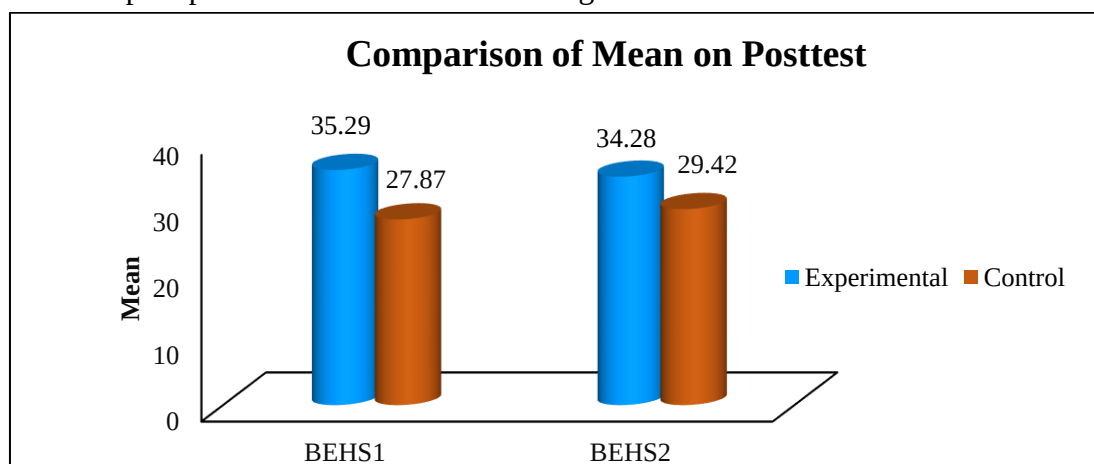
Findings of Students' Overall Biology Achievement on the Posttest**Table 4 The Results of Analysis of Covariance on the Posttest Scores**

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	35.99	35.29	4.91	7.42	30.695	.000***
	Control	34	27.13	27.87	3.63			
BEHS 2	Experimental	33	34.64	34.28	4.36	4.86	12.432	.001***
	Control	36	29.10	29.42	6.39			

Note. BEHS 1= No.1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

*** $p \leq .001$.

In consideration of the mean scores of two groups in each selected school, the mean scores of experimental groups were higher than those of control groups. Therefore, it can be concluded that there were significant differences between experimental and control groups in each selected school. The result highlighted that the use of project-based learning was more effective on the overall achievement of biology students in selected schools at cognitive level than ITPR procedure. Graphic presentation is illustrated in Figure2.

**Figure 2.** The comparison of means for posttest scores**Comparison of Achievement Scores at Remembering Level****Table 5 The Results of Analysis of Covariance on the Remembering Level Scores**

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	6.61	6.65	1.46	0.63	1.992	.163 (ns)
	Control	34	6.06	6.02	1.35			
BEHS 2	Experimental	33	7.42	7.34	1.20	-	3.288	.074 (ns)
	Control	36	7.78	7.85	1.07			

Note. BEHS 1= No.1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

ns = not significant.

The result indicated that there were no significant differences between experimental and control groups in each selected school in answering remembering level questions. Thus, it can

draw on conclusion that the both methods had equal ability in memory retention, rote learning and repetition of the lessons learned by students. Graphic presentation is illustrated in Figure3.

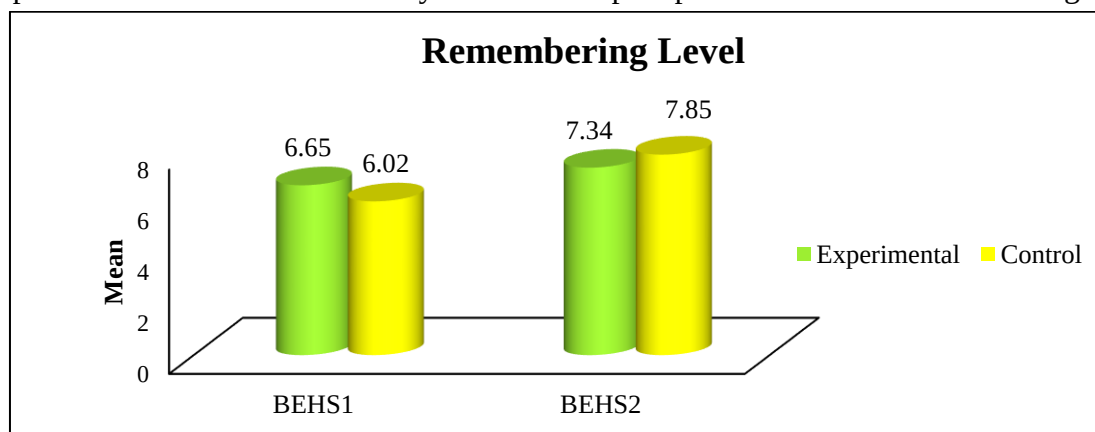


Figure 3. The comparison of means for students' biology achievement at remembering level.

Comparison of Achievement Scores at Understanding Level

Table 6 The Results of Analysis of Covariance on the Understanding Level Scores

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	9.17	8.95	1.86	1.33	6.900	.011*
	Control	34	7.38	7.62	1.35			
BEHS 2	Experimental	33	8.67	8.67	1.41	1.17	5.937	.018*
	Control	36	7.50	7.50	2.24			

Note. BEHS 1= No.1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

* $p < .05$.

The result showed that there were significant differences between experimental and control groups in each selected school in answering understanding level questions. This meant that teaching with project-based learning was more effective in explaining, relating and generalizing the biological knowledge than teaching with ITPR procedure in the subject of biology. Graphic presentation is illustrated in Figure 4.

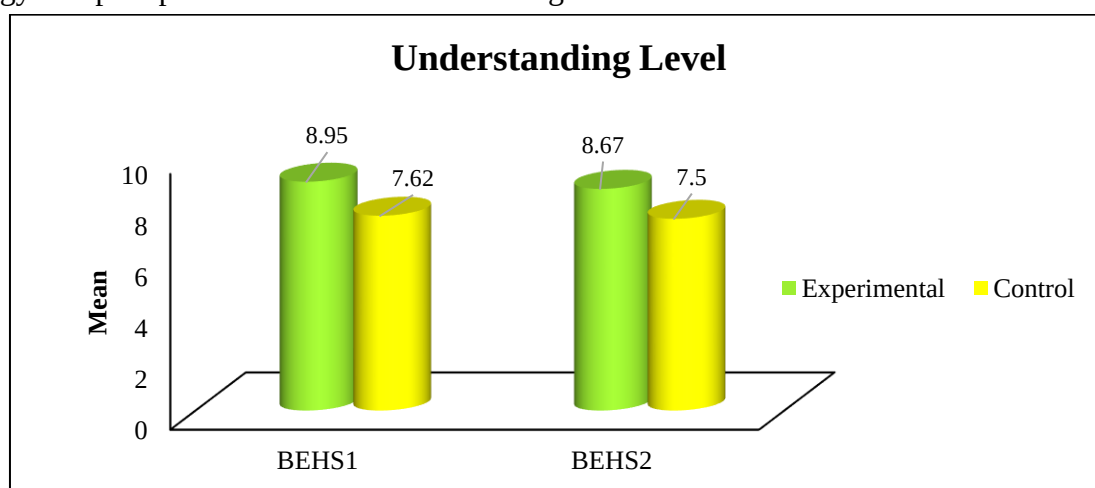


Figure 4. The comparison of means for students' biology achievement at understanding level.

Comparison of Achievement Scores at Applying Level**Table 7 The Results of Analysis of Covariance on the Applying Level Scores**

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	6.82	6.73	1.72	2.33	26.633	.000***
	Control	34	4.31	4.40	1.05			
BEHS 2	Experimental	33	5.79	5.65	1.71	1.13	7.615	.007**
	Control	36	4.39	4.52	1.63			

Note. BEHS 1= No.1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

** $p < .01$. *** $p < .001$.

The result showed that there were significant differences between experimental and control groups in each selected school in answering applying level questions. Thus, it can be clearly interpreted that teaching with project-based learning can enhance the students' ability of applying biological knowledge in new conditions by interpreting, sketching and implementing the concepts and ideas they learned. Graphic presentation is illustrated in Figure 5.

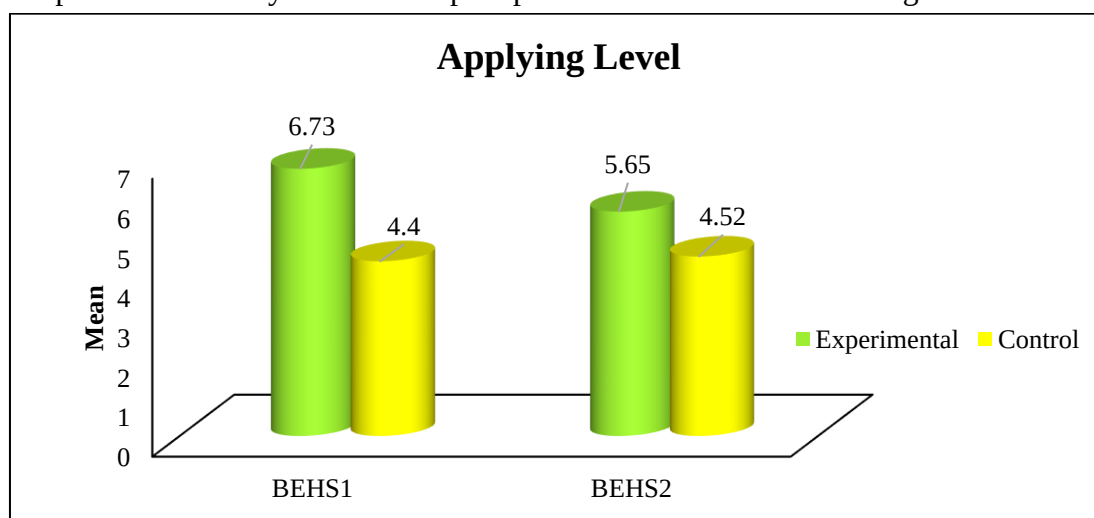


Figure 5. The comparison of means for students' biology achievement at applying level.

Comparison of Achievement Scores at Analyzing Level**Table 8 The Results of Analysis of Covariance on the Analyzing Level Scores**

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	9.19	8.96	1.15	1.76	21.047	.000***
	Control	34	6.96	7.20	1.35			
BEHS 2	Experimental	33	8.97	8.86	1.33	2.02	11.027	.001***
	Control	36	6.74	6.84	3.08			

Note. BEHS 1= No. 1 Basic Education High School, Amarapura, BEHS 2= No.2 Basic Education High School, Amarapura.

*** $p \leq .001$.

The result suggested that there were significant differences between experimental and control groups in each selected school in answering analyzing level questions. Thus, it can be inferred that teaching with project-based learning has positive effect in comparing and contrasting ideas, organizing relationship and connections of biological concepts. Graphic presentation is illustrated in Figure 6.

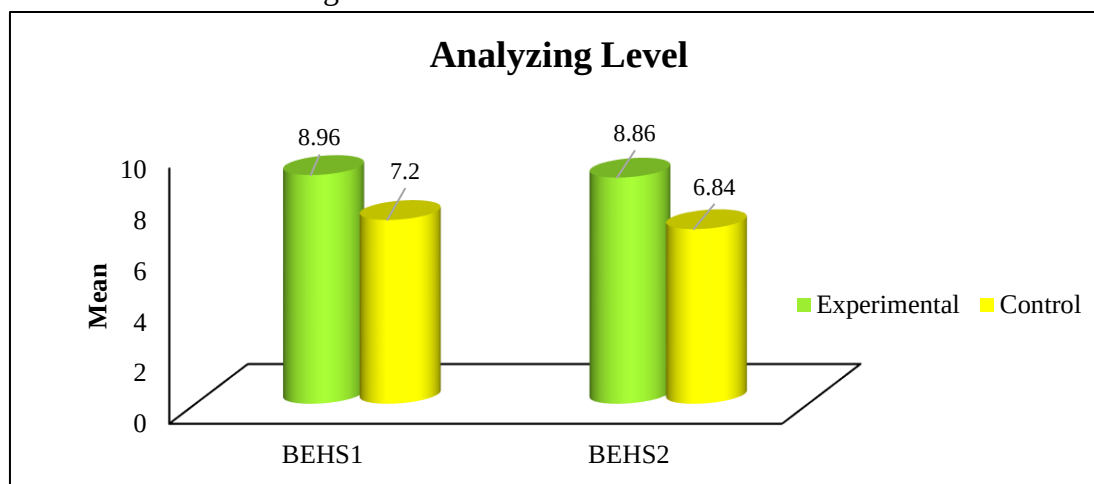


Figure 6. The comparison of means for students' biology achievement at analyzing level.

Comparison of Achievement Scores at Evaluating Level

Table 9 The Results of Analysis of Covariance on the Evaluating Level Scores

School	Group	<i>n</i>	Unadjusted Mean	Adjusted Mean	<i>SD</i>	<i>MD</i>	<i>F</i>	<i>p</i>
BEHS 1	Experimental	36	4.19	4.01	1.14	1.38	18.874	.000***
	Control	34	2.43	2.63	0.91			
BEHS 2	Experimental	33	3.79	3.76	0.74	1.04	24.173	.000***
	Control	36	2.69	2.72	0.92			

Note. BEHS 1= No. 1 Basic Education High School, Amarapura, BEHS 2= No. 2 Basic Education High School, Amarapura.

*** $p < .001$.

The result suggested that there were significant differences between experimental and control groups in each selected school in answering evaluating level questions. Thus, it can be inferred that teaching with project-based learning can improve students' evaluating skills by helping to judge and recommend the biological concepts. Graphic presentation is illustrated in Figure 7.

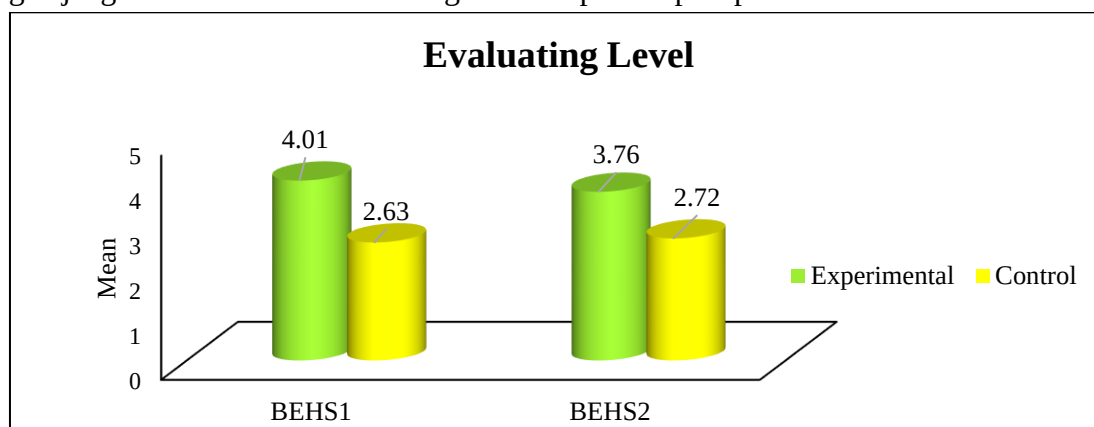


Figure 7. The comparison of means for students' biology achievement at evaluating level.

Results of Students' Attitude towards Project-based Learning

The data about students' attitude towards project-based learning activity was collected through attitude questionnaire. It included ten items and five-point Likert scale, strongly disagree, disagree, undecided, agree and strongly agree. The result was shown with percentage in Table 10.

Table 10 The Percentage of Students' Response on General View about Project-based Learning Activity

No.	Item	N	SDA	DA	UD	A	SA
			Percentage (%)				
1	Projects are more interesting than ITPR instruction.	68	-	-	-	36.8	63.2
2	I feel satisfied to learn biology with projects than textbook.	68	-	-	1.5	51.5	47
3	Projects help me understand biology concepts more.	68	-	1.5	1.5	51.5	45.5
4	Projects can increase my motivation to learn biology.	68	-	-	4.4	55.9	39.7
5	I prefer participating in biology projects to learning on my own way.	68	-	-	8.8	58.8	32.4
6	I wish to learn biology with more projects in later lessons.	68	-	-	13.3	44.1	42.6
7	I gain a lot of biological content knowledge from projects.	68	1.5	-	5.8	55.9	36.8
8	I can improve team spirit and interpersonal skills by participating in projects than by ITPR instruction.	68	-	-	25	32.4	42.6
9	I can reflect my progress in learning biology by participating in projects.	68	1.5	-	10.3	48.5	39.7
10	I think projects are one of the effective and efficient means to learn biology.	68	-	-	1.5	38.2	60.3

Note. SDA = Strongly Disagree, DA = Disagree, UD = Undecided, A = Agree, SA = Strongly Agree

The first item deals with projects are more interesting than ITPR instruction. In both selected schools, 36.8% of students agreed and majority of students (63.2%) strongly agreed to this item. It was found that students fully agreed this item among all items.

The eighth item deals with students can improve team spirit and interpersonal skills by participating in projects. In both selected schools, some students (32.4%) agreed and nearly half of students (42.6%) strongly agreed, but some others were undecided about (25%) to this item. It was found that students responded undecided most only in this item.

The seventh item deals with students gain a lot of biological content knowledge from projects. In both selected schools, over half of students (55.9%) agreed and some students

(36.8%) strongly agreed, but some others were undecided about (5.8%) and only (1.5%) strongly disagreed to this item.

The ninth item deals with students can reflect their progress in learning biology by participating in projects. In both selected schools, nearly half of students (48.5%) agreed and some students (39.7%) strongly agreed, but some others were undecided about (10.3%) and only (1.5%) strongly disagreed to this item. It was found that students strongly disagreed only in item seven and item nine.

Based on above findings, it could be interpreted that many biology students in both selected schools had positive attitude towards project-based learning.

Discussion

According to the experimental results, there were significant differences between the control and the experimental groups for the pretest in both schools. It can be interpreted that, there were imbalance biological knowledge between the students from experimental group and the control group in each school. In determining the posttest mean scores, the posttest mean score of the experimental groups was significantly higher than that of the control group in each school. Thus, it can be interpreted that the use of project-based learning is more effective than the use of ITPR procedure in the restricted content area of biology used in this study. Moreover, according to the indication of each level of Bloom's taxonomy, there were not significant differences in remembering level. As a result, it can be interpreted that both project-based learning and ITPR procedure have the ability to retain the students' memory equally. However, there were significant differences in understanding level. According to the results, it can be concluded that the use of project-based learning helps students to understand biology concepts and it can also develop students' rewriting and constructing meaning based on their meaningful understanding. Similarly, there were significant differences in applying level. It can be concluded that students can apply their valuable information and experience by participating in projects in real world situations. Similarly, there were significant differences in analyzing level. It can be concluded that project-based learning can bring the improvement of the students' ability to analyze the information into isolated pieces and to use them in new situations. Similarly, there were significant differences in evaluating level. It can be concluded that students may refer to the knowledge that they have learned to make thoughtful value decisions and may develop personal opinions and judgements when they are taught by project-based learning. Thus, all the findings pointed out that project-based learning had positive effect in developing students' ability to catch the biological concepts, to utilize in real life situation, to analyze and evaluate another condition. The finding is in line with the research conducted by Hermanto, Sarwi and Yusuf (2019). They discussed that project-based learning can improve students' cognitive skills.

Moreover, questionnaire was used to know students' attitude towards project-based learning. According to quantitative questionnaire survey, students responded that projects are more interesting than ITPR procedure in the opinion biology students. Students feel satisfied to learn biology with projects than textbook. Projects help students understand biology concepts more and increase their motivation to learn biology. Furthermore, students prefer participating in biology projects to learning on their own way and they wish to learn biology with more projects in later lessons. Students gain a lot of biological content knowledge from projects. Moreover,

they can improve team spirit and interpersonal skills by participating in projects. Students can reflect their progress in learning biology by participating in projects. Finally, students think projects are one of the effective and efficient means to learn biology. Based on the result findings, students had a positive attitude towards project-based learning and they had a preference to learn with project-based learning.

Suggestions

A single instructional strategy is not appropriate all the time. Project-based learning focuses on learning by doing. Thus, the choosing of topic should be based on doing hands-on experiments and activities. As project-based learning is a team work, teacher should assign heterogeneous groups. In grouping, small group setting is required for effectiveness. In implementing project-based learning, teacher should consider the available resources such as budget, students' abilities. Furthermore, time investment is needed for long-term experience and better result.

To promote 21st century skills, the teacher should support students to collaborate, to give respect each other, to define their responsibilities and to appreciate their collaborative effort. To promote higher order thinking, teacher need to stay actively engaged with their students, constantly pushing them to choose on their own interest content, collect data, analyze data, synthesize information, evaluate their project work and make decision clearly. Moreover, teacher should initiate Entry event with good driving questions to motivate students' interest. The recommendations for further researches were that the time spend should be allowed more. A large sample size in different State and Region and different grade levels should be carried out. Moreover, not only the whole biology content area but also other subject areas should be studied to claim the effectiveness of project-based learning. In addition, qualitative research method and mix method should be conducted.

Conclusion

Project-based learning had positive effect in teaching biology at high school level according to the results of finding. Moreover, students had a positive attitude towards project-based learning and they had a preference to learn with project-based learning. Project-based learning is a practical learning. Students learn on their own. They are provided autonomy from choosing topic to presenting the final product. They combine old and present experiences to form new concept. They use their new concepts in applying hands-on activity. As they develop their ideas and products, student team can review and critique on another team's work. And then they can analyze and evaluate as a chain reaction. It made not only to improve their achievement but also to strengthen their friendship and team spirit. They became realized and appreciated the role of leader, supporter and mutual interdependence. It can be clearly seen that project-based learning can connect the demands of 21st century.

In ITPR procedure, students can absorb teacher's ideas and concepts. Since teacher deliver conceptual knowledge, it can avoid students' misconception. Then, this method is also designed to meet the need of 21st century. Although students are provided with learner-centered activities such practical learning, discussion, presentation etc., student independent learning is insufficient.

Nevertheless, this study indicated that project-based learning had a positive effect only in restricted content area in biology teaching of the two selected schools. No single instructional strategy is appropriate all the time and not all lessons from the textbook are consistent with the same approach. All teaching methods are valuable. But only if the teacher uses them correctly and systematically, they can be more beneficial in the field of education. If the purpose of the instruction is to increase students' achievement by doing hands-on activities, project-based learning is exactly a harmonious teaching method.

Acknowledgements

First of all, we would like to express our special thanks to all teachers in our life and our parents. We would like to express our respectful thanks to U Aung Thaik Tun (Rector, University for the Development of the National Races of the Union- UDNR), Dr. Moe Moe (Pro-Rector, Academic, UDNR), Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Saging University of Education, SUOE), and Daw Tin Myo Latt (Lecturer, Department of Methodology, UDNR) for their guidance and good will in assessing our research study and invaluable comments and suggestions.

References

- Hornby, A. S. (2010). *Oxford advanced learner's dictionary* (8th ed.). Oxford, England: Oxford University Press.
- Kalabzová, M. (2015). *The application of project-based learning in the English classrooms* (Bachelor's thesis, University of West Bohemia, Pilsen, Czech Republic). Retrieved from [https://otik.uk.zcu.cz/bitstream/11025/19660/1/KAL_ABZOVA%2C thesis.pdf](https://otik.uk.zcu.cz/bitstream/11025/19660/1/KAL_ABZOVA%2C%20thesis.pdf)
- Kızıkan, O., & Bektaş, O. (2017). The effect of project-based learning on seventh grade students' academic achievement. *International Journal of Instruction*, 10(1). 37-54. Retrieved from http://www.e-iji.net/dosyalar/iji_2017_1_3.pdf
- Mills, G. E., & Gay, L. R. (2019). *Educational research: Competencies for analysis and application* (12th ed.). New York: Pearson Education.
- Ministry of Education (MOE). (2019). *Grade-10 Biology Textbook*. Nay Pyi Taw, Myanmar: Basic Education Curriculum, Syllabus and Textbook Committee.
- Ministry of Education. (2016). *National Education Strategic Plan 2016-21, Summary*. The Government of the Union of Myanmar. Retrieved from https://www.Britishcouncil.org/sites/default/files/myanmar-national_education_strategic_plan_201621.pdf
- Ozkan, S. (2003). *The roles of motivational beliefs and learning styles on tenth grade students' biology achievement*. (Master's thesis, The Middle East Technical University, Ankara, Turkey). Retrieved from https://etd.lib.metu.edu.tr/upload/1051_010/index.pdf
- Simpson, J. (2011). *Integrating project-based learning in an English language tourism classroom in a Thai University* (Doctoral thesis, Australian Catholic University, North Sydney, Australia). Retrieved from https://acuresearchbank.acu.edu.au/download/3b2a4e91aed4fc2fc60c732cee0755cab56d531b892edb14d9f31_8dd2b424d65/1045234/02whole.pdf
- Taha, A. M. (2021). A mixed methods study of the implementation of project-based learning in a United Arab Emirates middle school. *International Journal of Scientific and Management Research*, 4(7), 117-139. Retrieved from <http://doi.org/10.37502/IJSMR.2021.4711>
- Vygotsky, L. S. (1930). *Mind and society*. Cambridge, MA: Harvard University Press.
- Rajan, S. (2012). *Methodology of teaching science*. New Delhi, India: Dorling Kindersley (India) Pvt. Ltd.
- Bender, W.N (2012). *Project-based learning. Differentiating instruction for the 21st34 century*. California: Corwin A SAGE Company.
- Muijs, D., & Reynolds, D. (2011). *Effective teaching: Evidence and practice* (3rd ed.). Los Angeles, CA: Sage.
- LibreTexts. (2023). *Biology for non-majors II (Lumen)*. Davis, California: Author.
- Thomas, J. W. (2000). *A review of research on project-based learning*. San Rafael, CA: Autodesk Foundation. Retrieved from http://www.bie.org/research/study/review_of_projectbased_learning_2000

- Wint Zaw Htet. (2020). Basic education curriculum reforms in Myanmar and the role of social studies. *The Journal of Social Studies Education in Asia*, 9, 37-45. Retrieved from <http://jerass.com/jssea/wp-content/uploads/2020/10/04WintZaw Htet.pdf>
- Brown, H. D and Lee, H. (2015). *Teaching by principles: An interactive approach to language pedagogy* (4th ed.). Pearson Education.
- Hermanto, I., Sarwi, S., & Yusuf, A. (2019, June 29). *Effectiveness of project-based learning model to improve students' cognitive skills*. Proceedings of the 5th International Conference on Science, Education and Technology, ISET 2019, Semarang, Central Java, Indonesia. Retrieved from <https://eudl.eu/pdf/10.4108/eai.29-6-2019.2290522>

THE RELATIONSHIP OF TEACHER EDUCATORS' PERCEPTIONS ON INFORMATION AND COMMUNICATION TECHNOLOGY WITH THEIR INTEGRATION IN TEACHING PRACTICES IN EDUCATION DEGREE COLLEGES

Mu Wah Kyaw¹ and Wai Wai Oo²

Abstract

This study aims to investigate the relationship of teacher educators' perceptions on information and communication technology (ICT) use with the integration of ICT into their teaching practices in Education Degree Colleges. The study was employed with the descriptive, survey research design. A sample of (217) teacher educators from four Education Degree Colleges was involved. Simple random sampling method was used. The questionnaires were involved teacher educators' perceptions on ICT use that were comprised of four categories with 40 Likert-type items from basis of the questionnaires of Gebremedhin and Fenta (2015) and Mahdum, Hadriana and Safriyanti (2019), 30 Likert-type items of teaching practices from basis of the questionnaires of Aslan and Zhu (2018) and European Schoolnet (2013) and demographic data. The quantitative data was analyzed by using descriptive statistics, inferential statistics such as independent samples *t* test, one-way (ANOVA) and Pearson product-moment correlation. This study indicated that teacher educators have positive perceptions towards ICT use and there was no significant difference between the perceptions of teacher educators towards ICT in terms of gender and in terms of ICT training. And, there was a significant difference between overall perceptions and teaching practices in terms of Education Degree College. Moreover, there was a positively high correlation between perceptions of teacher educators towards the use of ICT and their integration of ICT into teaching practices. Thus, teacher educators should apply ICT related techniques and resource materials to integrate their teaching process.

Keywords: Teacher Educator, Perception, ICT, ICT Integration in Teaching, Teaching Practices

Introduction

Nowadays, everything is changing in accordance with the modern world. Education is also important in shaping the future of our lives. It is a foundation for every country to develop their better situation. It is also essential for the social, personal and economic development of the nation. It empowers people to create better lives. It enables learners to make their life decisions within the knowledge age. Every learner promotes their learning skills according to 21st century skills. Therefore, new curriculum had been developed to get new knowledge, new learning styles and new teaching strategies in classrooms at most countries including Myanmar.

Every educator needs to know what computers can do and what they cannot. In teacher trainings, therefore, both in-service and pre-service teacher trainings, teacher educators need to provide for developing skills of information and communication technology (ICT) and for improving computer competency. It is essentially needed to conduct a research study to explore the perceptions of teacher educators towards ICT use and to survey the integration of ICT into their teaching practices.

Technological integration of teaching and learning process rapidly occurs in today's classrooms. Teachers and students in colleges and universities familiarize using technological tools in today's classrooms. Using ICT such as teaching learning materials can promote better

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teaching and learning process. But there may be many challenges in using ICT for teachers and students. Therefore, it is important to seek the effect of using ICT in teaching and learning process for training teachers in teacher programs.

Teachers need to actively participate in using ICT. But most of the teachers are using social networks and entertainments rather than academic purposes. Using ICT in teaching and learning strongly depends on the attitudes or perceptions of the teachers. Thus, it needs to investigate the relationship of teacher educators' perceptions on ICT use in teaching and learning process with the integration of ICT into their teaching practices.

Purpose of the Study

The main purpose of the study is to investigate the relationship of teacher educators' perceptions on ICT use in teaching and learning process with their integration of ICT into teaching practices in Education Degree Colleges. The specific objectives of the study are as follows:

1. to explore the perceptions of teacher educators on the use of information and communication technology.
2. to examine the use of tools of information and communication technology integration into teaching practices.
3. to investigate the relationship between teacher educators' perceptions of information and communication technology and their teaching practices.
4. to make suggestions and recommendation based on the results of the study.

Research Questions

The research questions for the study are as follows:

1. What are teacher educators' perceptions with regard to the use of information and communication technology?
2. To what extent do teacher educators use tools of information and communication technology in their teaching practices?
3. What is the relationship between teacher educators' perceptions of information and communication technology use and their teaching practices?

Definition of Key Terms

The followings are the definition of key terms in this study.

Teacher Educator -Teacher educator means professional educator who serves as the training arm of the teaching profession (Law Insider, 2013).

Perception -Perception is defined as the thoughts or mental images which teachers have about their professional activities and their students, which are shaped by their background knowledge and life experiences and influence their professional behavior (Papadakis & Kalogiannakis, 2020).

Information and Communication Technology (ICT) -Information and communication technology (ICT) is defined as a diverse set of technological tools and resources used to transmit, store, create, share or exchange information (UNESCO-UIS, 2009).

ICT Integration in Teaching -Integrating ICT in teaching defines the use of communication with computers and technological tools that is implemented into daily classroom teaching processes (Ghavifekr, Athirah & Rosdy, 2015).

Teaching Practices -Teaching practices mean that teachers have specific skills and know-how about the teaching-learning processes and classroom management with digital tools (OECD, 2023).

Scope of the Study

The scope of the study includes the following points.

- The research is intended to study teacher educators' perceptions on the use of ICT and integration of ICT into their teaching practices in Education Degree Colleges.
- Pilot study was conducted in Sagaing Education Degree College.
- The research was conducted and the participants were confined to teacher educators in Mandalay, Meikhtila, Taunggyi and Pakokku Education Degree Colleges.
- The variables involve teacher educators' perceptions about the use of ICT, the barriers to technology use, the perceived usefulness of ICT, the perceived ease of use of ICT and their teaching practices with ICT.

Review of Related Literature

The theoretical framework related to this study and literature review are presented.

Theoretical Framework

The theoretical framework of this study is based on the Technology Acceptance Model (TAM) by Davis (1989). The TAM theory comprises of various parts which is representing the process of ICT acceptance by the users including such as behavioral intension, perceived usefulness and perceived ease of use (Ghavifekr et al., 2015). Besides, Abel, Tondeur and Sang (2022) pointed out that ICT integration can enhance students' learning and play experiences while also presenting opportunities for metacognition and creative growth. They also stated that teachers are shown to hold perceptions about numerous challenges, including perceptions about teaching and teacher perceptions of ICT are important as it forms a tendency that helps them to be favorable or unfavorable towards the use of the most modern technology in the field of education. Aslan and Zhu (2018) described that the use of technology will make a significant contribution to enhancing teaching and learning process. They also indicated that the employment of ICT in the transformation of education needs to be implemented effectively and rationally. Thus, teachers' integration of ICT into teaching practices is also important.

The Concept of Technology

The term technology is widely used in the field of education. There are many definitions for the term technology with the descriptions of many writers. Many people use different forms of technology in everyday lives. Technology is rapidly increasing nowadays. According to Kumar and Shaifali (2011), technology may be defined as an art of application. Bloomer (1973, as cited in Pal, 2013) defined that "Technology is the application of scientific theory to practical ends" (p.2). Besides, Muffoletto (1994, as cited in Roblyer & Edwards, 2000) says that "Technology is commonly thought of in terms of gadgets, instruments, machines, and devices ... most (educators) will defer to technology as computers" (p.5). In education, the term technology is used in various roles for different situations.

Many people are confusing between the meaning of technology of education and technology in education. Technology of education deals with active use of all the systematic

application of the resources of scientific knowledge of the process of learning that each individual has to pass through in order to acquire and use knowledge (Kumar & Shaifali, 2011). They also described that technology in education refers to the use of technological hardware in education. It is mainly concerned with electrical and electronic gazettes which are used to facilitate the teaching and learning process.

Information and Communication Technology (ICT) in Education

Information and communication technology (ICT) is defined as a diverse set of technological tools and resources used to transmit, store, create, share or exchange information (UNESCO-UIS, 2009). ICT is an important tool for teaching as it helps in facilitating teaching and increases better understanding of the subjects for the students (Pal, 2013). Shokeen, Ram and Ruwali (2022) described that ICT refers to the computer and internet connection used to handle and communicate information for learning purposes. Besides, Fu (2013) stated that ICT includes computers, Internet, and electronic delivery systems such as radios, televisions, and projectors among others, and is widely used in today's education field.

The role of ICT in education is important. Shokeen et al. (2022) stated, as ICT provides more opportunities for both students and teachers to adapt learning and teaching to individual needs, society is forcing schools to respond appropriately to this technological innovation. In rapport of Shokeen et al. (2022), the following terms are included ICT in education: WWW, E-learning, group discussion, E-module, and teleconferencing: audio – conferencing, video – conferencing, Web-based conferencing and open and distance learning.

Teacher educators include higher education faculty and school-based practitioners who supervise field experiences, student teaching, and internships (Law Insider, 2013). They are beginning to look at technology resources to help make the new directions at once feasible and motivational to students (Roblyer & Edwards, 2000). In addition, Kivunja (2015) described that they have engaged with ICT and tried to explain how the use of technology, driven by computers and digital technologies, can improve pedagogy and curriculum. Thus, teacher educators can be more opportunity to improve their skills that demand for 21st century skills.

Perceptions of Teacher Educators for Use of ICT

There are several definitions of perception put forward by the researchers. According to McShane and Glinow (2008), perception is the process of receiving information and making sense of the world around us. Davis, Bagozzi and Warshaw (1989) explained that perceived usefulness means the degree to which a person believes that using a technology will enhance his or her job performance, and perceived ease of use means the degree to which a person believes that the use of a technology will be free of effort. In addition, integration required teachers to develop lessons, activities, and data files for students to use with the application packages (Bennett, 1987). Thus, teacher educators' perceptions in this research are the teachers' acceptability of using ICT in their teaching, compile the knowledge about ICT and the barrier that technology use. The indicators used are perceived usefulness and ease of use.

Integration of ICT into Teaching Practices

Teaching practices that rely on ICT require teachers to have specific skills and know-how about the learning process and classroom management with digital tools (OECD, 2023). Law and Chow (2008) described that ICT is important for bringing changes to classroom teaching and

learning so as to foster the development of students' 21st century skills. Teacher educators should have both basic ICT skills and advanced ICT skills to use ICT in their teaching more effectively. OECD (2023) described that ICT can be used to support teachers' activities outside of the classroom. For instance, teachers can use ICT to communicate with colleagues, and to contribute to the development of overarching and transversal pedagogical practices. Thus, teacher educators need to gain the competences necessary to integrate ICT in order to improve their teaching.

In summary, this research is directed towards investigating about the use of ICT and integration of ICT into teaching practices in Education Degree Colleges while considering the teacher educators perceptions and the relation to their teaching practices and adopting a quantitative research approach.

Research Method

This section provides a description of the research design, population and sample size, instruments, data analysis and data collection procedure.

Research Design

In this study, descriptive method and survey research design were used.

Population and Sample Size

The target population for this study is all teacher educators in Education Degree Colleges. Mandalay, Meikhtila, Taunggyi and Pakokku Education Degree Colleges were selected by using simple random sampling method. The sample population is approximately 31%. For descriptive research, it is common to sample 10 to 20 % of the population, although this range will change with the size of the population (Gay & Airasian, 2003). The following Table 1 shows the number of participants.

Table 1 Sample Population and Sample Size

Sr No.	Name of Education Degree College	Sample
1	Mandalay	82
2	Meikhtila	57
3	Taunggyi	51
4	Pakokku	27
	Total	217

Instruments

In this study, a questionnaire for the perceptions of teacher educators on ICT use was constructed based on the questionnaires of Gebremedhin and Fenta (2015) and Mahdum et al. (2019). The questionnaire was divided into three parts. The first part of the questionnaire included demographic questions. The second part of the questionnaire included five points Likert-type scale (Strongly disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly agree = 5) with (40) items for four categories: the perceptions of teacher educators about use of ICT, the barriers to technology use, the perceived usefulness of ICT and the perceived ease of use of ICT. The third part of the questionnaire for integration of ICT into their teaching practices was created based on questionnaires of Aslan and Zhu (2018) and European Schoolnet (2013). The questionnaire includes five points Likert-type scale (Never = 1, Seldom = 2, Sometimes = 3, Often = 4, Always = 5) which has (30) items.

Data Collection Procedure

Firstly, the researcher collected the relevant literature concerned with the research. Secondly, in order to get the required data, the researcher constructed an instrument under the guidance of the supervisor. The content validity was determined by experienced teacher educators' judgment. Then pilot testing was conducted with all teacher educators in the Sagaing Education Degree College. Some of the items were revised according to the pilot results with the help of supervisor. After getting the validity and reliability of the instrument, the questionnaire was distributed to the teacher educators in Mandalay, Meikhtila, Taunggyi and Pakokku Education Degree Colleges. The respondents were asked to decide about the questionnaire statements and marked the relevant response category honesty. The questionnaires were returned (71.85%) from the subjects in the sample Education Degree Colleges under the research work. According to Mills and Gay (2016), the rule of thumb for the survey response rate, based on a good sample, is 50%. Anything above 50% will increase the confidence with the findings. Thus, the collected data was analyzed and interpreted. Finally, based on the findings, discussion, suggestions and recommendations were made.

Data Analysis

Descriptive statistics was used to examine the effect that teacher educators' perceptions towards ICT in teaching and learning process. Independent samples *t*-test was used to compare the teacher educators' perceptions towards ICT use in terms of gender and ICT training. In addition to these, ANOVA was used to determine the teacher educators' perceptions towards ICT use and integration of ICT into teaching practices in terms of Education Degree College. And then, the frequencies of teacher educators' use of ICT tools in their teaching practices were expressed. Moreover, Pearson product-moment correlation was used to explore the relationship between teacher educators' teaching practices with ICT and overall perceptions.

Research Findings

This section is concerned with the findings based on the data obtained from the study. Then, the findings of the results were discussed.

Findings on Research Question (1)

The followings are descriptions for findings on research question (1).

Table 2 Means and Standard Deviations of the Perceptions of Teacher Educators towards ICT on each Category

No.	Category	N	Minimum	Maximum	M	SD
1	C1	217	2.60	5.00	4.164	.434
2	C2	217	1.90	5.00	3.897	.610
3	C3	217	2.27	5.00	3.923	.379
4	C4	217	2.22	5.00	4.079	.427
5	Overall	217	2.55	4.85	4.016	.345

Note. C1=Perceptions about the use of ICT, C2=Barrier to technology use, C3=Perceived usefulness, C4=Perceived ease of use.

According to Table 2, the mean for perceptions about the use of ICT was 4.164, the mean for barrier to technology use was 3.897, the mean for perceived usefulness was 3.923 and the

mean for perceived ease of use was 4.079. Among them, it can be found that the mean for perceptions about the use of ICT was the highest and the mean for barrier to technology use was the lowest (See Figure 1).

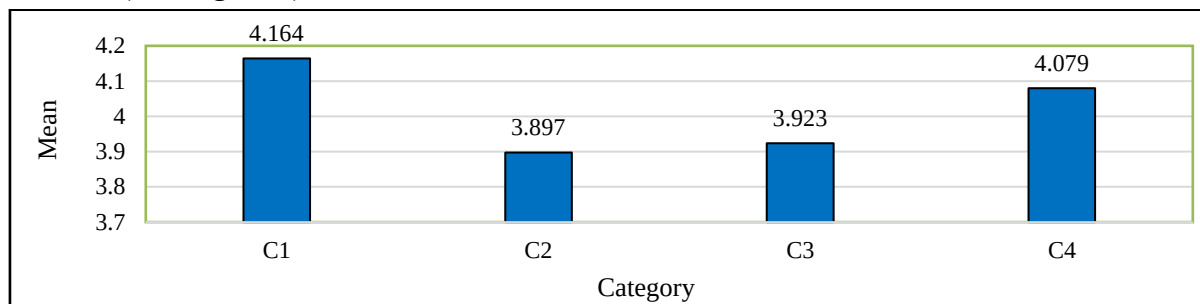


Figure 1. The comparison of means for each category.

Note. C1=Perceptions about the use of ICT, C2=Barrier to technology use, C3=Perceived usefulness, C4=Perceived ease of use.

According to Figure 1, this finding pointed out that teacher educators in four Education Degree Colleges were strong in perceptions about use of ICT, but they have difficulty in technology use. It was also found that they were convenience in perceived ease of use and a little accept in perceived usefulness of using ICT.

Findings on Research Question (2)

The followings are descriptions for findings on research question (2).

Table 3 Means and Standard Deviations of the Integration of ICT into Teaching Practices

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
ICT integration into teaching practices	217	1.67	5.00	3.752	.777

Based on the results of the means, teacher educators' use of ICT often does with their teaching learning activities in their class. 73.3% of teacher educators especially use search engines (e.g., Google, Yahoo, etc.) to look for information on the Internet, and 15.2% of them never communicate online with parents.

Table 4 represents the types of ICT tools which used by teacher educators during their teaching practices.

Table 4 Frequencies Related to Teacher Educators' Use of ICT Tools during their Teaching Practices

No.	Types of ICT tools	Yes	Percentage (%)	No	Percentage (%)
1	PowerPoint/Slides	178	82.0	39	18.0
2	E-mail or G-mail	93	42.9	124	57.1
3	Educational CD/VCD/DVD	85	39.2	132	60.8
4	Film	37	17.1	180	82.9
5	Online quiz	49	22.6	168	77.4
6	Educational online game	32	14.7	185	85.3
7	Giving task/discussing learning materials using smart-phones	114	52.5	103	47.5
8	Google Classroom	54	24.9	163	75.1
9	Others	50	23.0	167	77.0

By the Table 4, 82% of teacher educators mostly use PowerPoint or slides that including text, graph, image, audio, video or animation. 14.7% of them use educational online game as a tool and 23% of them use other ICT tools and applications in their teaching-learning activities.

Findings Based on Demographic Data

Based on the demographic data, the results were interpreted by Pallant (2016) and Morgan, Leech, Gloeckner and Barrett (2013). Table 5 shows *t* values.

Table 5 *t* Values for the Perceptions of Teacher Educators towards ICT in terms of Gender

No.	Category	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
1	Perceptions about the use of ICT	Male	16	3.987	.620	-1.699	215	.091 (ns)
		Female	201	4.178	.415			
2	Barrier to technology use	Male	16	3.756	.536	-.962	215	.337 (ns)
		Female	201	3.908	.616			
3	Perceived usefulness	Male	16	3.704	.613	-1.520	15.79	.148 (ns)
		Female	201	3.940	.351			
4	Perceived ease of use	Male	16	3.847	.716	-1.386	15.72	.185 (ns)
		Female	201	4.098	.393			
5	Overall	Male	16	3.823	.547	-1.498	15.83	.154 (ns)
		Female	201	4.031	.321			

Note. ns = not statistically significant.

* $p < .05$.

When Table 5 was examined, it indicated that there is no significant difference in terms of gender. Both male and female teacher educators are positive perceptions towards ICT and they accept the use of ICT in their teaching-learning activities that can be more effective. Table 6 describes *t* values.

Table 6 *t* Values for the Perceptions of Teacher Educators towards ICT in terms of ICT Training

No.	Category	ICT Training	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
1	Perceptions about the use of ICT	Yes	185	4.178	.432	1.174	215	.242
		No	32	4.081	.444			
2	Barrier to technology use	Yes	185	3.905	.639	.604	60.61	.548
		No	32	3.853	.411			
3	Perceived usefulness	Yes	185	3.939	.373	1.518	215	.131
		No	32	3.829	.406			
4	Perceived ease of use	Yes	185	4.108	.425	2.362	215	.019*
		No	32	3.916	.410			
5	Overall	Yes	185	4.033	.348	1.714	215	.088
		No	32	3.920	.315			

Note. * $p < .05$.

The Table 6 showed that teacher educators who had attended the ICT training have more positive perceptions about the ease of use of ICT than the teacher educators who did not attend the ICT related training. Therefore, all teacher educators should attend the ICT related training in accordance with the rising digital world. Overall finding indicated that there was no statistically significant difference between teacher educators for three categories ($t = 1.714$, $df = 215$, $p < .05$) except the category perceived ease of use. In order to see at a glance, the comparison of mean values was presented by graph (See Figure 2).

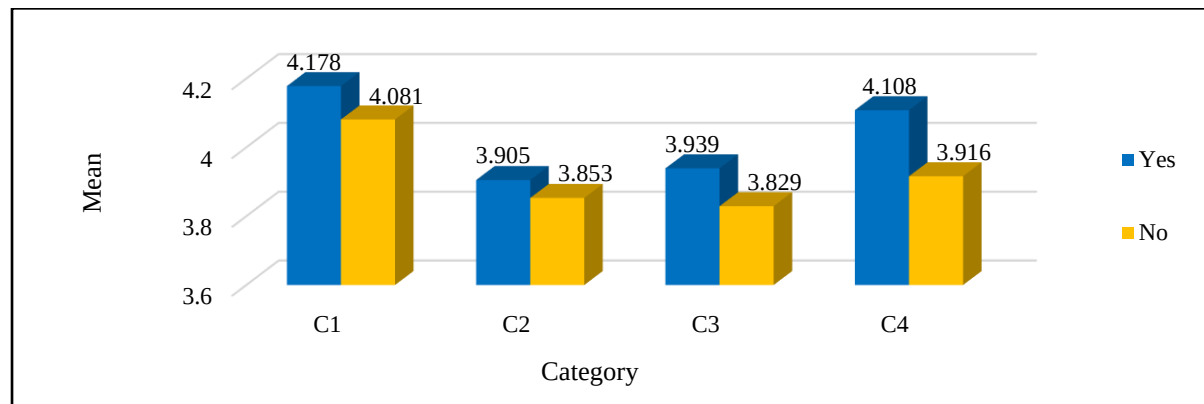


Figure 2. The comparison of mean for the perceptions of teacher educators towards ICT in terms of ICT training.

Note. C1=Perceptions about the use of ICT, C2=Barrier to technology use, C3=Perceived usefulness, C4=Perceived ease of use.

According to Figure 2, this finding described that teacher educators who had attended the ICT training used ICT in learning activities that is quite easy and is not troublesome for them. In here, most teacher educators have basic ICT related knowledge and lack of pedagogical competence with ICT. But teacher educators have difficulty in usage of technology by the above mean values. Thus, they should have technology literacy skills for surviving the educational reform and development. Besides, Table 7 shows the comparison of mean values.

Table 7 Comparison of Mean Values on each Category and Integration of ICT into Teaching Practices in terms of Education Degree College

Groups	No. of participants	M/SD	Category				Overall	Teaching Practices
			C1	C2	C3	C4		
EDC 1	82	M	4.367	4.287	3.946	4.289	4.222	4.302
		SD	.367	.501	.299	.395	.303	.502
EDC 2	57	M	4.059	3.812	3.921	4.031	3.956	3.622
		SD	.434	.465	.411	.291	.302	.615
EDC 3	51	M	4.062	3.462	4.014	3.997	3.884	3.354
		SD	.378	.621	.373	.417	.264	.760
EDC 4	27	M	3.962	3.714	3.683	3.699	3.765	3.104
		SD	.501	.454	.454	.454	.362	.756

Note. C1=Perceptions about use of ICT, C2=Barrier to technology use,

C3=Perceived usefulness, C4=Perceived ease of use, EDC=Education Degree College.

The comparison of mean values for each category of the perceptions of teacher educators on ICT and integration of ICT into teaching practices was presented in Figure 3.

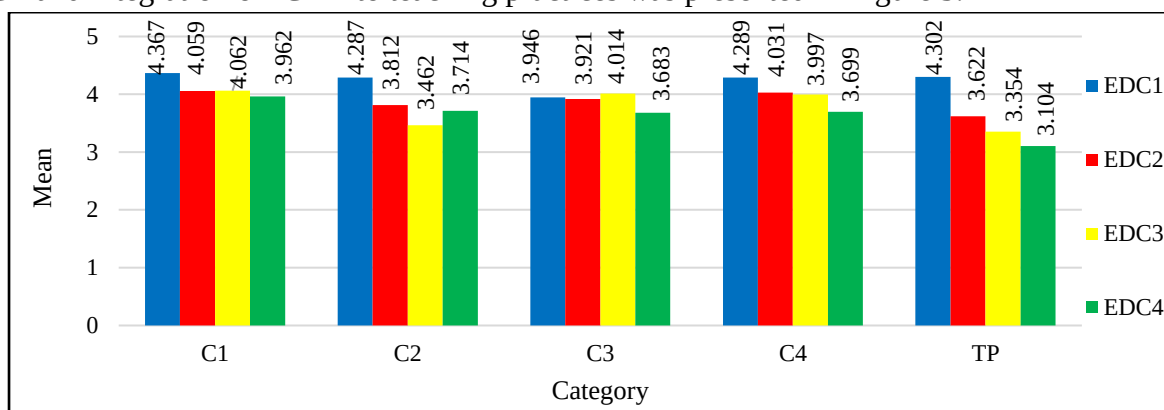


Figure 3. The comparison of mean in terms of Education Degree College.

Note. C1=Perceptions about use of ICT, C2=Barrier to technology use, C3=Perceived usefulness, C4=Perceived ease of use, TP=Teaching Practices, EDC=Education Degree College.

According to Figure 3, teacher educators of Education Degree College 1 use ICT in their teaching and learning activities than other teacher educators of Education Degree Colleges by the mean values. Among them, teacher educators of Education Degree College 4 have lowest mean, it can be supposed that they are weak in applying technology, especially ICT into their teaching practices.

Table 8 ANOVA Results for all Categories in terms of Education Degree College

		Sum of Squares	df	Mean Square	F	p
Perceptions on use of ICT	Between Groups	5.616	3	1.872	11.32	.000*
	Within Groups	35.22	213	.165		
	Total	40.83	216			
Barrier to technology use	Between Groups	23.44	3	7.815	29.12	.000*
	Within Groups	57.16	213	.268		
	Total	80.60	216			
Perceived usefulness	Between Groups	2.02	3	.673	4.924	.003*
	Within Groups	29.12	213	.137		
	Total	31.14	216			
Perceived ease of use	Between Groups	8.00	3	2.668	18.02	.000*
	Within Groups	31.52	213	.148		
	Total	39.52	216			
Overall perceptions	Between Groups	6.295	3	2.098	22.93	.000*
	Within Groups	19.48	213	.091		
	Total	25.78	216			
Teaching practices	Between Groups	45.18	3	15.06	37.55	.000*
	Within Groups	85.44	213	.401		
	Total	130.63	216			

Note. * $p < .01$.

According to Table 8, it was found that there was significantly different among four Education Degree Colleges on all categories; $F(3, 213) = 22.935, p < .01$. This means that the perception towards all categories differs among four Education Degree Colleges. Moreover, there was also statistically significant differences among four Education Degree Colleges on Integration of ICT into teacher educators' teaching practices in terms of Education Degree College; $F(3, 213) = 37.55, p < .01$. This means that the teacher educators' teaching practices with the use of ICT differ among four Education Degree Colleges.

Findings on Research Question (3)

The followings are descriptions for findings on research question (3).

Table 9 Correlation between Perceptions of Teacher Educators towards Use of ICT and their Integration of ICT into Teaching Practices

		Overall Perceptions	Integration of ICT into Teaching Practices
Overall Perceptions	Pearson Correlation	1	.687**
	Sig. (2-tailed)	-	.000
	N	217	217

Note. **Correlation is significant at the .01 level (2-tailed).

According to Cohen (1988), it can be interpreted that there was a positively high correlation between perceptions of teacher educators towards the use of ICT and their integration of ICT into teaching practices. Thus, the more positive perceptions towards the use of ICT are high, the more they use ICT related materials during their teaching practices.

Summary of Research Findings

- On the basis of research findings, teacher educators have positive perceptions towards use of ICT but they have difficulty to technology use. They were convenient in perceived ease of use and a little accept in perceived usefulness of using ICT.
- Teacher educators often use ICT with their teaching-learning activities in their class. They use PowerPoints and smart-phone during their teaching practices.
- It indicated that there was no significant difference in terms of gender. They accept the use of ICT in their teaching learning activities that can be more effective.
- However, teacher educators who had attended the ICT training used ICT in learning activities that is quite easy and is not troublesome for them.
- Besides, there was a positive correlation between perceptions of teacher educators towards use of ICT and their integration of ICT into teaching practices.

Discussion and Conclusion

Discussion

According to the research findings, the mean for perceptions about the use of ICT was the highest and the mean for barrier to technology usage was the lowest. This result is confirmed by the report of Goktas, Gedik and Baydas (2013) that indicated teachers face the barriers in their integration of ICT. The survey results also show that teacher educators perceived the things such as lack of teachers' technical knowledge to prepare materials based on technology, shortage of resources like computer, projector etc., lack of interest of teachers in ICT usage for teaching and learning.

In regard to teacher educators' general use of ICT, the survey found that teacher educators often apply ICT with their teaching-learning activities in their classroom. They especially use search engines for the information. These findings are supported by Aslan and Zhu (2018).

The results of the analysis indicated that there was no significant difference in the perceptions of teacher educators towards ICT in teaching and learning process in terms of gender. It was consistent with the result of Law and Chow (2008), they stated that no statistically significant gender difference was found and it can be due to the fact that both male and female teacher educators had positive perceptions in using ICT within the digital age. Everyone has the gender equity in modern times and modern world.

Besides, in terms of ICT training, the research findings showed that teacher educators' perceptions on ICT are no statistically significant difference except for the category perceived ease of use. Teacher educators who had attended the ICT training used ICT in teaching-learning activities that is quite easy and is not troublesome for them. But they attend that the trainings are chiefly on computer basic rather than on how to integrate ICT to their subjects. Thus, both teacher educators and their students should be made more competent in ICT integration and should attend ICT trainings and programs.

Based on the result of the study, it was found that there was a significant difference between perceptions of teacher educators on ICT and integration of ICT into teaching practices in terms of Education Degree College. Law and Chow (2008) suggested that teachers are more likely to use ICT in their teaching if they feel they and their students are receiving support from the school-support. Thus, every Education Degree College should get the support of ICT related materials, availability of full-time electricity, Wi-Fi and Internet connection in using ICT.

According to the result, there was a positive correlation between perceptions of teacher educators towards the use of ICT and their integration of ICT into teaching practices. As Aslan and Zhu (2018) reported that pedagogical knowledge plays an important role in integrating ICT into teaching practices. Thus, the more teacher educators' perceptions on ICT change to develop in teaching-learning situations, the more they apply ICT in their teaching practices.

For open question that experience in using ICT with their difficulties, teacher educators said that they described the poor internet connection, lack of electricity, lack of technical knowledge, incompetence of using ICT related materials, insufficient of technical resources, lack of pedagogical knowledge, and weak of insufficient time and study of technology.

Finally, several implications can be drawn from the present study's findings. Initially, it is the extent to which 21st century-oriented pedagogical or teaching practices are arising with the use of technology. Secondly, it is proposed that every teacher educator should have a good understanding and applying technology for innovative strategies. Further, teacher educators' perceptions of the contributions that ICT-use make to improve students' interest and motivation for better performance. Thus, teacher educators should be noteworthy to increase their professional development and adopt 21st century-oriented pedagogies and in ICT-using practices.

Suggestions

The research findings give rise to several relevant recommendations and suggestions.

- Teachers should give priority for ICT related professional development with both pedagogical and technical competence and knowledge.
- Teacher educators should attend the ICT related trainings, seminars and forum to improve their ICT related skills and knowledge.
- It should give the ICT related courses and training programs for all teachers to increase their proficiency in using technology in the classroom.
- Policy makers or decision makers should prioritize to support the availability of electricity and Internet connection for schools, colleges and universities. Thus, it can be easy to use ICT in teaching and learning processes.
- Decision makers and school leaders should consider to support the ICT infrastructures facilitating use of ICT in teaching-learning situations.
- It should clearly understand required technology skills for both teachers and students and ICT related education policies.

Conclusion

This study was conducted to investigate the relationship of teacher educators' perceptions on information and communication technology with their integration in teaching practices in Education Degree Colleges. According to the results, the research denoted that teacher educators in selected Education Degree Colleges have positive perceptions on ICT and mostly use PowerPoint or slides that including text, graph, image, audio, video or animation during their teaching learning activities. To conclude, the study found that there was a positive correlation between perceptions of teacher educators towards the use of ICT and their integration of ICT into teaching practices. According to the study, it can contribute to policymakers, administrators, school leaders, teacher educators, teachers and students for using technology in education.

Acknowledgements

We would like to express our deepest gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education) and Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education) and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) who permitted us to do this research. Our special acknowledgement goes to Prof. Dr. Soe Than (Retired, Professor & Head of Department of Curriculum and Methodology, Sagaing University of Education) for his expert guidance and valuable comments throughout the study. We also thank to all principals and teacher educators of Education Degree Colleges who permitted to conduct the research and actively participated in this study.

References

- Abel, V.R., Tondeur, J., & Sang, G. (2022). Teacher perceptions about ICT integration into classroom instruction. *Education Sciences*, 1 (2). Retrieved from <https://doi.org/10.3390/educsci12090609>
- Aslan, A., & Zhu, C. (2018). Starting teachers' integration of ICT into their teaching practices in the lower secondary schools in Turkey. *Educational Sciences: Theory & Practice*, 18 (1), 23–45. Retrieved from <http://dx.doi.org/10.12738/estp.2018.1.0431>
- Bennett, R. E. (1987). *Planning and evaluating computer education programs*. Columbus, Ohio: Merrill.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Lawrence Erlbaum Associates.
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use and user acceptance of information technology. *MIS Quarterly*, 13 (3), 319-340. Retrieved from file:/// C:/Users/xxx/Downloads/Davis1989MISQ.pdf

- Davis, F. D., Bagozzi, R., & Warshaw, P. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35 (8), 903-1028. Retrieved from <http://eli.johogo.com/Class/p6.pdf>
- European Schoolnet. (2013). *Teacher questionnaire - MASTER EN*. European Schoolnet. Retrieved from http://essie.eun.org/c/document_library/get_file?uuid=fd33ffa6-a8c1-478f-a01b-6664c7db380d&groupId=21279
- Fu, J. S. (2013). ICT in education: A critical literature review and its implications. *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, 9 (1), 112-125. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1182651.pdf>
- Gay, L. R., & Airasian, P. (2003). *Educational research: Competencies for analysis and applications* (7th ed.). Columbus, Ohio: Merrill Prentice Hall.
- Gebremedhin, M. A., & Fenta, A. A. (2015). Assessing teachers' perception on integrating ICT in teaching-learning process: The case of Adwa College. *Journal of Education and Practice*, 6 (4), 1735-2222. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1083759.pdf>
- Ghavifekr, S., Athirah, W., & Rosdy, W. (2015). Teaching and learning with technology: Effectiveness of ICT integration in schools. *International Journal of Research in Education and Science*, 1 (2), 175-191. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1105224.pdf>
- Goktas, Y., Gedik, N., & Baydas, O. (2013). Enablers and barriers to the use of ICT in primary schools in Turkey: A comparative study of 2005-2011. *Computers & Education*, 68, 211-222. DOI:10.1016/j.compedu.2013.05.002
- Kivunja, C. (2015). *Teaching, learning & assessment: Steps towards creative practice*. Victoria, SM: Oxford University Press.
- Kumar, P., & Shaifali. (2011). Emergence of educational technology as a discipline. In S. C. Pachauri, P. Kumar & P. S. Rana (Eds.), *Educational technology* (pp. 1-26). New Delhi, DG: A. P. H. Publishing Corporation.
- Law Insider. (2013). *Teacher educators definition*. Retrieved from <https://www.lawinsiders.com>dictionary>teacher-educators>
- Law, N., & Chow, A. (2008). Teacher characteristics, contextual factors, and how these affect the pedagogical use of ICT. In N. Law, W. J. Pelgrum, & T. Plomp (Eds.), *Pedagogy and ICT use: In schools around the world, findings from the IEA SITES 2006 study* (pp. 181-219). The University of Hong Kong: Springer.
- Mahdum, M., Hadriana, H., & Safriyanti, M. (2019). Exploring teacher perceptions and motivations to ICT use in learning activities in Indonesia. *Journal of Information Technology Education: Research*, 18, 293-317. Retrieved from <https://doi.org/10.28945/4366>
- McShane, S. L., & Glinow, M. A. V. (2009). *Organizational behavior: Emerging knowledge and practice for the real world* (5th ed.). New York, NY: McGraw-Hill.
- Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). Edinburgh Gate, Harlow: Pearson Education.
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2013). *IBM SPSS for introductory statistics: Use and interpretation* (5th ed.). New York, NY: Routledge.
- OECD. (2023). *PISA 2022 assessment and analytical Framework*. Paris: OECD Publishing.
- Pal, K. (2013). *Educational technology*. Phagwara: Lovely Professional University.
- Pallant, J. (2016). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (6th ed.). New York: McGraw-Hill Education.
- Papadakis, S., & Kalogiannakis, M. (2020). Exploring preservice teachers' attitudes about the usage of educational robotics in preschool education. In Faculty of education, department of preschool education, university of Crete, Greece, *Handbook of research on tools for teaching computational thinking in P-12 education* (pp. 335-351). DOI: 10.4018/978-1-7998-4576-8.ch013
- Roblyer, M. D., & Edwards, J. (2000). *Integrating educational technology into teaching* (2nd ed.). Columbus, Ohio: Prentice Hall.
- Shokeen, Ram, N., & Ruwali, P. N. (2022, May). Information and Communication Technology (ICT) in Education. *Kala Sarovar*, 25 (1), 547-550. Retrieved from <file:///C:/Users/xxx/Downloads/118ShokeenNaveenRamDr.PriyankaNeerajRuwali%20.pdf>
- UNESCO-UIS. (2009). *Guide to measuring information and communication technologies (ICT) in education*. Montreal: UIS.

THE RELATIONSHIP BETWEEN READING HABITS OF IN-SERVICE TEACHERS AND THEIR INSTRUCTIONAL PRACTICES

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Abstract

The main purpose of the study is to explore the relationship between the reading habits of in-service teachers and their instructional practices. The reading habits of in-service teachers were surveyed in three school groups, Mandalay Region. This study is carried out with cross-sectional survey research design. Three groups of sample schools from Amarapura Region were selected by cluster sampling method. There were (745) in-service teachers in Amarapura Region. For obtaining the required data, (186) in-service teachers from (15) Basic Education Schools were selected by simple random sampling method as subjects. The instrument used in this study was a questionnaire including two parts: reading habits of in-service teachers and the use of knowledge getting from reading habit in their instructional practices. Descriptive statistics and inferential statistics were used to analyze the data collected from participants. The results showed that the sampled in-service teachers have positive reading habits but they are weak in using the knowledge getting from their reading habits. They use only in reflection sector but moderate in lesson planning and least in teaching learning process.

Keywords: Reading, Habit, Reading Habit, Instructional Practices, In-service teacher.

Introduction

The recognition of the symbols and the linking of appropriate meaning can be explicated as reading. It requires identification and comprehension (Palani, 2012). The reading habit is irreplaceable weapon for everyone in order to mentally grow and fulfill his or her potential. According to Tella and Akande (2007), the capability to read is the core part of self-education and lifelong learning and is also an art capable of modernizing life and society.

Reading, being an essential part to the field of teaching in any educational setting, is not be capable of omission. Stakeholders such as the government, the public libraries of Myanmar, and the Educational Bureaus should collaborate to revitalize reading habit if academic excellence is to be achieved. Reading habit can make people to grow mentally and fulfill their potential at every aspect in their society. Neither a farmer nor a graduate biologist can fulfill his or her potential without the cognitive growth that comes from reading widely. Such growth is every person's right and will benefit the society economically as well as individuals personally. To foster such a reading habit and forge the link between people with basic literacy skills and knowledge, it is necessary for the literature to reach out to the people. It is also necessary to provide material that is easy enough to be enjoyable so that people want to read.

Reading is an important activity in the process of learning. In the movement of human society, it has been given a greater importance and becoming one of the essential aspects of the functioning of the society, exposure of knowledge and revelation of literate society. Reading shapes personality, ideas, thinking and attitude. It is necessary to create a general awareness of the importance of books to the mental growth of the individual and to the economic growth of the nation. It is important to give books to the people in a manner that is culturally acceptable. When reading habit is developed, the demand for books will grow and the people of Myanmar

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including teachers and learners will achieve the greatness they once had. Capacity development plans are now developing to enhance teachers' teaching quality since the curriculum reform is implemented (CESR, 2013). On the basis of capacity building, developing reading habit of teachers can have an effect to some extent for quality improvement.

Purposes of the Research

The following purposes will guide this research:

The main purpose of the study is to investigate the relationship between reading habits of in-service teachers and their instructional practices. The specific objectives are as follows:

- to explore the reading habits of the in-service teachers in terms of reading habit indicators.
- to examine the use of knowledge getting from reading habits in their instructional practices.
- to find out the relationship between the in-service teachers' reading habits and instructional practices.
- to make suggestions and recommendations to improve the professional development trainings based on the results of the study.

Research Questions

Based on the purposes of the study, the following research questions are constructed.

1. Which type of reading habit exist among in-service teachers in terms of reading habit indicator?
2. How do the in-service teachers use knowledge getting from reading habit in their instructional practices?
3. To what extent do the relationship between the reading habits and instructional practices of in-service teachers' vary?

Definition of Key Terms

The key terms of this study are described as follows:

Reading: Reading is the process of deriving meaning through a goal and strategy, based on effective communication between reader and the author, where the reader configures the new information with the current knowledge in a convenient environment (Powell, 2005).

Habit: Habit refers to a thing that someone does quite often and almost without thinking; especially something that is hard to stop doing and it is usual behavior (Singh, 2013).

Reading Habit: Reading Habit is the behaviour which express the likeness of reading of individual types of reading and tastes of reading (Sangkaeo, 1999).

Instructional Practices: Instructional practices generally refer to the action taken by the teachers in developing the lesson in the classroom and it is also the teachers' characteristics and behaviors that lead their classes and consistently used over time (Saleh & Jing, 2020).

In-service Teacher: The term in-service teacher designates a teacher that has certification or is already teaching in a classroom (Koellnar & Greenblatt, 2021).

Scope of the study

This study is geographically restricted to Amarapura Township in Mandalay Region. The participants were (186) in-service teachers working in basic education schools from the selected region within 2023-2024 Academic Year.

Review of Related Literature

The reading habits of in-service teachers are studied based on two theories: social learning theory and self-determination theory.

Albert Bandura's Social Learning Theory

A key concept of Bandura's Social Learning Theory is Reciprocal Determinism which recognizes the fact that there are external and internal determinants that form an interweaving system that influences people's behavior (Bandura, 1977). Reciprocal determinism supports the idea of observational learning or learning through modeling (Bandura, 1989). Learning through modeling is based on the premise that people learn from their interactions with others in a social context. Therefore, by observing others' behaviors, a person tends to assimilate and imitate that behavior, particularly if those observational experiences are positive and/or include some kind of reward related to the observed behavior (Nabavi, 2012). This main element of modeling in Bandura's theory is directly related to the aim that drives this study since it can be argued that modeling from teachers in the classroom may influence students' attitudes towards reading if the teacher's performance is seen as positive by students.

Self-determination Theory

According to self-determination theory, autonomous motivation can be fostered through autonomy-supportive behaviors offered by significant others in the social environment. A perception of autonomy-supportive behaviors - perceived autonomy support, from significant others, such as the provision of choice and a personal rationale for doing a behavior, acknowledging the perspective of the individual, and providing competence-related feedback, have all been shown to promote autonomous motivation (Reeve & Jang, 2006, as cited in Chan et al. 2014).

The Nature of Reading Habit

Reading is an essential part of human existence that will continuously follow the path of human life and bring various benefits in various fields of human life. Experts such as Wijesuriya (1995) also argues that the individual's reading habit starts from the early stage of life, this habit does not necessarily occur instantly, but there is a long process to obtain such a good reading habit. Over time, an individual not only gets the title of someone who has good reading habits, but the individual also experiences a significant process of self-development and has a positive impact on professional work. Reading habits can be interpreted as activities that are regularly carried out, and there are some special considerations. According to Gaona and Gonzalez (2011), there are several components of reading habits such as attitude toward reading habit, book read, reading frequency, time spent on reading and motivation in reading.

(1) Attitude towards Reading Habit: Attitude is an intricate concept that has been studied by numerous authors in different fields. Ortega, et al. (as cited in Romero, 2021) defined attitude as the common specific reactions people tend to experience towards a stimulus which can be a

person, a situation, or any phenomenon. In regards to reading habits, several scholars have agreed on the idea that it can be seen as a system of reading-related feelings which causes the reader to approach or elude any reading situation. Similarly, Smith (as cited in Romero, 2021) shared the belief that reading attitude involves not only feelings but also convictions about reading. This means that if learners just read without the willingness or conviction, they will not be doing it wholeheartedly and enthusiastically. Attitude towards reading can be positive or negative (Isakson et.al. 2016) and can influence the learners' academic success and/or becoming life-long readers (McKenna et al. 2012). It can be concluded that teachers with positive attitudes towards reading will believe reading is important, will enjoy the act of reading, and will develop a high self-concept as a reader. According to Hassen (2016), high school teachers read for many reasons. They read primarily to help them teach. Furthermore, they read for knowledge, education, updated information, and to some extent for leisure. Few teachers read when they don't have anything to do. A great deal of the high school teachers read for pleasure, to pass an exam, or to write lesson notes. The majority read to be current with developments.

(2) Book Type: The concept of books read includes the purpose of books read and types of books read. Gaona and Gonzalez (2011) stated that the person should report their number of books read at least in their three last month. The number of books teachers reading should be at least one book in a week. The teachers should read books regularly not to lose their sense in reading and their ability in comprehending reading text. The books read by the teachers can be separated into two types; the first one is the number of the book read and the second one is the types of the book that get the teachers' intention to read. The number of teachers' books read show their interest in reading activity. The choice of books can be one of the way to make them want to read and their frequency in reading increase. They choose the genre based on their favorite and to enjoy reading without being forced by others.

(3) Reading Frequency: Frequency is the rate at which something happens or is repeated over a period of time or in a particular sample. Reading frequency is the frequency or the time a person has to read books in their spare time, Gaona and Gonzalez (2011). Reading frequency of teacher's show their interest in reading. The more teachers read books, the more they get their interest in reading. According to National Endowment for the Arts, there are two types of reading frequency of teachers. The first type of reader is the one who never has intention to read and do not have any purpose by doing reading, they are usually reading just for the daily teaching lesson. The second type of reader is the one who really like to read, they have some purposes in reading, not only for daily instruction but also for the range of knowledge.

(4) Time Spent on Reading: According to Gaona and Gonzalez (2011), there are two types of time spent in reading. They are (1) Time spent on academic reading: It is the time that the person reports to devote to reading books on studying subjects. Most of the teachers read on the purpose of their teaching subjects. (2) Time spent on non-academic reading: It is the time that the person reports to devote to reading books that are not directly relate to the subjects of his or her studies. It is purposed for the mediated time and for enjoyment after reading.

The time that teachers spent on their academic time helps them to solve their curiosity in learning and it helps them to enlarge their knowledge and increase their new vocabulary. The

time that they spent on non-academic time helps them to reveal their stress after school, for their enjoyment and for their hobby.

(5) Motivation in Reading: Motivation in reading motivation perceive as a complex and complicated series of the desire and assumption in direct reading behavior and mostly have a positive connection with each other. According to Baket and Wigfield (as cited in Hamdini, 2018), reading motivation is defined as the inseparable part of the whole reading efficiency and the reader engagement, which is tightly connected with pupils' entire academic motivation.

Benefits of Reading Habit for Teachers

Reading is an excellent skill that can provide many benefits in many fields of life without limits, especially in education. Educators are intelligent people who have the absolute trust of society to sustain and grow knowledge in human existence; they are trustworthy individuals who can guide the future generation with a high-quality education. According to Broemmel et al. (2019), teachers who experience significant changes in teaching and continue to experience better teaching quality have strong reading habits. Thus, teachers should continue to educate themselves and develop their practical teaching skills such as reading relevant reading sources.

The relationship of teacher beliefs to practice is highly complex and appears to be dialectical rather than unilateral, in so much as practice does not always follow as a direct result of beliefs. Rather, change in beliefs may come after, or as a result of, change in practice. Pajares (1992) cautions that regarding teachers' educational beliefs as separate and unconnected to their belief systems and values.

Reading as a part of Professional Growth

Pedagogy as a profession must seek to show that the nature of the work it does is such as both to require and to cultivate in those who do it not only special knowledge and skills but also special qualities of mind and character. In order to get special knowledge, reading is the best thing to pour the knowledge of mind and also a teacher's pedagogy especially in instructional practices. Professional expertise (special knowledge and skills) is based on the belief that the performance of a vital function in a society requires immense knowledge and specialized skills, which must be acquired through prolonged education and experience. The teacher or professor must also publicize his discovery one way or another so that the younger generation everywhere may benefit from instruction informed and improved by his fresh insight. In Myanmar there exists four main channels of publicizing – Pyinnyatasaung for grade teachers, Pyinnyalawka for secondary school teachers, Tekkatho Pyinnya Padaytha for university and college faculty, and advanced research journals/ magazines for learned professors and expert pedagogues. The important point is that there should be no ambiguity in the mind of the teacher or the public on the precedence of the student's growth and development over the teacher's fame and/or fortune (Khin Zaw, 2001).

Teachers' Instructional Practices

Teachers seldom consider professional growth. In-service preparation is also one of the most important components in the total teacher education program. In-service teachers do either reading or writing. A professional teacher is also aided by reading of three types (i) professional, (ii) expansive, (iii) slice-of-life or variety reading. Reading for profession growth are ways of adding breadth to a pedagogue as both a person and a teacher. It can take several benefits for the

professional immaturity and inexperience (Khin Zaw, 2001). Teachers have a responsibility to make every lesson a positive and productive learning experience for all students and this cannot be achieved without careful planning. Reflective teaching should involve searching for patterns about one's thinking, about classroom practices and interrogating the reasons for labelling some lessons as success or failures (Raines & Shadiow, 1995, as cited in Killen, 2015). Using the notions of frames, Schön (1983, 1987, as cited in Killen, 2015) argued that professionals develop their expert knowledge through two separate, but related, processes: reflection-on-action and reflection-in-action. Both approaches to reflection involve similar activities- framing and reframing problematic situations – but they occur at different times in relation to the situations being considered. Reflection-on-action is the typical self-evaluative thinking that teachers engage in after lessons. Reflection-in-action occurs on the run-teachers simultaneously teach and analyze what they are doing and how the learners are reacting. Reflecting the instructional practices when the teachers encountered the related experiences can refine their teaching skills.

Research Method

Population and Sample Size

This study is geographically restricted to Amarapura Township, Mandalay Region and then (15) basic education schools in all levels were selected by using simple random sampling method. The number of population and sample size for two selected schools are presented in Table1.

Table 1 Population and Sample Size

Participants	Population	Sample
Upper Secondary Teacher	131	44
Lower Secondary Teacher	232	71
Primary Teacher	382	71
Total	745	186

Research Design

The design used in this study was cross sectional survey design.

Instruments

As for the instruments, a questionnaire for the relationship between reading habits of in-service teachers and their instructional practices was used. In order to obtain participating teachers' information; age, years of teaching experience, qualification, teacher training program, current teaching grade and current school level were asked by using multiple choice item format in part one. The instrument for the reading habits of in-service teachers was based on the questionnaires of Riesty (2018). For the questions in part two of the questionnaire, there are thirty seven items and used perception five-point Likert scale:

(1) Strongly Disagree, (2) Disagree, (3) Undecided (4) Agree and (5) Strongly Agree was used for five factors: (1) Attitude toward reading habit, (2) Books read, (3) Reading frequency (3) Time spent on reading, (5) Motivation for reading. In order to support the questionnaire, two open-ended question were also used in this part.

The instrument for the in-service teachers' use of knowledge getting from reading habits in their instructional practice was developed based on the study of Wijayanti, Mujiyanto & Pratama (2022) consisted of three subscales: (1) Planning , (2) Instructional Process, (3) Reflection.

In part three of the questionnaire, there are eighteen items and participants will require answering each question using frequency five-point Likert scale (1= Never, 2= Seldom, 3= Sometimes, 4= Often and 5= Always). Open-ended question was used in this section to get more detailed information.

Procedure

Firstly, the literature review concerning the research was made. After that, the instruments were constructed to survey the in-service teachers' reading habits and their instructional practices. For validation, the copies of questionnaires were distributed to three experienced teachers from the Department of Curriculum and Methodology, Sagaing University of Education. And then, the items were modified according to their advice and guidance. The pilot testing was conducted with a non-sample group of (60) in-service teachers at Shwe Min Wun Practising High School, Sagaing. Based on the pilot result, the internal consistency reliability of the questionnaire was determined by Cronbach's coefficient alpha. The internal consistency reliability of the questionnaire for the reading habit of in-service teachers was (.764) and that of the questionnaire for the use of knowledge getting from reading habit on their instructional practice was (.974). According to Morgan, Leech, Gloeckner and Barrett (2013), the questionnaires had internal consistency reliability and so the researcher conducted the main survey. The procedure did not disrupt the participants' normal, daily and classroom activities. After that the data were analyzed using descriptive statistics and inferential statistics.

Analysis of the Data

Two methods of quantitative data analysis were used in this study. The answers to the questionnaires were analyzed by using descriptive statistics (means and standard deviation) and inferential statistics (one-way analysis of variance (ANOVA) and Post Hoc Multiple Comparison Test (Games Howell) was utilized as suggested by Morgan, Leech, Gloeckner and Barrett (2013) in case to guarantee type I error since the participants from each selected schools were not equivalent and to examine the differences between reading habits of in-service teachers in terms of teaching experience, qualification and current school level). And then, Pearson product-moment correlation was used to explore the relationship between reading habits of in-service teachers and their instructional practices.

Findings

Findings of Research Question (1)

Table 2 Means and standard deviations of reading habits of in-service teachers on each dimension

Dimension	N	Minimum	Maximum	M	SD
D1	186	3	4	3.66	.242
D2	186	3	5	3.99	.396
D3	186	1	5	3.01	.603
D4	186	2	5	3.25	.440
D5	186	2	5	3.13	.528
Overall	186	3	4	3.51	.246

Note. D1 = Attitude toward reading; D2 = Book Type; D3 = Reading Frequency; D4 = Reading Time; D5 = Motivation to read.

The mean values of book type ($M = 3.99$) is the highest and that of reading frequency ($M = 3.01$) is the least in all of the dimensions. It can be interpreted that in-service teachers like to choose the books which may give the information and also ideas to use in their instructional practices. But it can be interpreted that they rarely read the book again once they had ever read. The comparison of mean scores are illustrated in figure 1.

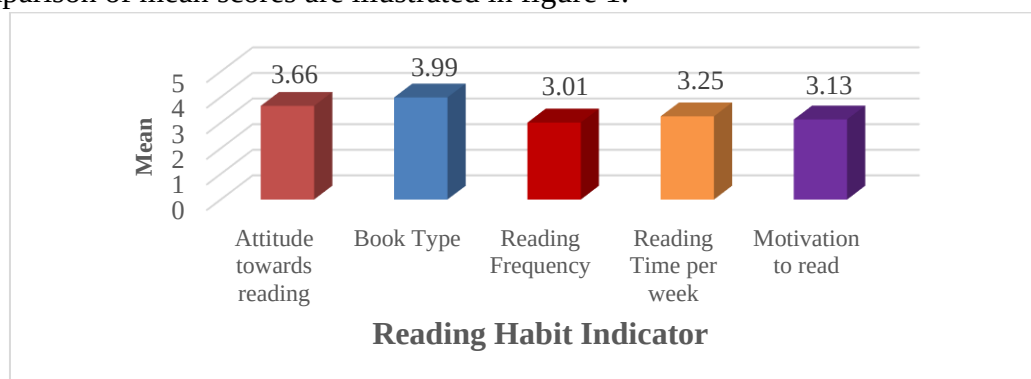


Figure 1 The comparison of means on each dimension of reading habit of the in-service teachers.

Table 3 *The Percentage of In-service Teachers' Response on General View about the Book Type that are chosen to read*

No	Item	N	SDA	DA	UD	A	SA
			Percentage (%)				
16	I like reading the magazines on teacher education like Pyin-nyar-ta-saung, Pyin-nyar-law-ka	186	-	-	2.2	44.1	53.8
17	I like reading the reasearch publications.	186	-	2.7	3.2	71.5	22.6
18	I like reading the daily newspaper	186	-	2	0.5	57.5	40.9
19	I like reading textbooks.	186	-	-	-	44.6	55.4
20	I like reading novels.	186	-	1.1	0.5	73.1	25.3
21	I like reading online updates.	186	-	1.6	0.5	66.1	31.7
22	I like reading every literature.	186	-	-	0.5	43.5	55.9

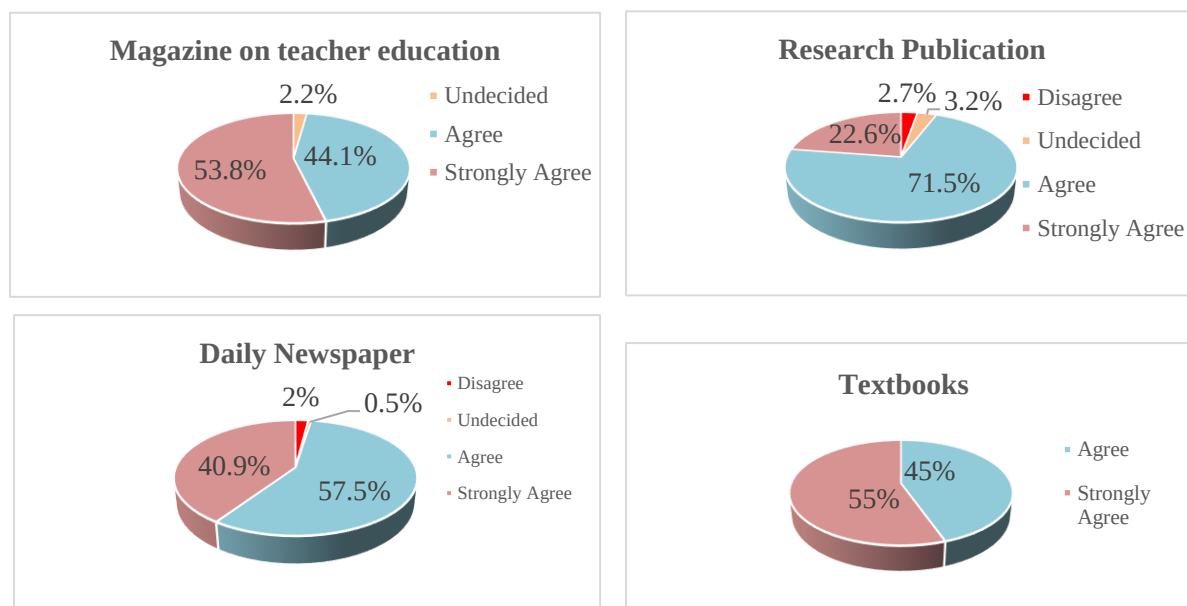


Figure 2. In-service Teachers' Response Rate on General View about the Book Type that are chosen to read

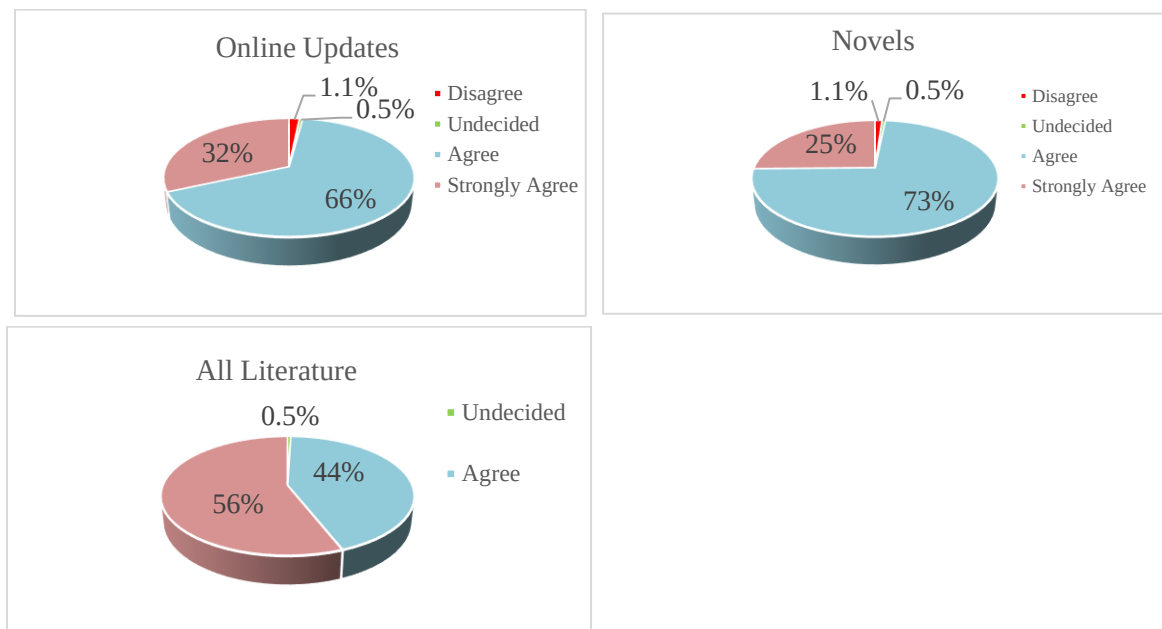


Figure 2. In-service Teachers' Response Rate on General View about the Book Type that are chosen to read (Continued)

Table 4 *In-service Teachers' Responses about their Reading Time per week*

Time Taken	<i>n</i>	Percentage
About 1 hour	27	14.5
About 2 hours	33	17.7
About 3 hours	31	16.8
About 4 hours	9	4.8
About 5 hours	49	26.3
Others	37	19.9
Total	186	100

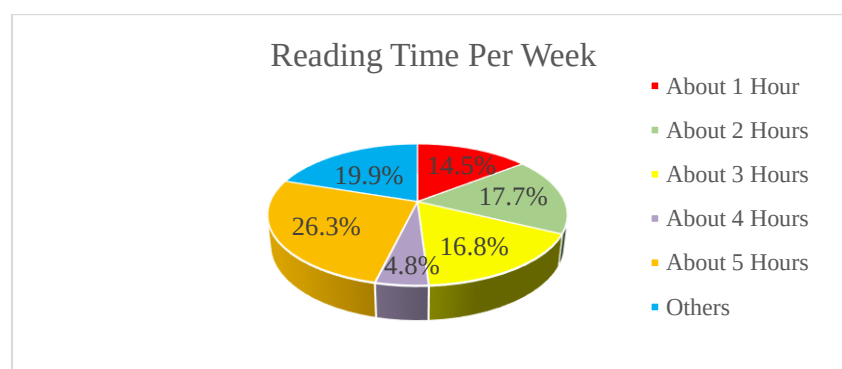


Figure 3. In-service Teachers' Response Rate on General View about their reading time per week

Analysis of Reading habits of In-service teachers in terms of Teaching Experience

To find out whether there is a difference in the reading habits of in-service teachers in terms of teaching experience, teachers' teaching experiences were divided into four groups such as under 2 years, (3-5) years, (6-10) years and over 11 years and the collected data were analyzed by using descriptive statistics and one-way analysis of variance (ANOVA). The mean values and

standard deviations of teachers grouped by teaching experience and ANOVA results were shown in Table 5.

Table 5 Means and standard deviations of reading habits of in-service teachers in terms of teaching experience

Teaching Experience(Years)	<i>n</i>	<i>M</i>	<i>SD</i>
≤ 2	22	3.49	.238
3 to 5	15	3.48	.222
6 to 10	32	3.49	.220
≥ 10	117	3.52	.259
Total	186	3.51	.246

The mean value of teachers whose teaching service having over 11 years ($M = 3.52$) is the highest among the other in-service teachers. The mean values of teachers whose teaching service under 2 years and (6 – 10) years is ($M = 3.49$). The results can be interpreted that highly in-service teachers have great reading habits and use most of the knowledge and idea getting from reading since they have ever read many books as they have spent many life span and experience many events that can be drawn to identical in their practical situation with the events that have read. It can also be stated that all the mean values of in-service teachers are nearly 4 points on 1-5 rating scale. Based on the mean values, Figure 4 is illustrated to see clearly. It showed that the comparison of the means for the in-service teachers by teaching experience.

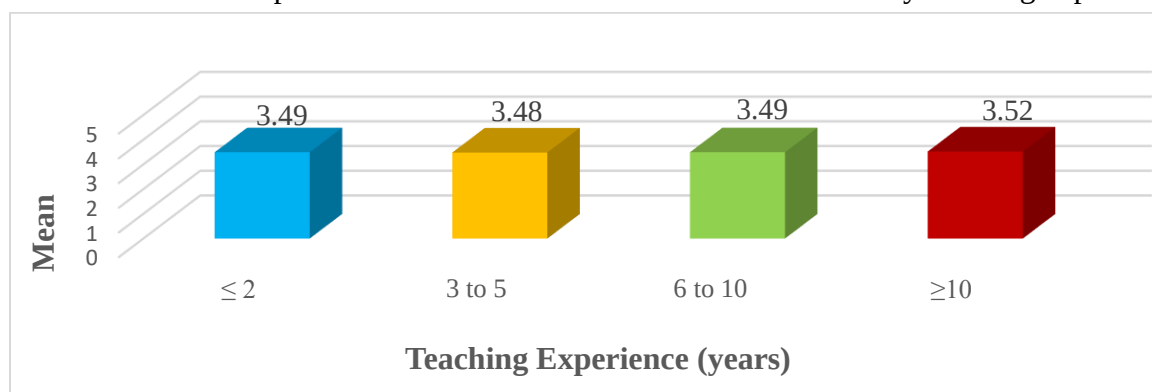


Figure 4. The comparison of means for reading habit of In-service teachers in terms of teaching experience.

Table 6 ANOVA Results of in-service teachers' reading habits in terms of teaching experience

Teaching Experience	Sum of Squares	<i>df</i>	Mean square	<i>F</i>	<i>p</i>
Between Groups	0.54	3	.018	.293	.831
Within Groups	11.176	182	.061		(ns)
Total	11.230	185			

Note. ns = not statistically significant.

The ANOVA results meant that there was no significant differences in comparing in-service teachers' reading habit in terms of reading habit ($p < .05$). Consequently, it can be interpreted that in-service teachers' reading habit did not depend on the their teaching experience. It can be seen in Table 6: ANOVA results of in-service teachers' reading habits in terms of teaching experience.

Findings on Research Question (2)**Table 7 Means and standard deviations of In-service teachers' use of knowledge getting from reading habit to their instructional practice on each dimension**

Dimension	N	Minimum	Maximum	M	SD
D1	186	2	5	4.48	.756
D2	186	2	5	3.99	.597
D3	186	2	5	4.54	.695
Overall	186	2	5	4.22	.607

Note. D1 = Lesson Planning; D2 = Teaching – Learning Process; D3 = Reflecting.

According to the results, the mean scores of in-service teachers' use of knowledge getting from reading habits to their instructional practices was least in teaching-learning process ($M = 3.99$) and highest in reflecting ($M = 4.54$). Thus, it can be interpreted that teachers use the knowledge getting from reading habit only for few times during the teaching-learning process because they may pay attention mostly either on the subject matter content or on instruction time. On the other hand, the teachers use these in reflecting because they can match the ideas that were used during the instruction in order to make fact check or the events in the reading content were matched with the events which they experienced. In order to be seen clearly, Figure 5 is illustrated.

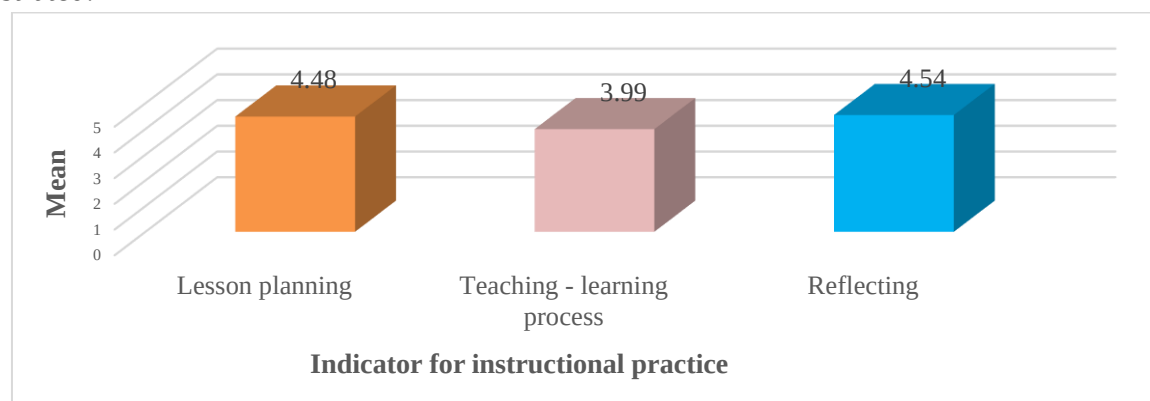


Figure 5. The comparison of means on each dimension of teachers' instructional practice using knowledge getting from reading habit.

Descriptive statistics (ANOVA) are analyzed in order to determine teachers in which positions are statistically significant.

Table 8 ANOVA Results of in-service teachers' use of knowledge getting from reading habits in their instructional practices in terms of position

Dimension	Position	Sum of Squares	df	Mean square	F	p
D1	Between Groups	3.646	2	1.823	3.268	.040*
	Within Groups	102.070	183	.558		
	Total	105.715	185			
D2	Between Groups	2.883	2	1.441	4.189	.017*
	Within Groups	62.972	183	.344		
	Total	65.854	185			
D3	Between Groups	4.137	2	2.069	4.437	.013*
	Within Groups	85.311	183	.466		
	Total	89.448	185			

Note. D1 = Lesson Planning; D2 = Teaching – learning Process; D3 = Reflecting. * $p < .05$.

Table 9 Results of multiple comparison for the use of knowledge getting from reading habits of in-service teachers towards their instructional practices on each dimension in terms of teaching position

Dependent Variable	Teaching Position (I)	Teaching Position (J)	Mean Difference (I-J)	p
D1	Upper Secondary Teacher	Primary Teacher	.339	.007*
	Upper Secondary Teacher	Lower Secondary Teacher	.373	.029*
D2	Upper Secondary Teacher	Primary Teacher	.301	.003*
D3	Upper Secondary Teacher	Primary Teacher	.388	.002*

Note. D1 = Lesson Planning; D2 = Teaching – learning Process; D3 = Reflecting. * $p < .05$.

Findings on Research Question (3)

As described by the research question (3), to get the relationship between the reading habit and teaching practices of in-service teachers, Pearson product-moment correlation was used. The results of the findings were described in Table 6.

Table 10 Pearson correlation between reading habits and instructional practices of in-service teachers

		Correlation	
		Reading Habits	Instructional practices
Reading Habits	Pearson Correlation	1	.189**
	Sig.(2-tailed)	-	.01
	N	186	186
Instructional Practices	Pearson Correlation	.189**	1
	Sig.(2-tailed)	.01	-
	N	186	186

Note. **Correlation is significant at the 0.01 level (2-tailed).

The result showed that there was a significant correlation between the reading habit and instructional practice of in-service teachers at $r(1,186) = .189, p < .01$. It was directed that the correlation was positive but the relation strength is small as Cohen (1988, pp. 79-81) suggested. This means that in-service teachers who have relatively reading habit were slightly use the knowledge getting from reading in their instructional practices. According to Mills and Gay (2016), it can be interpreted that there was a correlation but very weak between the reading habits and instructional practices of in-service teachers. Therefore, reading habits of in-service teachers can have an effect to a small extent in their instruction practice.

Summary of Analysis and Interpretation of Data

According to the statistical analysis on the mean scores of respective dimensions, the results of the study can be summarized as follows:

1. In-service teachers tend to read all types of literature. They like to spend about 5 hours per week for reading.
2. In-service teachers used the knowledge getting from reading habits in the reflection sector relating to their instructional practices. Upper secondary teachers mostly used this knowledge than teachers in other position.
3. The reading habits of in-service teachers can have an effect to a small extent (small positive relations) in their instruction practice.

Discussion

In-service teachers have the positive attitude toward reading and enjoy to read a book. Most of them select the books to read besides their curriculum course books. Since the in-service teachers were facing work overload during the research doing time, they had the little time to read and number of book read are less. Although they are busy with their duties, they have already motivated to read.

The findings of the study indicated that the mean values of five dimension of in-service teachers' reading habit: Attitude towards reading ($M= 3.66$), reading by choosing book type ($M= 3.99$), reading frequency or frequency to read a book ($M= 3.01$), reading time per week ($M= 3.25$) and motivation to read ($M= 3.13$). Therefore, it can be interpreted that in-service teachers have the positive attitude toward reading and enjoy to read a book. Most of them select the books to read besides their curriculum course books. The ANOVA result showed that no significant differences were found in the reading habit of in-service teachers in terms of teaching experiences. Research findings pointed that teachers whose teaching service over 11 years was the highest and those who had teaching service (3-5) years is the lowest. It can be interpreted that in-service teachers have the positive reading habit with various frequency to read a book.

Ruber (2019) revealed that middle school teachers' personal reading habit did not impact on their literacy practices in the classroom whereas in this study, there was an positive impact on literacy practices due to the reading habit of in-service teacher especially in the reflecting section since the Pearson product moment correlation result is $r(1,186) = .189$, $p < .01$ and can be accepted that it has a weak positive relation.

Wijyanti, et al. (2022) conducted a narrative inquiry research on three Indonesian English teachers at one of the vocational high schools in Indonesia with the title of the influence of the teachers' reading habit on their teaching practice. The results revealed that reading can promote their instructional practices. In this study, the findings of the open-ended questions show that teachers' reading habits have vital roles in their practice whereas most of in-service teachers from selected sample also said that reading plays a vital role in the profession. They usually read Pyin-Nyar-Ta-Saung and many other non-fiction and fiction related to the curriculum. Reading can improve their knowledge and apply the related experiences. They often read in the academic time and usually read in the weekend. Most of in-service teachers replied to the open ended question that they can get many knowledge from reading and can apply in the teaching-learning process although the statistical result point out that in the reflection sector.

Suggestions

A professional is a person who possesses some specialized knowledge and skills, can weigh alternatives, and can select from among a number of potentially productive actions (Morine-Dersheimer, 2011). This study was a small-scale study and used small size of the sample population. Thus, it cannot cover all in-service teachers from basic education sector. A large sample size should be used to increase the statistical power of the result. The data in this study was collected through questionnaire. As an alternative, observation checklist and interview question should be used in order to triangulate the result. Further study should be conducted to investigate the effect of reading habits of teachers who are working in other teaching position

like teachers in higher education sector as the workload condition and study habits may be different and can reveal a different result.

Conclusion

As teaching is being a profession which is based from knowledge transmission with various effective methods, teachers should be rich in pedagogical content knowledge and have a reading habit as it can provide as pool of knowledge for the profession. Findings of this survey research lead to the following conclusions. Teachers should have a regular reading habit and if not so, should join in extensive reading program, book club to improve the cognition level. Studying the reading habits of in-service teachers, possible relationship between the reading habits and use of knowledge getting from reading habit in the instructional practice of in-service teachers can provide some ideas for the improvement in the profession. The main purpose of the study is to investigate the relationship between the reading habits of in-service teachers and their instructional practices. The findings of this study indicated that the in-service teachers have positive reading habits and use the knowledge getting from reading habit in their reflection sector. All in all, it was hoped that that result of the present study may provide useful ideas and information for the route of in-service courses, lectures, seminars, conferences summer workshops and extension classes.

Acknowledgements

We would like to express special thanks to Dr. Myat Myat Thaw, an honorable Rector of Sagaing University of Education, Dr. Khin Hnin Yi, Pro-Rector of Sagaing University of Education and Dr. Cho Kyi Than, Pro-Rector of Sagaing University of Education for their kind permission to do our study. We would like to express sincere and deep thanks to Dr. Soe Than, Professor and Head of Department of Curriculum and Methodology (Retired), Sagaing University of Education for his timely advice, expert judgments, critical remarks and necessary information for our study.

References

- Bandura, A. (1977). *Social learning theory*. United States of America: General Learning Corporation.
- Bandura, A. (1989). Social cognitive theory. In R. Vasta (Ed.), *Six theories of child development*, 6 (pp. 1-60). Greenwich, CT: JAI Press.
- Broemmel, A. D., Evans, K. R., Lester, J. N., Rigell, A., & Lochmiller, C. R. (2019). Teacher reading as professional development: Insights from a national survey. *Reading horizons: A journal of literacy and language arts*, 58 (1).
- CESR, (2013). *Myanmar comprehensive education sector review phase 1: rapid assessment: technical annex on the secondary education subsector*. Retrieved from Asia Development Bank website: <https://www.adb.org/projects/documents/cesr-p1-rapid-assessment-annex-secondary-education-tacr>.
- Chan, D. K. C., Fung, Y. K., Xing, S., & Hagger, M. S. (2014). Myopia prevention, near work, and visual acuity of college students: Integrating the theory of planned behavior and self-determination theory. *Journal of Behavioral Medicine*, 73(3), 369-380. doi: 26 10.1007/s10865-013-9494-9.
- Chettri, K. & Rout, S. K. Dr. (2013). *Reading habits – An overview*. *IOSR Journal of humanities and social science*, 14 (6). Retrieved from <https://www.iosrjournals.org/iosr-jhss/papers/Vol14-issue6/C01461317.pdf>
- Cohen, J.W. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Gaona, J. C. G. & Gonzalez, E. R. V. (2010). *Relationship between reading habits, university library and academic performance in a sample of psychology students*, 40(1), 55-73. Retrieved from http://publicaciones.anuies.mx/pdfs/revista/Revista157_S1A3EN.pdf.

- Hamdini, S. C. (2018). Reading habits university students in Pekanbaru. *Published thesis*. Retrieved from file:///C:/Users/Acer/Downloads/Reading%20Habit%20Indicator.pdf
- Hassen, R. (2016). Reading habits of secondary school teachers: A study of selected secondary schools in Addis Ababa and Dessie. *Journal of education and practice*, 7(22).
http://baylor-ir.tdl.org/bitstream/handle/2104/3001/MichellePettijohn.phd.pdf?sequence=4
- Isakson, R. L., Isakson, M. B., Plummer, K. J., & Chapman, S. B. (2016). Development and validation of the Isakson survey of academic reading attitudes (ISARA). *Journal of college reading and learning*, 46(2), 113-138. Retrieved from <https://doi.org/10.1080/10790195.2016.1141667>.
- Khin Zaw, Dr. (2001). *Theoretical pedagogy (II) (Ethics)*. A reference for post graduate students in education, PhD Course. Yangon: Yangon University of Education.
- Killen, R. (2015). *Effective teaching strategies: Lessons from research and practice*. (7th ed.). Australia: Cengage Learning.
- Koellnar, K. & Greenblatt, D. (2021). In-service teacher education. *Oxford bibliography*. DOI: 10.1093/OBO/9780199756810-0196.
- Saleh, S. & Jing, T. A. (2020). Instructional Practices in Science Education in German and Malaysian Secondary Schools: A Comparative Case Study. *International Journal of Instruction*, 13(4). Retrieved from <https://files.eric.ed.gov/fulltext/EJ1270748.pdf>
- McKenna, M. C., Conradi, K., Lawrence, C., Jang, B. G., & Meyer, J. P. (2012). Reading attitudes of middle school students: Results of a US survey. *Reading research quarterly*, 47(3), 283-306. Retrieved from <https://doi.org/10.1002/rrq.021>.
- Mills, G. E. & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). New York: Pearson Education Limited.
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2013). *IBM SPSS introductory statistics: Use and interpretation* (5th ed.). New York: Routledge.
- Morine-Dersheimer, G. (2011). Instructional planning. in J. M. Cooper, T. D. Tenbrink, G. Morine-Dersheimer, R. Shostak, M. Sadker, D. Sadker, K. Zittleman, C. A. Tomlinson, C. Weinstein, W. Weber, M.S. Leighton, & J. Irizarry (Eds.), *Classroom teaching skills*, (pp.46-84). Australia: Wadsworth, Cengage Learning.
- Nabavi, R. (2012). *Bandura's Social Learning Theory & Social Cognitive Learning Theory*. Retrieved from: <https://n9.cl/jjpyw>
- Pajares, M. F. (1992). Teachers' beliefs and educational research: cleaning up a messy construct. *Review of educational research*, 62(3), 307-332.
- Palani, K. K. (2012). Promoting reading habits and creating literate society. *International Refereed Research Journal*. 3(1). Retrieved from www.researchersworld.com
- Powell, M. P. (2005). *Teachers and Professional Reading: A study of reading experience and administrative support across Traditional, Paideia, and PDS Schools* (Doctoral Dissertation). Retrieved from <http://baylor-ir.tdl.org/bitstream/handle/2104/3001/MichellePettijohn.phd.pdf?sequence=4>
- Riesty, J. (2018). *Theoretical framework for reading habit*. Retrieved from <https://repository.uir.ac.id/4270/5/bab2.pdf>
- Romeo, W. R. (2021). *Reading Attitudes, Habits and Classroom Practices among Ecuadorian Master's Students*. Retrieved from <http://dx.doi.org/10.35381/r.k.v7i1.1680>
- Ruber, J. (2019). *The impact of middle school teachers' personal reading habits on their literacy instruction* (Master Thesis). Retrieved from https://soar.suny.edu/bitstream/handle/20.500.12648/116/Ruber_Jessica_Masters_Thesis_Spring2019.pdf?sequence=1&isAllowed=y
- Sangkaeo, S. (1999). Reading Habit Promotion in ASEAN Libraries. *IFLA Council and general conference*, (pp.91-114). Bangkok. Retrieved from <https://eric.ed.gov/?id=ED441496>
- Singh, M. Dr. (2013). A comparative study of study habits among boys and girls students of intermediate college in Lucknow city. *International Journal of Creative Research Thoughts (IJCRT)*, 1(1), 625-721. Retrieved from <https://ijcrt.org/papers/IJCRT1134677.pdf>

- Tella, A., & Akande, S. (2007). Children's reading habits and availability of books in Bostwana primary schools: Implications for achieving quality eduation. *The Reading Matrix*, 7(2) Retrieved from <http://www.readingmatrix.com/article/adeyinka/article/pdf>
- Wijyanti, E., Mujiyanto. Y. & Pratama. H. (2022). The influence of the teachers' reading habit on their teaching practice: A narrative inquiry. *English Education Journal*. 12(2), 205-214. Retrieved from <https://journal.unnes.ac.id/sju/index.php/eej/article/view/56256>

THE EFFECTS OF PROBLEM-BASED LEARNING ON GRADE 11 STUDENTS' ECONOMICS ACHIEVEMENT

Theingi Lwin¹ and Wai Wai Oo²

Abstract

The study aimed to investigate the effects of problem-based learning on Grade 11 students' economics achievement. A quantitative research method was used to compare economics achievement between the students who received instruction with problem-based learning and those who did not. The design applied was a quasi-experimental study with a nonequivalent control group design. The sample schools were randomly selected and the groups were intact. There were 102 participants Grade 11 students from two schools in Sagaing Township. Learning materials were selected from the Grade 11 Economics Textbook: Chapter 4 (Money and Banking). To establish the reliability of the instruments, a pilot study was conducted with (35) Grade 11 students. The reliability level of Kuder-Richardson for the pretest items was (0.97) and the value of Cronbach's alpha for the posttest questions was (0.73). After the treatment, the data obtained were analyzed by using the independent samples *t* test. The results revealed that there were significant differences in economics achievement between the students who received instruction with problem-based learning and those who did not receive it at $p < .01$. By using Cohen's *d*, the values of effect size (0.83) and (1.1) for both schools were larger than typical. It was proved that the experimental groups got better economics achievement than the control groups. This research highlights that problem-based learning is a more effective and well-equipped approach to raising economics achievement and problem solving skills.

Keywords: problem, learning, problem-based learning, economics, achievement

Introduction

Today, the amount of knowledge is as rapidly explosion as the problems people face in the global society. People need to know how to solve problems in their daily lives and how to handle the predicament tactfully. So it is urgently demanded to find ways that students not only need to have the body of knowledge but also need to be able to apply it to solve complex problems in meaningful ways. Successful problem solvers possess the foundation of knowledge and master the skills to utilize the existing knowledge in problem solving. Delisle (1997) stated that all education involves either problem solving or the preparation of problem solving which is important for students facing hard challenges in real life. From calculations of economics problems to literary analysis to economics issues investigation, teachers who teach economics direct students how to answer questions and solve problems.

When strategically posed, problems and questions with associated economics issues can enhance the depth and quality of thinking (Tan, 2003). The focus here is intellectual problem solving for real-world application in learning. Tan (2002) explained that the goals of problem-based learning are content learning, acquisition of discipline-related heuristics, and development of problem solving skills. Problem-based learning also includes the life-wide learning goals of self-directed learning, information-mining skills, collaborative and team learning, and reflective and evaluative thinking skills.

Economics is the social science that relates to the ends and scarce. Based on scarcity, people have to choose to fulfill their wants and needs. Doing the right things right enhances

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problem solving skills with logical methods rather than normative ones with vague judgments (Robbins, 1984). It does not primarily stand on the collection of facts to memorize although there are plenty of concepts in economics to learn (Steven & David, 2011). Delisle (1997) suggested that the ordinary teachers emphasize facts and procedures without giving opportunities to build sound knowledge instead of skipping the formal teaching approach for economics that focuses on transmitting knowledge, skills, and attitudes. In this situation, economics teachers need to consider whether problem-based learning or formal instruction can enhance students' insight. This is the reason why this study aims to investigate the effects of problem-based learning on Grade 11 students' economics achievement.

Purpose of the Study

The major purposes of the study are as follows:

1. To investigate the effects of problem-based learning on Grade 11 students' economics achievement.
2. To present the economics achievement of Grade 11 students who receive instruction with problem-based learning.
3. To make suggestions and recommendations for developing teaching economics based on the study results.

Research Questions

The following research questions are set down to carry out the purposes of the study.

1. To what extent does problem-based learning affect Grade 11 students' economics achievement?
2. How does the economics achievement of the students who receive instruction with problem-based learning differ from that of those who do not receive it in answering remembering, understanding, applying, and analyzing level questions?

Definition of Key Terms

Throughout the study, five key terms are used. It is necessary here to clarify exactly what is meant by the words: problem, learning, problem-based learning, economics, and achievement.

Problem	:	A problem is defined as a situation or a task that is difficult to control due to complexity and opaqueness. In everyday language, a problem is a question proposed for a solution, a matter stated for examination or proof (Seel, 2012).
Learning	:	Learning is the change of behavior through direct or indirect experiences (Mangal & Mangal, 2019).
Problem-based learning	:	Problem-based learning is a student-centered approach in which students learn about a subject through the experience of problem-solving (Nilson, 2010).
Economics	:	Economics is the social science that deals with how people make choices about ways to use limited resources to satisfy their unlimited and competing wants (Clayton, 2008).
Achievement	:	Achievement is an individual proficiency level in a given area of knowledge or skills by measuring academic achievement tests (Noori, 2021).

Scope of the Study

This research study is geographically restricted to No. (1) Basic Education High School and No. (3) Basic Education High School in Sagaing Township, Sagaing Region. The participants from the selected schools were Grade 11 students in (2023-2024) Academic Year. In this study, the experimental groups receive instruction with problem-based learning, and the control groups also receive formal instruction for the same topics. This study is conducted with the content area of Chapter 4 (Money and Banking) from the Grade 11 economics textbook.

Review of Related Literature

Theoretical Framework of Problem-Based Learning

Problem-based learning was first rooted in cognitive theory in which learning focuses on students' insight. Cognitivist theorists seek to understand how individuals learn and what goes on inside the mind when learning occurs (Schmidt, 1983 as cited in Linden & Alanko-Turunen, 2006). According to Thamrin and Hutasuhut (2017), problem-based learning focuses on helping students build their knowledge through real-world problem-solving efforts in a structured way. Savin-Baden and Major (2004) stated that students utilize their previous knowledge and ways of thinking and construct knowledge into a new form that is understandable and meaningful to them. John Dewey's, Piaget's, and Vygotsky's theories are major works of problem-based learning.

History of Problem-Based Learning

In the early 1950s, a pedagogical approach to problem-based learning has relatively emerged in medical education such as the New Mexico Medical Colleges and the Harvard University of Medical School (Cuban, 1999). According to Barrows and Tamblyn (1980), students explored a problem situation and then examined their knowledge gaps based on the findings of the exploration to decide what information they needed to acquire or what information they needed to resolve the situation in which they were presented.

In the latter half of the twentieth century, Savin-Baden and Major (2004) described that the use of problem-based learning expanded in education and other professional fields. In secondary education, teachers and students have grappled with questions in ways that are engaging, challenging, and productive in an environment where they can safely take academic risks. From the modern perspective, teachers are not authoritative experts; rather they participate in inquiry. They are co-learners so there is a shift away from patrollers and controllers of knowledge. Problem-based learning has developed as an essential approach in the evolution of teaching and learning in academics.

Phases of Problem-Based Learning

There are five phases of problem-based learning. The teacher begins to introduce the problem situation and ends with the reflection and evaluation of students' work. Tan (2003) developed the five phases of problem-based learning.

Phase 1. Meeting the problem

The problem scenario acts as a stimulus to scaffold and extend a realistic context students might encounter in the future. This means that students are asked about their previous knowledge of real-life situations. For example, to teach the functions of money, the teacher begins to ask the

question. Imagine the most important things for a person who stays conveniently in daily life. This question leads to students' interest in economics issues concerned with the importance of money for livelihood. The next step is to define and analyze the problem of this concept.

Phase 2. Problem analysis and learning issues

The students' prior knowledge is activated and the teacher gives questions to discuss new learning. For instance, the second task of students is to discuss the functions of money for better explanations of the issues and questions posed. People exchange goods and services to fulfill their needs and wants. The functions of money play a vital role in the exchange system. The results of the discussion or the solutions to problems are reported in the next step.

Phase 3. Discovery and reporting

Students report their discovery of learning to their own groups. They gather to share the new information they have individually discovered. The teacher trains students to have group collaboration and communication skills through questions and encourages them to seek further information from one another. It is followed by the example that the teacher also helps students learn the key areas of the functions of money and the evocation of money to solve the weakness of the barter system and obtain accurate and valid information for them.

Phase 4. Solution presentation and reflection

After students have presented their solutions to the problem scenario, they reflect on their knowledge acquired such as the functions of money and the evocation of money or legal tender to solve the weakness of the barter system. This involves contextualization and application of the knowledge to the situation. Teacher helps students be aware of gaps and correct misconceptions.

Phase 5. Overview, integration, and evaluation

The review and evaluation process is important to synthesize students' ideas. The teacher encourages students how to criticize the new knowledge they have learned.

In the problem-based learning process, the teacher pays close attention to students' thoughts through the problem solving steps. The teacher also evaluates the results of whether the problems and questions presented acquire the new concepts or the desired learning outcomes.

Advantages and Disadvantages of Problem-Based Learning

Shoimin (2014, as cited in Mahardik, Subiki & Maimunah, 2017) described that there are several advantages of problem-based learning. They are:

- Students are encouraged to have the ability to solve problems in real situations.
- Students can build their knowledge through learning activities.
- Learning to focus on issues that matter and that have nothing to do not need to be learned by the students. This reduces the burden on students by memorizing or storing information.
- Students accustomed to using resources have better knowledge of the library, the internet, interviews, and observations.
- Students can assess their own learning progress.
- Students can conduct scientific communication in discussion or presentation of the results of their studies.

- Individual students' learning difficulties can be overcome through group work in the form of peer teaching.

However, Wirantaka and Sukarno (2022) suggested that problem-based learning has many limitations as follows:

- If the teacher does not prepare carefully the problem-based learning process, this will affect students' understanding.
- Initially, it takes time to solve a problem until students reach a solution.
- Experience teachers or enthusiastic teachers are needed to apply problem-based learning in the economics classroom.

Research Method

Population and Sample Size

The sample schools were selected by the use of the simple random sampling method of Mills and Gay (2016) to carry out the research. The selected schools were two Basic Education High Schools: No. (1) BEHS and No. (3) BEHS Sagaing, Sagaing Township, Sagaing Region. The participants in this study were selected as intact groups from two classes of the schools. The sample size and population size for the two selected schools are presented in Table1.

Table 1 Population and Sample Size

Name of Schools	Population Size	Sample Size		
		Group	Number of Subjects	Total
BEHS 1	150	Experimental	27	57
		Control	30	
BEHS 3	102	Experimental	23	45
		Control	22	

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing

BEHS 3 = No. (3) Basic Education High School, Sagaing

Research Design

A quasi-experimental study with a nonequivalent control group design has been adopted to explore the results of whether a problem-based learning approach affects teaching economics or not (Mills & Gay, 2016).

Research Instruments

The instruments were constructed under the selected design to conduct this experimental research. Therefore, (1) a pretest and its marking scheme, (2) learning materials or sample lesson plans that are based on problem-based learning and (3) a posttest and its marking scheme for quantitative research were used.

Pretest

This study used a pretest to determine group equivalence between experimental and control groups. Pretest items were constructed based on the content areas of chapters from one to three in Grade 11 economics textbooks. It consists of (30) multiple-choice items and its marking scheme. For validation, the pretest questions and their marking scheme were distributed to the

experienced teachers from Sagaing University of Education. After that, test items were modified again according to their suggestions.

To establish the reliability of the instruments, a pilot test was administered with (35) Grade 11 students at the Basic Education Practicing High School Shwe Min Wun, Sagaing Township, Sagaing Region. After that, internal consistency among the pretest items was analyzed by using Kuder-Richardson 20, and the reliability level of KR-20 was (0.97). This result was clear evidence to use pretest questions for the main study.

Posttest

The posttest was constructed to measure the economics achievement of Grade 11 students. It consisted of 15 objective test items and others for essay test items. This test was developed based on Chapter 4 (Money and Banking) for measuring the four levels of Bloom's taxonomy: remembering, understanding, applying, and analyzing (Anderson et al., 2001).

To get validation, the posttest questions and their marking scheme were distributed to the experienced teachers from Sagaing University of Education. Test items were modified to their suggestions. To get reliability, the pilot study was conducted for one week. The allocated time for the posttest was (1:00) hour and the given marks were (50) marks. After the pilot period, the items were analyzed by reliability statistic with Cronbach's alpha and got the reliability level (0.73). This finding result is relevant for the main study to evaluate the economics learning outcomes.

Procedure

To carry out an experimental study, a quasi-experimental design was used. At the start of the study, two classes will be randomly selected from each school as intact groups. These two groups were assigned the experimental and control groups. Then, two groups were administered a pretest to determine the level of performance of the participants for comparison. The means of the groups were calculated by using independent samples *t* test to determine group equivalence. The lesson plans were prepared for the experimental and control groups before the study. Procedures for problem-based learning are developed by using five steps: meeting the problem, problem analysis and learning issues, discovery and reporting, solution presentation and reflection, and overview, integration, and evaluation (Tan, 2003). While the experimental groups received instruction with problem-based learning, the control groups received formal instruction on the same content for the same period. After the treatment period, the posttest was administered to both groups.

Data Analysis

To be able to determine whether there is a significant difference in economics achievement between the experimental group and the control group, the post-test scores were analyzed by using an independent samples *t* test.

Research Findings

Findings of Students' Basic Economics Knowledge

Before the treatment began in each school, the students from two groups were examined on their basic economics knowledge with the independent samples *t* test to study whether their knowledge was equivalent. The data obtained from the pretest are shown in Table 2.

Table 2 *t* Values of Students' Basic Economics Knowledge

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
BEHS 1	Experimental	27	19.81	4.46	1.51	1.37	55	.18 (ns)
	Control	30	18.30	3.87				
BEHS 3	Experimental	23	18.65	3.82	- 0.08	- 0.06	43	.95(ns)
	Control	22	18.73	4.74				

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing.

BEHS 3 = No. (3) Basic Education High School, Sagaing.

ns = not statistically significant.

According to the results, there were no statistically significant differences in basic economics knowledge between experimental and control groups in both schools.

Findings of Students' Economics Achievement on Posttest

Since it was found that the two pretest mean scores in both schools were not initial differences, the independent samples *t* test was only used to analyze the posttest scores to present the effects of problem-based learning on Grade 11 students' economics achievement (Mills & Gay, 2016, p.540). In addition to statistical significance, the effect size was also examined to indicate the magnitude of these differences. Cohen (1988, cited in Morgan et al., 2013) developed the effect size (*d* family) to measure the absolute magnitude of the coefficient, rather than its significance. The guidelines for interpreting the size of the effect are provided by four levels: $d \geq .20$ is small or smaller than typical, $d \geq .50$ is medium or typical, $d \geq .80$ is large or larger than typical and $d \geq 1.00$ is much larger than typical. The results of the current study are given in Table 3.

Table 3 *t* Values of Students' Economics Achievement on Posttest

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
BEHS 1	Experimental	27	37.19	7.05	6.66	3.14	55	.003**	.83
	Control	30	30.53	8.76					
BEHS 3	Experimental	23	39.00	9.33	9.86	3.67	43	.001**	1.1
	Control	22	29.14	8.64					

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing.

BEHS 3 = No. (3) Basic Education High School, Sagaing.

** $p < .01$. Effect Size: $d \geq .80$. $d \geq 1$.

The results of this study were separately indicated for both schools. In No. (1) Basic Education High School (Sagaing), there were significant differences in economics achievement between the students who received instruction with problem-based learning and those who did not receive it at $p < .01$. Interestingly, the value of effect size (.83) was larger than typical which means the effects of problem-based learning are strength on the economics achievement. The finding of No. (3) Basic Education High School is similar to that of No. (1) Basic Education High School. The most striking result to emerge from the data is that the effect size (1.1) was much larger than typical.

According to the results of overall post-test scores, the mean differences in economics achievement are in height between the experimental and control groups in both schools. Thus, the experimental groups got better economics achievement than the control groups. Figure 1 is illustrated the comparison of mean scores for both groups.

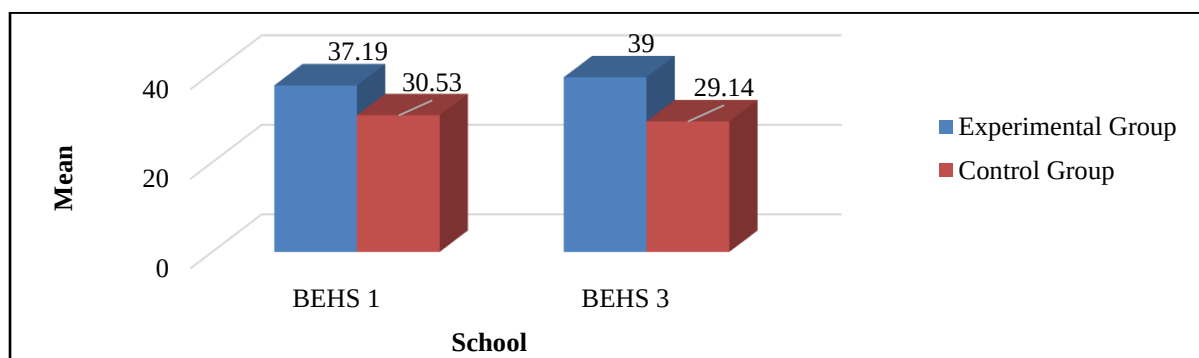


Figure 1. Comparison of mean scores for posttest.

According to the figure, this study has evaluated that problem-based learning can contribute to some extent to improving students' economics achievement in answering remembering, understanding, applying, and analyzing level questions.

Findings of Students' Economics Achievement on Remembering Level Questions

Table 4 t Values of Students' Economics Achievement on Remembering Level

School	Group	n	M	SD	MD	t	df	p
BEHS 1	Experimental	27	8.44	3.43	0.04	0.04	55	.97 (ns)
	Control	30	8.40	4.65				
BEHS 3	Experimental	23	11.09	1.35	1.23	1.79	43	.08 (ns)
	Control	22	9.86	2.92				

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing.

BEHS 3 = No. (3) Basic Education High School, Sagaing.

ns = not statistically significant.

The findings of remembering level for both schools proved that there were no significant differences in economics achievement of students who received instruction with problem-based learning and that of those who did not receive it. This is the reason why students who received instruction with problem-based learning acquired the facts and concepts in such ways by solving problems while students who received formal instruction learned the facts and concepts from their mastery teacher and memorize them carefully. So, they had the same level for answering remembering level questions. Figure 2 is pointed out the comparison of mean scores for remembering level questions.

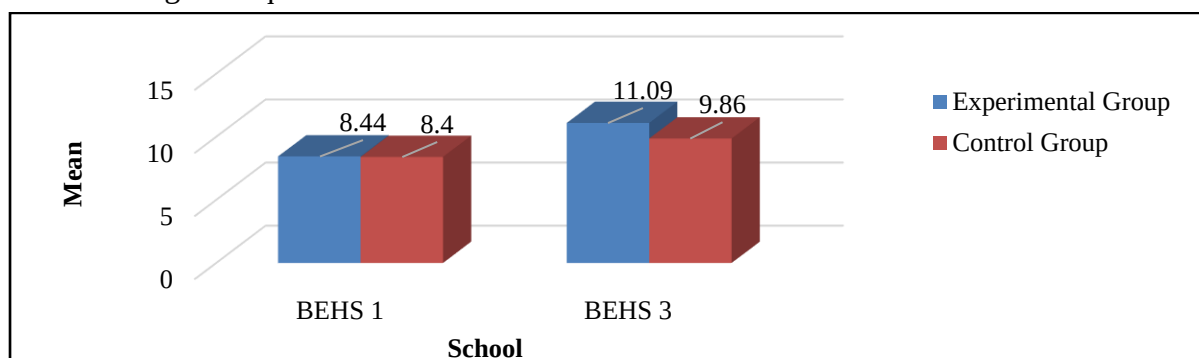


Figure 2. Comparison of mean scores for remembering level questions.

As students for experimental and control groups had the same level in answering remembering level questions, problem-based learning can support memorizing factual economics knowledge as the formal instruction in both schools.

Findings of Students' Economics Achievement on Understanding Level Questions

Table 5 t Values of Students' Economics Achievement on Understanding Level

School	Group	n	M	SD	MD	t	df	p	d
BEHS 1	Experimental	27	7.70	2.16	0.57	0.84	55	.40 (ns)	-
	Control	30	7.13	2.93					
BEHS 3	Experimental	23	9.00	2.76	3.05	3.72	43	.001**	1.1
	Control	22	5.95	2.73					

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing.

BEHS 3 = No. (3) Basic Education High School, Sagaing.

ns = not statistically significant. ** $p < .01$. Effect Size: $d \geq 1$.

According to the results of understanding level questions, the two studies differ in each school. In BEHS (1), there were no significant differences in the economics achievement of students who received instruction with problem-based learning and that of those who did not receive it. However, there were statistically significant differences for both groups in BEHS (3). The effect size, 1.1 was much larger than typical. Figure 3 is revealed that comparison of mean scores for understanding level questions.

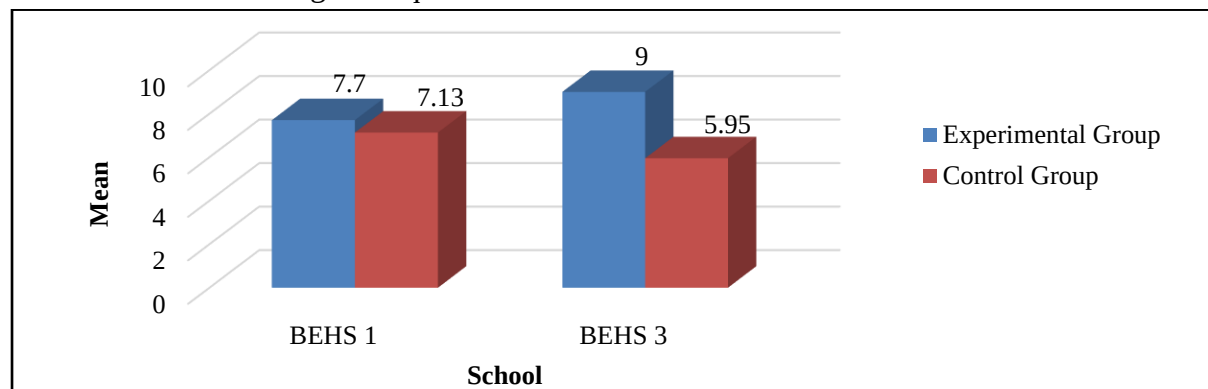


Figure 3. Comparison of mean scores for understanding level questions.

Although the finding of BEHS (1) indicated that problem-based learning does encourage as meaningful learning as formal instruction, the findings of BEHS (3) completed the effect of problem-based learning as better than formal instruction in teaching economics.

Findings of Students' Economics Achievement on Applying Level Questions

Table 6 t Values of Students' Economics Achievement on Applying Level

School	Group	n	M	SD	MD	t	df	p	d
BEHS 1	Experimental	27	9.11	2.08	2.01	3.22	55	.002**	.85
	Control	30	7.10	2.58					
BEHS 3	Experimental	23	8.61	2.86	2.29	2.71	43	.01*	.81
	Control	22	6.32	2.82					

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing.

BEHS 3 = No. (3) Basic Education High School, Sagaing.

* $p < .05$. ** $p < .01$. Effect Size: $d \geq .80$.

The evidence of this study suggested that the experimental groups were significantly higher than the control groups in both schools. There were statistically significant differences in answering applying level questions between the students who received instruction with problem-based learning and those who did not receive it. The values of effect size in both schools highlighted that the magnitude difference in the economics achievement used in problem-based learning is larger than typical. Overall, this study strengthened the idea that problem-based learning provides totally in teaching economics. Figure 4 is showed that comparison of mean scores for applying level questions.

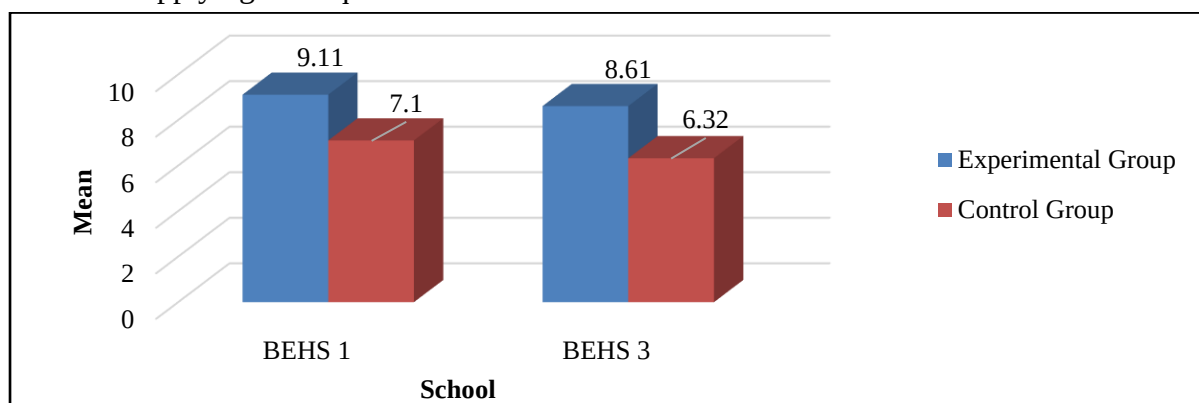


Figure 4. Comparison of mean scores for applying level questions.

The results of this study supported that problem-based learning is effective in solving economics problems.

Findings of Students' Economics Achievement on Analyzing Level Questions

Table 7 t Values of Students' Economics Achievement on Analyzing Level

School	Group	n	M	SD	MD	t	df	p	d
BEHS 1	Experimental	27	11.93	2.80	4.03	4.59	55	.000***	1.2
	Control	30	7.90	3.79					
BEHS 3	Experimental	23	10.74	4.13	3.83	2.92	43	.006**	.9
	Control	22	6.91	4.66					

Note. BEHS 1 = No. (1) Basic Education High School, Sagaing

BEHS 3 = No. (3) Basic Education High School, Sagaing

** $p < .01$. *** $p < .001$. Effect Size: $d \geq .80$. $d \geq 1$.

The findings of both schools enhanced the understanding of the effects of problem-based learning on Grade 11 students' economics achievement because there were statistically significant differences in answering analyzing level questions between the students who received instruction with problem-based learning and those who did not receive it. According to the values of effect sizes, the magnitude of difference in economic achievement between the experimental groups and the control groups was larger than typical. Figure 5 is described the comparison of mean scores for analyzing level questions.

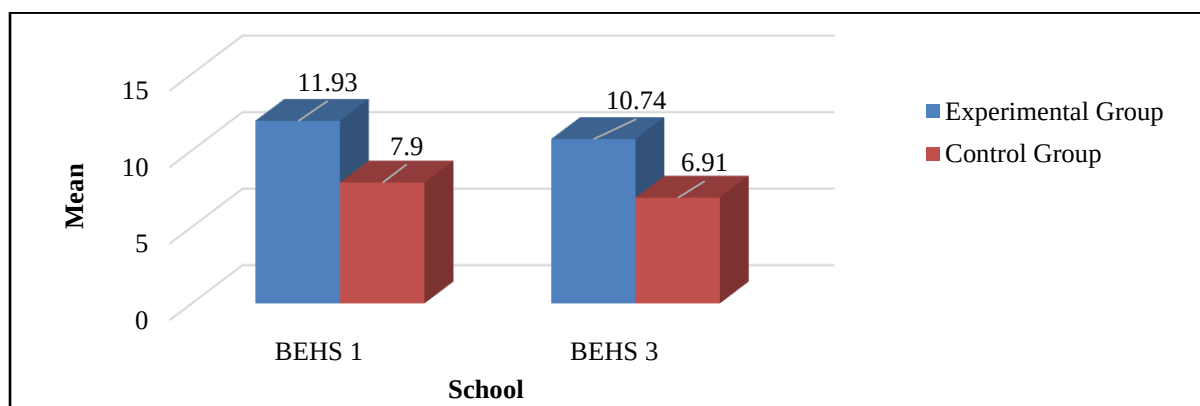


Figure 5. Comparison of mean scores for analyzing the level questions.

The findings of this study proved that problem-based learning is particularly relevant for teaching economics to develop procedural knowledge.

Conclusion

Discussion

This section is to reflect on the extent to which this study is based on research findings. This discussion is enlightened two research questions.

(1) To what extent does problem-based learning affect Grade 11 students' economics achievement?

To satisfy this question, the overall post-test findings revealed that there were significant differences in economics achievement between the students who received instruction with problem-based learning and those who did not receive it at $p < 0.01$. To express the extent of mean differences, the values of effect size were computed. These values (0.83 and 1.1) were larger than typical. Together these results provided important insights into the effects of problem-based learning on economics achievement. Specifically, students who are exposed to problem-based learning can organize their thoughts in an orderly manner which is essential for problem solving. Narmaditya, Winarning, and Wulandari (2017) supported the same findings. It highlighted the effects of problem-based learning that can improve students' achievement. Considering all of this evidence, problem-based learning provides better achievement levels than formal instruction.

(2) How does the economics achievement of the students who receive instruction with problem-based learning differ from that of those who do not receive it in answering remembering, understanding, applying, and analyzing level questions?

The findings of the second question were discussed individually. **For remembering level**, there were no significant differences in the economics achievements of the students who received instruction with problem-based learning and that of those who did not receive it for both schools. Students for both groups may answer definitions of economics terms by memorizing them or by building their own experiences. This finding is similar to the result of Masek & Yamin (2012).

The findings of understanding level got separated. For BEHS 1, there were no significant differences in the economics achievements of the students who received instruction with problem-based learning and that of those who did not receive it. This finding is consistent

with the results of Kasuga, Maro, and Pangani (2022). In contrast, there were significant differences in the economics achievements of the students who received instruction with problem-based learning and that of those who did not receive it at BEHS 3. Senyigit (2021) supported that problem-based learning is more effective in improving conceptual understanding and overcoming misconceptions than lecture-based learning.

According to the applying level's findings, there were significant differences in the economics achievements of the students who received instruction with problem-based learning and that of those who did not receive it for both schools. The most interesting finding to emerge from the mean differences is that the values of effect size are larger than typical. Together these results suggested students do better understand how to solve problems using problem-based learning. This finding is similar to the results of Bukari & Asiedu-Addo (2019). It was found that problem-based learning helps to develop good problem solvers.

The last finding of the analysis level is that there were significant differences in economics achievement of students who received instruction with problem-based learning and that of those who received formal instruction. In particular, the values of effect size to determine the magnitude of difference in economics achievement between problem-based learning and formal instruction were larger than typical. Based on these results, problem-based learning improves reasoning skills. This result was complemented by Wahyu, Sahyar and Gintings' (2017) study of problem-based learning improves students' critical thinking and problem-solving ability.

Overall, this study strengthens the idea that problem-based learning can enhance Grade11 students' economics achievement. This is due to the effects of problem-based learning on teaching economics, teachers who teach economics need to convey the use of problem-based learning in formal classrooms to achieve certain objectives effectively.

Suggestions

After discussing the questions posed at the beginning of this study, it is now suggested for teachers and students that problem-based learning can be implemented in teaching economics.

Suggestions for teachers

- (1) Teachers should prepare the real-life problems related to the contents that they teach.
- (2) Teachers should encourage students to participate in solving economics issues about the subject area.
- (3) Teachers should encourage students to cooperate within a group and discuss, solve problems, and make decisions together. Choosing the right decision reduces the fear of solving problems.
- (4) If classroom culture is not ready, teachers should tackle it successfully to remove hostile behavior within group activity and train their students to have collaborative skills.

Suggestions for Students

- (1) Students should actively engage in their learning process by solving problems instead of receiving information from teachers.
- (2) Students should identify and analyze problems such as exploring what they already know, what information they acquire, and how they solve it.
- (3) Students should report and reflect on their findings.
- (4) Students should be problem solvers and have logical manners instead of practicing what they have learned as formal instruction.

Recommendations

The current study leaves many important questions unanswered because a key limitation is to investigate whether problem-based learning affects economics achievement. The following recommendations are provided for implementing future research.

- (1) This study aimed to compare the economics achievement of students who received instruction with problem-based learning and that of those who did not receive it as a quantitative study. Further research should include qualitative or mixed-method studies to explore a deeper understanding of learning outcomes.
- (2) Further experimental investigations should also be needed to explore the difficulties of teachers or teachers' integration in problem-based learning.
- (3) The present study was confined to teaching Grade 11 economics. Further experiments should be undertaken in Grades 10 and 12 economics.
- (4) The current study was simply implemented by applying the steps of problem-based learning. Further work should be needed to fully understand the implications of problem-based learning based on technology.
- (5) Further study would be interesting in comparing academic achievement between problem-based learning and other non-formal instruction techniques.

Conclusion

The main goal of the current study was to investigate the effects of problem-based learning on Grade 11 students' economics achievement. One of the quantitative research methods used is a quasi-experimental study with a non-equivalent control group design. Two sample schools were selected by a simple random sampling method. The participants were intact groups in each school. The two groups in each school were examined for the pretest to determine group equivalence. Then, the experimental groups received instruction using problem-based learning, and the control groups received formal instruction. After the treatment, the results were analyzed using independent samples *t* test. It was found that there were significant differences between the students who received instruction with problem-based learning and those who did not receive it. The values of effect size were calculated to describe exactly the magnitude of differences. Considering the results of the findings, problem-based learning was effective in the power of teaching economics as well as economics achievement. In addition, solving problems, discussing ideas within the group, making decisions, reporting their understanding and reflecting on their solutions can support communication, collaboration, and critical thinking of 21st century skills. So, not only does problem-based learning strengthen the body of knowledge but it also contributes to 21st century skills.

Acknowledgments

We would like to express our deepest gratitude to Dr. Myat Myat Thaw, Rector, Sagaing University of Education, and Dr. Khin Hnin Yee and Dr. Cho Kyi Than, Pro-Rectors, Sagaing University of Education who allowed us to carry out this research. We could not have undertaken this journey without careful training, valuable advice, expert guidance, suggestions, and continuous encouragement of Dr. Soe Than, Emeritus, Department of Curriculum and Methodology, Sagaing University of Education. Last but not least, we sincerely thank all experienced teachers, school administrators, and participants who support the study.

References

- Anderson, L. W., Krathwohl, D. R., Airasian, P. W., Cruikshank, K. A., Mayer, R. E., Pintrich, P. R., ... Wittrock, M. C (Eds). (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy of educational objectives (Abr.ed)*. New York: Addison Wesley Longman, Inc.
- Barrows, H. S., & Tamblyn, R. M. (1980). *Problem-based learning: An approach to medical education*. New York: Springer Publishing Company.
- Bukari, H. I., & Asiedu-Addo, S. K. (2019). Effect of problem-based learning on colleges of education students' achievement in probability and attitude towards solving probability related problems. *African Journal of Educational Studies in Mathematics and Sciences*, 15(2), 157-170. doi: 10.4314/ajesms.v15i2.13
- [Clayton, G. E. \(2008\). *Economics, principles, and practices*. New York: McGraw-Hill Companies, Inc.](#)
- [Cuban, L. \(1999\). *How scholars trumped teachers: Change without reform in university curriculum, teaching and research, 1890-1990*. New York: Teachers College Press.](#)
- Delisle, R. (1997). *How to use problem-based learning in the classroom*. Alexandria, Virginia: Association for Supervision and Curriculum Development.
- Kasuga, W., Maro, W. & Pangani, I. (2022). Effect of problem-based learning on developing science process skills and learning achievement on the topic of safety in our environment. *Journal of Turkish Science Education*, 19 (3), 872-886. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1365779.pdf>
- [Linden, J., & Alanko-Turunen, M. \(2006\). Deconstructing conceptions of problem-based learning. In E. Poikela, & A. R. Nummenmaa \(Eds.\), *Understanding problem-based learning* \(pp. 51-64\). Academy of Finland: Tampere University Press.](#)
- Mahardik, I. K., Subiki, & Maimunah, S. (2017). Momentum and impulse learning helped by worksheet based RGM to SMA by using PBL model. *International Journal of Advanced Research (IJAR)*, 5 (9), 348-352. doi: 10.21474/IJAR01/5335
- [Mangal, S. K., & Mangal, S. \(2019\). *Learning and teaching*. New Delhi: PHI Learning Private Limited.](#)
- Masek, A., & Yamin, S. (2012). A comparative study of the effect of problem-based learning and traditional learning approaches on students' knowledge acquisition. *International Journal of Engineering Education*, 28(5), 1161-1167. Retrieved from <https://www.researchgate.net/publication/259873856>
- Mills, G. E., & Gay, L. R. (2016). *Educational research, competencies for analysis and applications* (11th ed.). Edinburgh: Pearson Education Publishing.
- Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2013). *IBM SPSS for introductory statistics: Use and interpretation* (5th ed.). New York: Routledge.
- Narmaditya, B.S., Winarning, & Wulandari, D. (2017). Impact of problem-based on student achievement in economics course. *Classroom Action Research Journal*, 1(1), 1-11. doi: 10.17977/um099v1i12017p1
- Nilson, L. B. (2010). *Teaching at its best: A research-based resource for college instructors* (2nd ed.). San Francisco, CA: Jossey-Bass. Retrieved from <https://teaching.cornell.edu/teaching-resources/engaging-students/problem-based-learning>
- [Noori, A. \(2021\). *Glossary of key terms in educational research*. Retrieved from https://files.eric.ed.gov/fulltext/ED611000.pdf](#)
- [Robbins, L. \(1984\). *An essay on the nature and significance of economic science* \(3rd ed.\). London: Macmillan Press.](#)
- [Savin-Baden, M., & Major, C. H. \(2004\). *Foundations of problem-based learning*. New York: Open University Press, McGraw-Hill Education.](#)
- [Seel, N. M. \(2012\). Problems: Definition, types, and evidence. In N. M. Seel \(Ed.\), *Encyclopedia of sciences of learning* \(pp. 2690-2693\). Boston, MA: Springer. doi:10.1007/978-1-4419-1428-6-914](#)
- Senyigit, C. (2021). The effect of problem-based learning on pre-service primary school teachers' conceptual understanding and misconceptions. *International Online Journal of Primary Education*, 10(1), 50-72. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1308676.pdf>
- [Steven, A., & David, S. \(2011\). *Principles of economics* \(2nd ed.\). Texas: OpenStax. Retrieved from https://openstax.org/details/books/principles-economics-2e.](#)

- Tan, O. S. (2003). *Problem-based learning innovation: Using problems to power learning in the 21st century*. Singapore: Cengage Learning.
- Tan, O.S. (2002). Problem-based learning: More problems for teacher education. *Review of Educational Research and Advances for Classroom Teachers*, 21(1), 43–55. Retrieved from <https://repository.nie.edu.sg/entities/publication/01f162b8-e183-4aa4-8ad8-d69558144633/details>
- Thamrin & Hutasuhut, S. (2017). The development of problem based on learning model course at the introduction macroeconomic subject to improve critical thinking and competency of student. *Journal of Research and Method in Education*, 7 (5), 56-62. doi: 10.9790/7388-0705065662
- Wahyu, E. S., Sahyar and Ginting, E. M. (2017). The effect of problem-based learning model towards student's critical thinking and problem solving ability in senior high school. *American Journal of Educational Research*, 5(6), 633-638. doi: 10.12691/education-5-6-7
- Wirantaka, A., & Sukarno, H. S. R. (2022). *Investigating the implementation of problem-based learning (PBL) in English teaching and learning*. Retrieved from <https://www.atlantispress.com/proceedings/icosi-hess-22/125979778>

AN EXPLORATION OF STUDENT TEACHERS' LEARNING STYLES AND THEIR ENGAGEMENT IN LEARNING MATHEMATICS AT SAGAING UNIVERSITY OF EDUCATION

Htet Wai Aung¹ and Wai Wai Oo²

Abstract

The purpose of the study is to explore student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education. A cross-sectional survey was used to get the required data. The participants were (216) mathematics specialized student teachers at Sagaing University of Education during 2023-2024 Academic Year and were selected using a simple random sampling method. Learning styles questionnaire based on Grasha-Riechmann Learning Scales (GRLSS) of Grasha (1996) and the student engagement questionnaire designed on the school's questionnaire (SESQ) by Lam and Jimerson (2008) were used as instruments to collect data. A pilot study was made with (30) mathematics specialized student teachers at University for the Development of the National Races of the Union. Cronbach's alpha coefficient for the learning styles questionnaire was (.852), and Cronbach's alpha coefficient for the student engagement questionnaire was (.872). The obtained data were systematically analyzed using descriptive statistics and Spearman rank-order correlation. According to the results, most student teachers (44%) preferred the dependent learning style, and no student teacher (0%) preferred the avoidant learning style. Most student teachers (63%) had a moderate level of engagement, and the least student teachers (17.6%) had a high level of engagement. Based on the correlation results, it can be concluded that there was a positive correlation between student teachers' independent, dependent, competitive, collaborative, and participant learning styles and their engagement in learning mathematics. Thus, student teachers will be motivated to engage in learning activities that lead to improved educational outcomes if they have the opportunity to learn in their preferred learning styles.

Keywords: learning, student teachers, learning style, student engagement, mathematics

Introduction

Nowadays, mathematics plays a predominant role in everyday life. Learning mathematics helps students think analytically and have better reasoning abilities. To educators, learning is a very complex and perplexing problem. To laymen, however, learning has always been a rather simple matter. Learning has been variously described as an accumulation of knowledge, improvement in an activity, solving a problem, and adjustment to changing situations. Khin Zaw (2001) urged that learning is generally defined as the process by which behavior is developed or altered through practice or experience.

Importance of the Research

One of the biggest challenges in learning is for individuals to take responsibility for their learning style. If learners take responsibility for their learning style, they attribute meaning to the process of learning, leading to effective learning. When students feel motivated in their learning styles, they progress in their academics. Students' learning styles and student engagement play a vital role to promote and increase learning and developmental growth (Nzesei, 2015). Education aims to promote learning. To make learning successful, educators should incorporate diversity into their styles of teaching to satisfy different learners. Teaching cannot be successful without

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knowledge of learning styles. An understanding of learning styles helps educators and learners to become successful in the endeavor of teaching the learning process. Therefore, the study is an attempt to investigate and find out student teachers' learning styles and their engagement in mathematics learning process at Sagaing University of Education.

Purpose of the Research

The purpose of the research is to explore student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education.

Objectives of the Research

The objectives of the research are as follows:

1. to investigate the different types of learning styles preferred by student teachers at Sagaing University of Education.
2. to explore the levels of student teachers' engagement in learning mathematics at Sagaing University of Education.
3. to examine the relationship between student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education.
4. to give suggestions and recommendations for improving student teachers' learning and engagement based on the results of the study.

Research Questions

In referring to the research objectives, the following research questions are laid down.

1. What are the different learning styles of student teachers in learning mathematics at Sagaing University of Education?
2. How do student teachers at Sagaing University of Education describe the levels of engagement in learning mathematics?
3. To what extent does the relationship exist between the learning styles of student teachers and their engagement in learning mathematics at Sagaing University of Education?

Scope of the Research

The study was restricted to Sagaing University of Education. Participants in the study were (216) student teachers who specialized in mathematics during 2023-2024 academic year.

Definition of Key Terms

The definition key terms of the research are as follows:

Learning: Learning is defined as a process that leads to change, which occurs as a result of experience and increases the potential for improved performance and future learning (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010).

Student Teachers: Student teachers are university students enrolled in a teacher preparation program (Wilkins, 2022).

Learning Style: Learning style is the composite of cognitive, affective, and psychological characteristics that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment (Doherty & Maddux, 2002).

Student Engagement: Student engagement means a condition of students' emotional, social, and intellectual readiness to learn characterized by curiosity, participation, and the drive to learn more (Abla & Fraumeni, 2019).

Mathematics: Mathematics is the study of the measurement, relationships, and properties of quantities and sets, using numbers and symbols (The American Heritage, 2011).

Review of Related Literature

The brain of a person receives information through all the five senses. Among the five, three senses that are eyes, ears, and skin help the most in forming the learning style. Learning style is a group of characteristics, attitudes, and behaviors that define the way of learning. Learning style is a particular way in which the mind receives and processes information. It is an integral concept that bridges the personality to the cognitive dimensions of an individual. Student engagement in school is an important construct that has been associated with student success. Engagement is a growth-producing activity through which an individual allocates attention in response to the environment (Csikszentmihalyi, 1990).

Theoretical Background of the Study

Piaget learning theory is also built on the idea that children's intelligence changes and develops as they get older. This learning theory breaks children's cognitive development down into four key stages: Sensorimotor stage (From birth to 2 years, children learn and understand the world through their senses and movements), Preoperational stage (From 2 to 7 years old, children develop language and begin symbolic play – using objects to represent other objects), Concrete operational stage (From 7 to 11 years old, logical thought develops, but children struggle with abstract or theoretical thought), and Formal operational stage (From 12 years into adulthood, children become more skilled at abstract thought and deductive reasoning). According to Gunuc and Kuzu (2014), behavioral engagement can be referred to as students' involvement in social and academic activities which leads to positive academic outcomes, emotional engagement concerns the relationships and reactions to teachers, peers, and staff that will enhance the love for learning, and cognitive engagement is about the concepts and skills of deep learning.

Concept of Learning Style

Learning style represents the classroom conditions under which someone prefers to learn. Much has been written about how some learners are more global (focusing on the big picture) than analytic (studying the details) in how they approach learning. Visual learners remember visual details and prefer to see what is being learned. Verbal learners enjoy discussion and like to talk aloud and discuss material in groups. Reflective learners learn best when time is allocated to thinking about and digesting new information. Sensory learners like to learn by touching and feeling objects and models. Intuitive learners prefer discovering new relationships and can innovate in their approaches to problem-solving. Sequential learners like to start from the beginning, knowing the detailed facts first and then building on these. Global learners may be able to solve complex problems quickly or put things in novel ways once they have grasped the bigger picture but may have difficulty explaining how they did it (Kivunja, 2015).

Grasha-Riechmann's Learning Styles Scale (GRLSS)

The areas of specialization of Anthony Grasha who is a Professor of Psychology at the University of Cincinnati are cognitive and social processes in human behavior, learning and teaching styles, cognitive processes in stress and coping, and conflict resolution. Grasha and Riechmann consider learning styles as social interactions. In 1974, Anthony Grasha and Sheryl Reichmann formulated the Grasha-Reichmann Learning Style Scales (GRLSS); namely,

dependent, independent, and cooperative styles. Later on, Grasha (1996) further developed the scale to identify and categorize student learning behavior preferences as Independent, Dependent, Competitive, Collaborative, Avoidant, and Participant. The following are general descriptions of each of these preferences.

(1) Independent Learning Style

Independent students prefer independent study, self-paced instruction, and working alone on course projects rather than with other students. They like to think for themselves and are confident in their learning abilities: and they prefer to learn the content they feel is important. They are confident learners who do not need to confer with others. Independent learners relish the opportunity to think for themselves.

(2) Dependent Learning Style

Dependent learners look to teachers and peers as a source of structure and guidance and prefer authority figures to tell them what to do. They show little intellectual curiosity and learn only what is required. Dependent students dislike change. Lacking intellectual curiosity, they tend to learn only what is required to get by and become frustrated if they are asked to explore ideas that are not fully explained in the classroom.

(3) Competitive Learning Style

Competitive students learn to perform better than their peers. They see the classroom as a win-lose situation in which they must win. Believe that they must compete with other students in a course for the rewards offered. They like to be the center of attention and receive recognition for their accomplishments in class. Competitive students are mistrustful of their peers and prioritize learning as a way to outperform other students in their class.

(4) Collaborative Learning Style

Collaborative learners learn through sharing and cooperating with their teacher and peers in small group discussions and group projects. Typical of students who feel that they can learn by sharing ideas and talents. They also cooperate with teachers and like to work with others. In direct contrast to competitive learners, collaborative students work in harmony with their peers and blossom as part of a team.

(5) Avoidant Learning Style

Avoidant students tend to perform poorly, achieving grades at the lower end of the spectrum. They are unenthusiastic about learning content and do not engage with other students or teachers. They are reluctant to learn and uninterested in participating in class activities with their teachers and peers. They do not enjoy learning and generally try to avoid it at all costs. They are uninterested and overwhelmed by what goes on in class. They may not even want to attend class.

(6) Participant Learning Style

Participant learners are eager to learn and enjoy classroom activities and discussions, and good citizens in class. They take responsibility for their learning and are eager to do as much class work as possible. They are highly motivated to meet the teacher's expectations, enjoy going to class, and take part in as many of the course activities as possible, both required and optional.

Student Engagement

Student engagement is a multidimensional construct that predicts learning performance. Both cognitive and emotional factors are influential in achievement in mathematics and retention. Students with learning engagement will gain more enjoyable classroom experiences, learn more, and perform better in mathematics. It is also important that student engagement in higher education is defined in a way that covers the processes of campus engagement and class engagement.

Student engagement in higher education has certain differences when compared to student engagement in other school levels, especially in the context of campus or social life. It was observed that the campus itself and campus activities have indirect effects on students, especially in higher education (Gunuc, 2013). Such concepts as giving value to campus (university) or to education, a sense of belonging, and participation in campus activities are considered to be among the important parts of student engagement. Willms (2003) defines engagement as students' sense of belonging, accepting the value of school, and active participation in school activities.

Class engagement is made up of three interdependent components – behavioral, emotional, and cognitive, whose compound effect reflects students' positive approach to learning and responses to in-class and out-of-class activities.

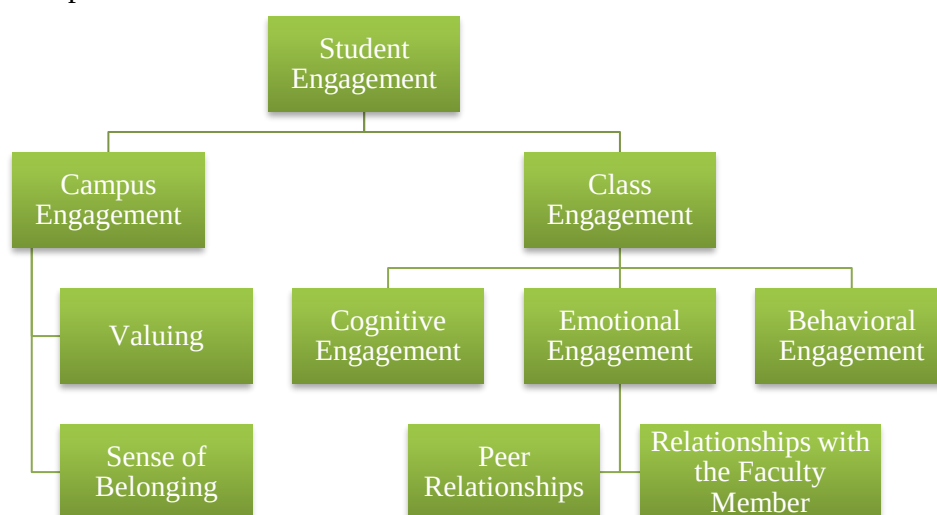


Figure 1. Student engagement structure (Gunuc & Kuzu, 2014).

Engagement has three facets – behavioral (participation in academic, social, and extra-curricular activities), emotional (affective ties with teachers and classmates), and cognitive (deliberate efforts to master complex problems and skills).

(1) Behavioral Engagement

Behavioral engagement consists of students' active engagement in learning and academic tasks, including behaviors such as effort, persistence, and focus, asking questions, and contributions to class discussions (Gunuc & Kuzu, 2014). The basics of behavioral engagement could be said to be related to class activities.

(2) Affective Engagement

Affective engagement refers to indicators such as the presence of interest and happiness and the lack of boredom, anxiety, and sadness. Affective or Emotional engagement involves

students' responses to the teacher, peers, course content, and the class which all include attitudes, interests, and values (Bryson & Hand, 2007). In addition, such emotions as a sense of belonging to the university, loving the university, and feeling oneself to be a member of a group are also examined within the scope of emotional engagement.

(3) Cognitive Engagement

Cognitive engagement refers to investment in learning and involves aspects such as willingness and thoughtfulness to expand the effort required to understand and master difficult tasks, the use of appropriate learning strategies, challenge preference, and self-regulation (Li & Lerner, 2011). Cognitive engagement includes value given to learning, learning goals, self-regulation, and planning. Cognitive engagement refers to students who invest in their learning, who determine their needs, and who enjoy mental difficulties.

Methods

This section describes the research design, population and sample size, instruments, procedure, and analysis of the data.

Research Design

To carry out the research, a cross-sectional survey which is one of the survey research designs was used to delve into student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education.

Population and Sample Size

The population for the study is student teachers who specialize in mathematics at Sagaing University of Education during 2023-2024 Academic Year. Among them, the participants were selected by using a simple random sampling method.

Table 1 Population and Sample

	Population	Sample
Student Teachers (Specialized in Mathematics)	356	216
Total	356	216

Instruments

To examine the learning styles that student teachers applied or the dominant learning style they have, a learning style questionnaire that was taken Grasha-Riechmann Learning Styles Scales (GRLSS) of Grasha (1996) was used. To explore student teachers' engagement, a student engagement questionnaire that was designed on student engagement in school's questionnaire (SESQ) by Lam and Jimerson (2008) was administered.

Procedure

Firstly, related literature to the study was explored and collected from various sources such as reference books, journals, theses, and internet sources. To be able to collect data about student teachers' learning styles and their engagement, the instruments – namely, the learning styles questionnaire and student engagement questionnaire were developed. For expert validation, copies of the instruments were distributed to three experienced teachers. Then, the questionnaire items were refined and jumbled by expert opinions and suggestions. Before conducting the main study, the questionnaire was tested for its validity and reliability with thirty

student teachers who are specializing in mathematics and are attending in 2023-2024 academic year at University for the Development of the National Races of the Union. The reliability value of Cronbach's alpha coefficient for the learning styles questionnaire was (.852), and the reliability value of Cronbach's alpha coefficient for the student engagement questionnaire was (.872) respectively. After pilot testing, the items of the questionnaires were reviewed and modified. After piloting, the main study was carried out with two hundred and sixteen student teachers who specialize in mathematics at Sagaing University of Education in 2023-2024 academic year. Finally, the collected data was analyzed, and findings and interpretations were presented.

Analysis of the Data

The computer program, namely, Statistical Package for Social Sciences (SPSS) version 23, will be utilized to analyze the data. Descriptive statistics will be used to analyze student teachers' different learning styles and their engagement levels in learning mathematics. Spearman rank-order correlation will be applied to determine if a relationship exists between two variables: the learning styles of student teachers and student teachers' engagement.

Findings

This section describes the quantitative findings of the research.

Findings for the Different Types of Learning Styles Preferred by Student Teachers

To look into the different types of learning styles preferred by student teachers in learning mathematics, descriptive statistics was used. The mean for each learning style is shown in Table 2.

Table 2 Mean and Standard Deviation for the Different Types of Learning Styles

Types of Learning Styles	<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Independent Learning Style	216	22	37	30.70	3.68
Dependent Learning Style	216	26	39	34.09	2.32
Competitive Learning Style	216	11	37	26.71	5.64
Collaborative Learning Style	216	25	40	33.87	3.44
Avoidant Learning Style	216	8	24	17.06	4.29
Participant Learning Style	216	24	39	31.76	3.09

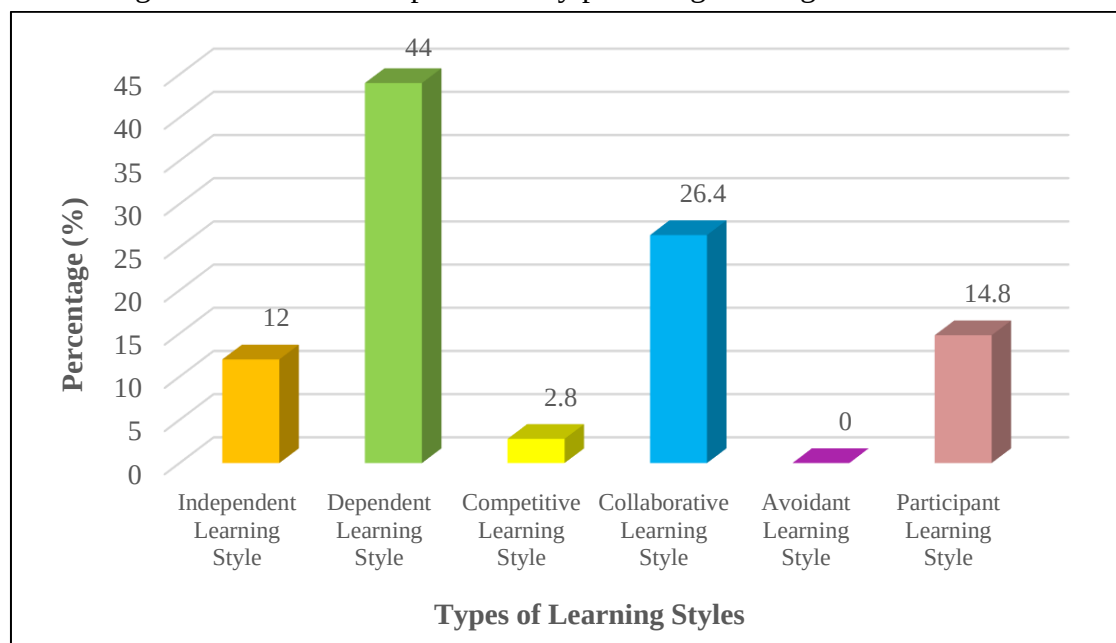
According to Table 2, it was found that the dependent learning style had the highest mean (34.09), and the avoidant learning style had the lowest mean (17.06) among the six learning styles. It means that the dependent learning style was a learning style that was mostly used by student teachers in learning mathematics.

The distribution of student teachers' preferences of learning styles is described by descriptive statistics. The mean, percentage, and standard deviation for each learning style are shown in Table 3.

Table 3 Distribution of Student Teachers by the Different Types of Learning Styles

Types of Learning Styles	<i>n</i>	Percentage	<i>Minimu</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
Independent Learning Style	26	12	34	37	35.85	1.49
Dependent Learning Style	95	44	30	37	34.17	1.81
Competitive Learning Style	6	2.8	28	32	29.67	1.63
Collaborative Learning Style	57	26.4	32	40	36.46	3.09
Avoidant Learning Style	0	0	-	-	-	-
Participant Learning Style	32	14.8	26	39	35.88	3.01

Among two hundred and sixteen student teachers, Table 3 shows that (44%) of student teachers preferred the dependent learning style, and (0%) of student teachers preferred the avoidant learning style. To see at a glance, the distribution of student teachers for each learning style in learning mathematics was represented by percentages in Figure 2.

**Figure 2.** Percentage of student teachers on each learning style.

The number of Student Teachers with different learning styles in terms of subject combination and gender is shown in Table 4.

Table 4 Number of Student Teachers with Different Learning Styles in terms of Subject Combination and Gender

Subject Combination	Gender	Number of Student Teachers					
		ILS	DLS	CLS	COLS	ALS	PLS
1. Mathematics, Chemistry, Physics	Male	3	11	-	4	-	2
	Female	3	16	1	8	-	3
2. Mathematics, Chemistry, Biology	Male	1	3	-	2	-	1
	Female	2	9	1	3	-	3

Subject Combination	Gender	Number of Student Teachers					
		ILS	DLS	CLS	COLS	ALS	PLS
3. Mathematics,	Male	2	8	-	3	-	2
Physics,	Female	3	12	-	7	-	2
Biology							
4. Mathematics,	Male	-	1	-	1	-	1
Geography,	Female	2	1	1	3	-	3
History							
5. Mathematics,	Male	2	-	1	4	-	3
Geography,	Female	3	6	-	5	-	3
Economics							
6. Mathematics,	Male	1	7	-	2	-	3
History,	Female	1	10	1	8	-	2
Economics							
7. Mathematics,	Male	-	2	-	1	-	1
Chemistry,	Female	-	-	-	1	-	1
Economics							
8. Mathematics,	Male	2	2	1	2	-	1
Physics,	Female	1	7	-	3	-	1
Economics							

Note. ILS = Independent Learning Style
DLS = Dependent Learning Style
CLS = Competitive Learning Style
COLS = Collaborative Learning Style
ALS = Avoidant Learning Style
PLS = Participant Learning Style

Findings for Student Teachers' Engagement in Learning Mathematics

Student teachers' engagement in learning mathematics was analyzed by descriptive statistics. The mean for student teachers' engagement is described in Table 5.

Table 5 Mean and Standard Deviation for Student Teachers' Engagement

<i>N</i>	<i>Minimum</i>	<i>Maximum</i>	<i>M</i>	<i>SD</i>
216	84	117	101.19	8.49

The student teachers' engagement is identified as high-level ($X > \bar{X} + 1 \text{ SD}$), moderate level ($\bar{X} - 1 \text{ SD} < X < \bar{X} + 1 \text{ SD}$), and low-level ($X < \bar{X} - 1 \text{ SD}$) based on Mean $\pm$ 1 SD. If the engagement result of student teachers is larger than (109.68), it is assigned as those student teachers have a high level of engagement. If the engagement result of student teachers is less than (92.7), it is assigned as those student teachers have a low level of engagement. In addition, if it is between (92.7) and (109.68), it is assigned as these student teachers are moderate level of engagement.

Table 6 Levels of Student Teachers' Engagement

Engagement Level	Frequency	Percentage (%)
Low Level	42	19.4
Moderate Level	136	63.0
High Level	38	17.6

According to Table 6, it can be interpreted that most student teachers had a moderate level of engagement in learning mathematics.

Findings for Student Teachers' Learning Styles to Their Engagement in Learning Mathematics

The relationship between each type of learning style and the engagement of student teachers was delved into using the Spearman rank-order correlation.

Table 7 Correlation between Student Teachers' Learning Styles and their Engagement

	Spearman's rho	Engagement
Independent Learning Style	Correlation Coefficient	.917**
	Sig (2-tailed)	.000
	N	26
Dependent Learning Style	Correlation Coefficient	.622**
	Sig (2-tailed)	.000
	N	95
Competitive Learning Style	Correlation Coefficient	.531(ns)
	Sig (2-tailed)	.278
	N	6
Collaborative Learning Style	Correlation Coefficient	.527**
	Sig (2-tailed)	.000
	N	57
Avoidant Learning Style	Correlation Coefficient	.
	Sig (2-tailed)	.
	N	0
Participant Learning Style	Correlation Coefficient	.505**
	Sig (2-tailed)	.003
	N	32

Note. ** Correlation is significant at the 0.01 level (2-tailed).

ns = not statistically significant.

Based on the results of the correlation, it can be concluded that there was a positive correlation between student teachers' independent learning styles, dependent learning style, competitive learning style, collaborative learning style, participant learning style, and their engagement in learning mathematics. Therefore, there was an increase in student teachers' engagement accompanied by an increase in student teachers' learning styles.

Discussion

The following points are discussed as the results of the study.

Discussion for Research Question 1

According to the results of the study, dependent learning style had the highest mean (34.09) and avoidant learning style had the lowest mean (17.06) among six learning styles – independent learning style, dependent learning style, competitive learning style, collaborative learning style, avoidant learning style, and participant learning style. Among six different learning styles, most student teachers (44%) preferred the dependent learning style and no student teacher (0%) preferred the avoidant learning style. The result of this research was also in line with the findings of Cardino and Ortega-Dela Cruz (2020) in which the most preferred learning style was dependent learning style and the least preferred learning style was avoidant learning style among two hundred and seventy-seven ninth grade students. Most students had dependent learning style preferences due to the nature of the subject. Most students may depend heavily on teachers and friends for learning tasks. Some students may find group work enjoyable, some may be attentive and responsive to coursework requirements, some may emphasize high marks and attention from teachers and some may prefer to work alone and need little direction or attention from teachers. Therefore, teachers need to understand different ways in which students acquire, retain, and apply knowledge learned to be able to adapt instruction to students' different styles of learning.

Discussion for Research Question 2

The results of the study showed that among two hundred and sixteen student teachers, most student teachers (63%) had a moderate level of engagement and the least student teachers (17.6%) had a high level of engagement. The findings support the study of Lam and Jimerson (2008) that affective, behavioral, and cognitive engagement in school is an important construct associated with student success. It can be viewed as an asset associated with positive student outcomes, and a happy classroom atmosphere. When student teachers have a good relationship with their teachers and classmates and feel a sense of belonging to their school (affective engagement), they may be more likely to participate in class discussions and activities (behavioral engagement), and over time this can lead to a stronger commitment and investment in their learning (cognitive engagement). Therefore, teachers should have high expectations for student learning, positive teacher-student relationships, and enthusiasm for teaching to promote student teachers' behavioral, affective, and cognitive engagement in learning mathematics.

Discussion for Research Question 3

The correlation results indicated that there was a positive correlation between student teachers' independent learning style, dependent learning style, competitive learning style, collaborative learning style, participant learning style, and their engagement in learning mathematics. Therefore, there was an increase in student teachers' engagement accompanied by an increase in student teachers' learning styles. The finding of this study is similar to the study of Halif et al., (2018) whose result is that there is a significant positive relationship between students' learning style and their engagement. Student engagement can be improved when teachers use effective pedagogy that is relevant to the student's preferred learning styles in the classroom, and when students are engaged, they learn more and perform better. Teachers should

prepare various learning activities that can give students multiple learning experiences to meet their preferred learning styles.

Recommendations

Based on the research findings, some recommendations can be made for further research studies.

- (1) To carry out this study, participants were randomly selected from Sagaing University of Education. Therefore, further studies should be conducted in other universities of education and education degree colleges. As the sample size was limited in this study, the results cannot be generalized to a larger population. Further studies should be carried out about this problem with a larger sample.
- (2) This study was conducted by classifying student teachers' learning preferences by Grasha-Riechmann Learning Styles Scales (GRLSS). Other studies can be implemented with other different classifications of learning styles.
- (3) This study explored the relationship between student teachers' learning styles and their engagement in learning mathematics using a cross-sectional survey research design. Further studies can be conducted with other research designs to get more reliable data.
- (4) This study was carried out with student teachers who are specialized in learning mathematics. Other studies can be conducted with other participants who are specialized in learning other subjects.
- (5) In addition, further study can be investigated to explore the moderating factors (learner motivation, teachers' teaching styles, culture, and student behavior) between student teachers' learning styles and their engagement in learning mathematics.

Conclusion

Education is an essential and indispensable part of human life (Aggarwal, 2010). Teachers play a vital role in ensuring quality education delivery. Teachers use various methods such as lectures, small group activities, and hands-on learning activities to dispense knowledge to students. Effective teaching and learning cannot occur without a congenial classroom environment and student engagement.

This study was carried out to explore student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education. In line with the objectives of the study, a cross-sectional survey was carried out. To achieve these objectives, three research questions were set down. The data were collected from two hundred and sixteen student teachers who specialized in mathematics at Sagaing University of Education during 2023-2024 academic year by using two research instruments, namely, a questionnaire for student teachers' learning style and a questionnaire for student teachers' engagement in learning mathematics. The collected data were analyzed by using descriptive statistics and Spearman rank-order correlation. It was found that the findings of the study serve the intended research purpose and research questions of the study.

In investigating the different types of learning styles preferred by student teachers in learning mathematics at Sagaing University of Education, the results revealed that student teachers' most preferred learning style was dependent learning style and student teachers' least

preferred learning style was avoidant. Educators can use this awareness to maximize student learning and support effective education by developing teaching methods that incorporate various learning styles.

In exploring the levels of student teachers' engagement in learning mathematics at Sagaing University of Education, it was found that most student teachers had a moderate level of engagement and the least student teachers had a high engagement level. Engaged students tend to perform better academically, develop important skills, and enjoy class more.

In examining the relationship between student teachers' learning styles and their engagement in learning mathematics at Sagaing University of Education, the findings showed that there was a statistically significant strong positive correlation between student teachers' independent learning style and their engagement in learning mathematics, and there was a statistically significant moderate positive correlation between student teachers' dependent learning style, collaborative learning style, participant learning style, and their engagement in learning mathematics. Then, there was a moderate positive correlation between student teachers' competitive learning style and their engagement in learning mathematics, but not statistically significant. Thus, teachers should use different teaching strategies and provide multiple learning experiences that will meet student teachers' different learning styles. When students have the opportunity to learn in their preferred ways, they will be motivated to engage in learning activities that lead to improved educational outcomes.

Teachers can learn student teachers' learning styles, strengths, interests, goals, challenges, and backgrounds by using questionnaires, surveys, interviews, portfolios, or other tools. According to the engagement of students, teachers can use their interests, strengths, and learning preferences in designing relevant and meaningful tasks to create appropriate learning opportunities. Overall, an awareness of learning style and student engagement is meaningful when used as a self-development guideline for both teacher and student. To stimulate student learning engagement, teachers should use a variety of teaching styles to accommodate or stimulate the learning styles of students. In this way, teachers can maximize student learning, keep the instruction fresh and more engaging for students, and support an effective education system by developing teaching methods that incorporate various learning styles.

Acknowledgements

With a heart filled with gratitude, we are thankful to Dr. Myat Myat Thaw, Rector, Sagaing University of Education, Dr. Khin Hnin Yee, Pro-Rector, Sagaing University of Education, and Dr. Cho Kyi Than, Pro-Rector, Sagaing University of Education for permitting us to undertake the research. We are profoundly grateful to Dr. Soe Than, Professor Emeritus, Department of Curriculum and Methodology at Sagaing University of Education for giving necessary advice and invaluable rich comments on our research. Finally, we would like to thank all participants who responded to the survey for their kind contributions.

References

- Abla, C., & B.R. Fraumeni, (2019). *Student engagement: Evidence-based strategies to boost academic and social-emotional results*. McREL International.
- Aggarwal, J. C. (2010). *Theory and principles of education* (13th ed.). New Delhi, Vikas Publishing House.
- Ambrose, S.A., M.W. Bridges, M. DiPietro, M.C. Lovett, & M.K. Norman (2010). *How Learning Works: 7 Research-based Principles for Smart Thinking*. Jossey-Bass, San Francisco.

- Bryson, C., & L. Hand, (2007). The role of engagement in inspiring teaching and learning. *Innovations in Education and Teaching International*, 44(4), 349-362.
- Cardino, J.M., & R.A. Ortega-Dela Cruz, (2020). Understanding of learning styles and teaching strategies towards improving the teaching and learning of mathematics. *International Journal on Math, Science and Technology Education*, 8(1), 19-43.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York, Harper & Row.
- Doherty, W.A., & C.D. Maddux, (2002). An investigation of methods of instruction and student learning styles in Internet-based community college courses. *Distance Education: Issues and Concerns*, 19(3), 23-32.
- Grasha, A.F. (1996). *Teaching with style: A practical guide to enhancing learning by understanding teaching and learning styles*. Pittsburgh, Alliance Publishers.
- Gunuc, S. (2013). *Determining the role of technology in student engagement and examining of the relationships between student engagement and technology use in class*. Anadolu University, Turkey.
- Gunuc, S., & A. Kuzu, (2014). *Student engagement scale: Development, reliability and validity*. *Assessment & Evaluation in Higher Education*. doi: 10.1080 /02602938.2014.938019.
- Halif, M.M., N. Hassan, N.A. Sumardi, A.S. Omar, S. Ali, R.A. Aziz, A.A. Majid, & N.F. Salleh, (2018). The effects of learning styles on student engagement among university students. *Proceeding of ISER 157th International Conference*. Retrieved from <https://www.worldresearchlibrary.org/upproc/pdf/1933154096786217-22.pdf>
- Khin Zaw. (2001). *Cybernetic analysis of learning theories*. Ph.D. Programme Course Material. Yangon: Yangon University of Education (YUOE).
- Kivunja, C. (2015). *Teaching, Learning and Assessment: Steps towards Creative Practice*. Melbourne, Oxford University Press.
- Lam, S.F., & S.R. Jimerson, (2008). *Exploring student engagement in schools internationally: Consultation paper*. Chicago: International School Psychologist Association.
- Li, Y., & R.M. Lerner, (2011). Trajectories of school engagement during adolescence: Implications for grades, depression, delinquency, and substance use. *Developmental Psychology*, 47(1), 233-247.
- Nzesei, M.M. (2015). *A correlation study between learning styles and academic achievement among secondary school students in Kenya*. University of Nairobi.
- The American Heritage (2011). *Science dictionary*. New York, Houghton Mifflin Harcourt.
- Wilkens, C.P. (2022). Remote University Supervision of Student Teachers: Lessons and Recommendations. *Preparing Faculty for Technology Dependency in the Post-COVID-19 Era* (pp. 22). New York, SUNY Brockport.
- Willms, J. D. (2003). *Student engagement at school. A sense of belonging and participation*. Paris, Organisation for Economic Co-operation and Development.

EFFECTIVENESS OF COOPERATIVE MASTERY LEARNING MODEL IN TEACHING SCIENCE TO GRADE 6 STUDENTS

Myat Hsu Win¹ and Thida Wai²

Abstract

The main purpose of this study is to investigate the effectiveness of the cooperative mastery learning model in students' achievement in middle school science teaching. This study was conducted by quasi-experimental design. As the instruments for this study, pretest and posttest were used. By using a random sampling method, four high schools from Mandalay and Sagaing Regions were selected. Cooperative mastery learning model was implemented on experimental groups. The control groups were exposed to formal instruction. ANCOVA results showed that there was a significant difference in the overall science achievement between middle school students who receive instruction with cooperative mastery learning model and those who do not receive it. Therefore, the findings of this study proved that students who receive instruction with cooperative mastery learning model were higher than those of students who do not receive it. In addition, it can be suggested that cooperative mastery learning model should be used in science teaching and learning.

Keywords: Cooperative learning, mastery, mastery learning, cooperative mastery learning, teaching model

Introduction

Education provides individuals with the opportunity to improve their lives, become successful members of their communities and actively contribute to the national development. It has innate relationship with the individuals' process of growth. It is a continuous re-organization or re-construction of the individual life experience. It also facilitates learning or the acquisition of knowledge, skills, values, beliefs and habits.

In today's world, science encompasses many ways of gaining information which help individual know themselves and their environment and renew this information frequently. Teaching science individually helps them to learn how adopt and adapt an inclination which enforces them to think objectively and make the right decision confronting different events and situations. This inclination provides a comfortable life for them as well as for their family and their environment.

The new curriculum moves Myanmar teaching away from rote learning and hopes to increase student engagement and performance, but requires teachers to have the capabilities to deliver this. The new curriculum also reflects society's need for citizens capable of learning how to learn, applying critical thinking, communication and creativity and possess a core of knowledge and skills in technical and academic areas (Lall, 2020).

It is necessary for today's students to engage in deeper learning or learning that allows students to take what is learned in one situation, and apply it to new situation. Deeper learning involves the interplay of the cognitive, intrapersonal and interpersonal competencies. Mastery of academic content is basic for higher-order thinking skills and interpersonal and intrapersonal competencies. For concept mastery, teachers give the formative test and certify which students achieve mastery. Students who fall short might work in small groups reviewing troublesome

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material, often with the aid of peer tutors who have mastered the material. Teachers allow students time to work on remedial materials along with homework.

Teachers must give children clear instructions and guidelines and must play an important role as facilitators and supporters during lessons. For this purpose, an instructional procedure whereby learners work together in small groups and are rewarded for their collective accomplishment is cooperative learning. Their usual tasks are to collectively learn or master content the teacher has previously presented or complete a teacher-assigned project as a team.

Therefore, this study is intended to investigate the effectiveness of cooperative mastery learning model in teaching middle school science.

Purpose of the Study

The main purpose of this study was to investigate the effectiveness of cooperative mastery learning model in student achievement in middle school science teaching. The specific objectives of the study are as follows:

1. to find out the effectiveness of cooperative mastery learning model in students' achievements in middle school science,
2. to make suggestions for the improvement of teaching middle school science.

Research Hypotheses

The research hypotheses are:

1. There is a significant difference in the overall science achievement between middle school students who receive instruction with cooperative mastery learning model and those who do not receive it.
2. There is a significant difference between the science achievement of middle school students who receive instruction with cooperative mastery learning model and those who do not receive it in answering lower level and higher level questions.

Scope of the Study

The following points are the scope of the study.

1. This study is geographically restricted to Sagaing Region and Mandalay Region.
2. Participants in this study are Grade 6 students from four selected schools.
3. It is limited to the content area of force, living things, cell and cell structure and reproduction from Grade 6 Science Textbook prescribed by Basic Education Curriculum, Syllabus and Textbook Committee, 2020-2021.

Definition of Key Terms

Cooperative Learning

Cooperative learning requires pupils to work together in small groups to support each other to improve their own learning and that of others (Jolliffe, 2007).

Mastery

Mastery refers to the attainment of a high degree of competence within a particular area (Ambrose, Bridges, DiPietro, Lovett & Norman, 2010).

Mastery Learning

Mastery learning is a set of group-based, individualized teaching and learning strategies based on the premise that all students can and will learn what the school have to teach (Anderson, 1975).

Teaching Model

A model of teaching is a plan or pattern that can be used to shape curriculums (long-term courses of studies), to design instructional materials, and to guide instruction in the classroom and other settings (Joyce & Weil, 1980).

Cooperative Mastery Learning (Operational Definition)

Cooperative mastery learning is an instructional strategy in which learners study cooperatively in small groups where task completion is contingent on mutual cooperation. Then, they are individually tested on the learning followed by learning activities to reach mastery.

Review of Related Literature

Mastery learning is an educational practice based upon behavioral theory that emphasizes how the environment can be manipulated in order to change behavior in a desirable direction (Cruickshank, Jenkins & Metcalf, 2009). According to Abrami and Chambers (1996, as cited in Killen, 2016), cooperative learning rests on four theoretical perspectives – motivational perspectives, social cohesion perspectives, cognitive developmental perspectives, and cognitive elaborations perspectives. Learning theories that influenced cooperative mastery learning include behaviorist, cognitive and motivational theories.

In behavioral aspects, there are two major assumptions about learning and learners. The first assumption is that learners are not just passive entities who react to environmental stimuli. Learners learn by doing, experiencing, and engaging in trial and error. What has been learned, under what conditions, and the consequences that support or maintain the learned behavior all work together, and must be observable and measurable.

A second assumption is that learning is a change in behavior due to experience and a function of building associations between the occasion on which the behavior occurs and the behavior itself. Learning tasks are ordered logically according to a hierarchy. Learners' performance of tasks is measured which is contingent on successful achievement at each stage (Deubel, 2003).

The cognitive perspectives are often grouped into two trends: the individual cognitive and the sociocultural. The first is in line with the views of epistemology expressed by Piaget. Science teachers who know the structure of intelligence – stages, structures, operations – can facilitate learning. Those who understand Piaget's work may even be able to broaden cognitive development and accelerate it in the transitional phases (Collette & Chiappetta, 1989). From this individual cognitive perspective, cooperative mastery learning will be grown in use and importance in science classrooms.

Vygotsky believes that culture plays an important role in cognitive development, and social interaction is the primary way. Cognitive development occurs through the child's conversations and interactions with others. In cooperative learning, social interaction is important for learning because higher mental functions such as reasoning, comprehension, and critical thinking originate in social interactions and are then appropriated and internalized by individuals (Kivunja, 2015).

Most educators agree that motivating students is one of the critical tasks of teaching. In order to learn, students must be cognitively, emotionally, and behaviorally engaged in productive

class activities. Woodruff (1948, as cited in Khin Zaw, 2001a) has stated that the speed of learning depends upon the degree of motivation. Thus, teachers must foster motivation for learning before they can expect students to profit from instruction or from school in general.

Cooperative learning and mastery learning are clearly distinct and focus on different aspects of the teaching and learning process. At the same time, the two strategies share several common premises that contribute to their complementary nature and enhance their mutual implementation.

In implementing mastery learning, teachers regularly check students' learning through some type of formative test. Although this test is often a paper-and-pencil quiz, it may be any mechanism through which teachers and students gain information on learning progress. Mastery learning therefore offers teachers using cooperative learning a systematic feedback and corrective procedure that can bring greater focus to the work of the student teams. With such a procedure, students are likely to spend more of the time they are in teams engaged in purposeful learning activities. Individual accountability is insured as all students strive to attain the mastery standard. Positive interdependence is fostered by offering special rewards to teams that succeed in getting all team members to mastery. The efficiency of the teams' work, as well as the cognitive and communicative functions of the team, is thus enhanced.

Cooperative learning helps teachers in their efforts to implement mastery learning. A difficulty often encountered by teachers attempting to use mastery learning is providing high-quality corrective and enrichment activities. This is particularly challenging in classrooms with heterogeneous students who have diverse learning styles and remedial needs (Mevarech, 1989, as cited in Guskey, 1990).

Learning together in teams also provides important incentives that strengthen motivation and alleviate anxiety. Furthermore, the use of student learning teams serves not only corrective but enrichment purposes as well.

Proposed model, a cooperative mastery learning model, is intended to contribute to teaching of science at the middle school level. This model consists of three main components. They are planning, implementation and assessment phase. Planning phase is the planning and preparation of the instructional procedure. There are two steps in this phase: (a) identifying learning objectives, and (b) preparing instructional procedure. In implementation phase, organizing students into groups, assigning different roles, presenting for attention and motivation, informing learning objectives, eliciting prior knowledge, presenting new materials, providing learning guidance, eliciting and interpreting evidence of learning, identifying the gap, instructional modification based on evidence, corrective activities/ providing feedback, enrichment activities and providing closure are included. The final step of the model is assessment in which assessment and feedback processes are involved.

Method

Research Design

The research design used in this study was one of the quasi-experimental designs, non-equivalent control group design.

Subjects

By using the simple random sampling method, four schools from Mandalay and Sagaing Regions were selected. The population and sample size of the selected schools are presented in Table 1.

Table 1 Population and Sample Size

Region	Township	School	No. of Population	No. of Sample
Sagaing	Sagaing	No. (3) BEHS	108	49
	Depeyin	BEHS, Depeyin	98	49
Mandalay	Amarapura	No. (2) BEHS	100	52
	Tada-U	BEHS, Chaung Khwa	104	55

Note: BEHS = Basic Education High School

Instruments

The instruments were pretest and posttest for this study. These were used after examining the reliability coefficient. A pretest was based on the levels of the cognitive domain (remembering, understanding, and applying). The allocated time for this test is one and a half hours. To measure the effectiveness of the instruction, a posttest was used. It was constructed on the basic levels of Bloom's Taxonomy: remembering, understanding, applying and analyzing items (Revised Bloom Taxonomy). The allocated time for this test is one and a half hours.

Procedure

The student from the selected sample schools were randomly assigned to two groups: the experimental group and the control group. This experimental study consists of three phases: pretesting, intervention and posttesting. Before students received any instruction, all participants were administered with the science achievement test (pretest). And then, the experimental group received an instruction by using cooperative mastery learning model and the control group received formal instruction. At the end of the treatment period, all student participants took the science achievement test (posttest).

Data Analysis

In this study, the Statistical Package for the Social Sciences (SPSS) version 25 was used in order to analyze quantitative data. The research data was analyzed by inferential statistics: one-way analysis of covariance (ANCOVA) to examine whether there are significant differences between the science achievement of students who receive cooperative mastery learning model and those who do not.

Findings

This findings of the pretest and posttest questions are presented in this section.

Findings of Students' Achievement on Posttest

A one-way analysis of covariance was conducted to compare the effectiveness of two different interventions. The independent variable was the type of intervention (cooperative mastery learning, and formal instruction), and the dependent variable consisted of scores on the posttest administered after the intervention was completed. Participants' scores on the pretest

were used as the covariate in this analysis. Table 2 shows the results of analysis of covariance for posttest scores in School 1.

Table 2 Analysis of Covariance Results for Posttest Scores in School 1

Level	Group	N	Unadjusted M	Adjusted M	MD	F	p	Partial Eta Squared
Remembering	Experimental	25	7.96	7.95	0.44	2.053	.159 (ns)	.043
	Control	24	7.50	7.51				
Understanding	Experimental	25	11.04	11.06	1.09	4.428	.041*	.088
	Control	24	10.00	9.97				
Applying	Experimental	25	7.48	7.49	1.75	9.458	.004**	.171
	Control	24	5.75	5.74				
Analyzing	Experimental	25	5.56	5.58	2.69	19.915	.000***	.302
	Control	24	2.92	2.89				
Total	Experimental	25	32.56	32.62	6.35	32.805	.000***	.416
	Control	24	26.33	26.27				

Note. ns = not significant

* $p < .05$. ** $p < .01$. *** $p < .001$

Bloom's taxonomy (1956, as cited in Kivunja, 2015) is one of the most widely used classifications of cognitive processes. The cognitive dimension has had the greatest application in education. In 2001, Bloom's taxonomy was revised. It includes six cognitive levels of hierarchical complexity. The lower cognitive levels were identified as remembering, understanding, and applying. The higher cognitive were called analyzing, evaluating, and creating.

As shown in Table 2, the adjusted mean values of the one-way analysis of covariance for the respective levels of School 1 are presented. According to the results, it was found that there was no significant difference between the experimental group and the control group for the posttest mean scores of remembering level questions. Therefore, it can be interpreted that the formal instruction could improve remembering level questions like cooperative mastery learning model.

For the lower level questions, the posttest mean score of experimental group was significantly higher than those of control group. Therefore, it can be interpreted that the use of cooperative mastery learning model enhanced students' understanding of science concepts, and the ability of applying the concepts in their problems.

The comparison of the posttest mean score of experimental and control groups showed that there was a significant difference between the achievement of the two groups for higher level questions. Therefore, it can be interpreted that cooperative mastery learning model developed students' ability to compare and contrast the concepts of the context.

For the overall achievement on the posttest, it was found that there was a significant difference between the experimental and control groups for the posttest mean scores $F(1, 46) = 32.805$, $p = .000$, partial eta squared = .416). It can be interpreted that cooperative mastery learning model had a significant effect on the academic achievement of students in school 1.

The mean comparison for posttest scores of the student achievement in school 1 is illustrated in Figure 1.

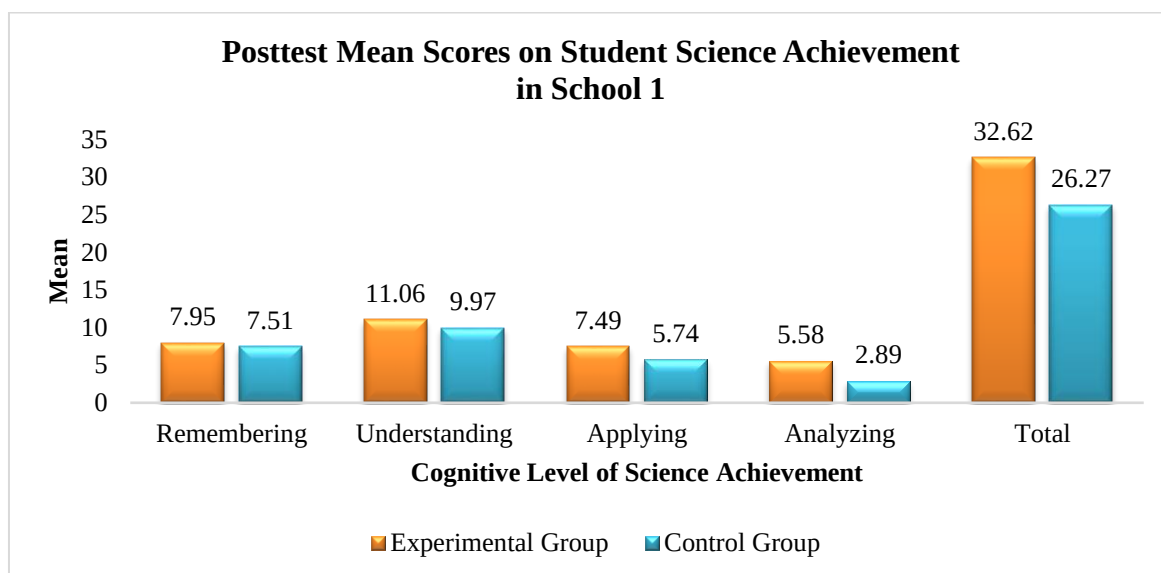


Figure 1 Comparison of Posttest Mean Scores in School 1

Table 3 shows the analysis of covariance results for student science achievement in posttest in school 2.

Table 3 Analysis of Covariance Results for Posttest Scores in School 2

Level	Group	N	Unadjusted M	Adjusted M	MD	F	p	Partial Eta Squared
Remembering	Experimental	24	7.62	7.63	0.31	1.163	.287 (ns)	.025
	Control	25	7.32	7.32				
Understanding	Experimental	24	11.67	11.66	2.26	20.762	.000***	.311
	Control	25	9.40	9.40				
Applying	Experimental	24	7.88	7.87	2.51	32.481	.000***	.414
	Control	25	5.36	5.36				
Analyzing	Experimental	24	6.13	6.12	1.94	22.682	.000***	.330
	Control	25	4.28	4.28				
Total	Experimental	24	33.29	33.29	6.93	60.657	.000***	.569
	Control	25	26.36	26.36				

Note. ns = not significant

*** $p < .001$

As shown in Table 3, the adjusted mean values of the one-way analysis of covariance for the respective levels of school 2 are presented. The results of ANCOVA showed that there was no significant difference between the experimental group and the control group for the posttest mean scores of remembering level questions. Therefore, it can be interpreted that the formal instruction could improve remembering level questions like cooperative mastery learning model.

It can also be interpreted for school 2 that cooperative mastery learning model had a significant effect on students' achievement, particularly at the lower level questions. Because the

experimental group perform significantly better than the control groups in answering these questions.

For higher level questions, the posttest mean score of the experimental group was significantly higher than those of control group. Therefore, it can be interpreted that cooperative mastery learning model had a significant effect on students' ability to distinguish science concepts.

In addition, the ANCOVA results revealed a significant difference between the experimental and control groups for the overall achievement at $p < .000$ ($F(1, 46) = 60.657$, $p = .000$, partial eta squared = .569). Therefore, it can be interpreted that the use of cooperative mastery learning model had a significant effect on student achievement in school 2.

The mean comparison for posttest scores in school 2 is illustrated in Figure 2.

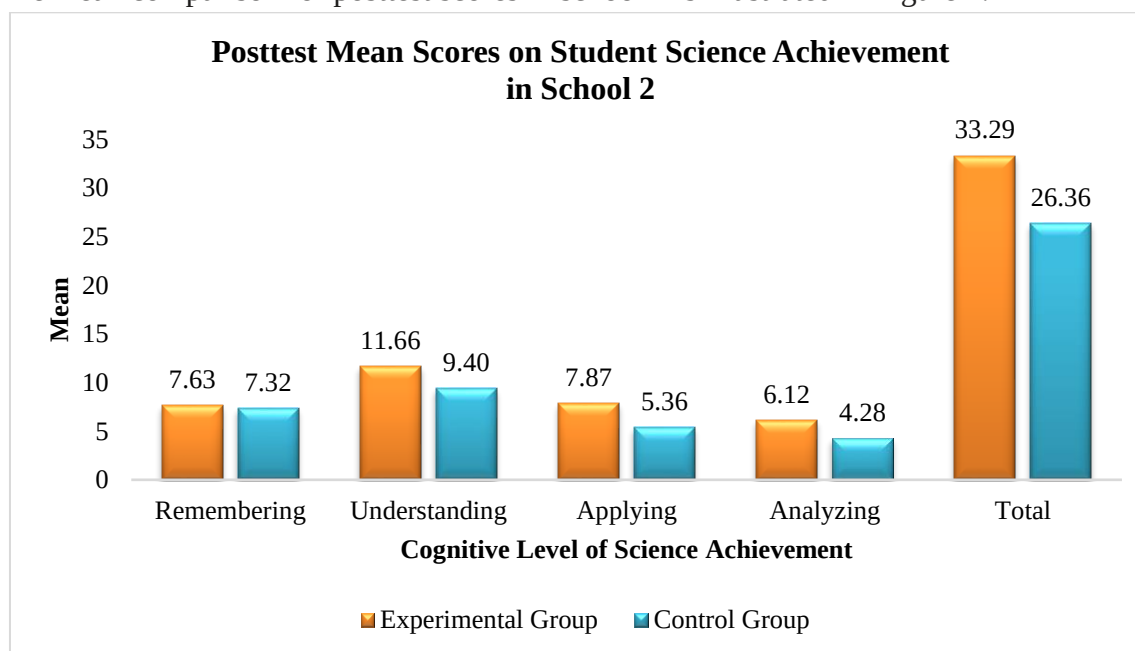


Figure 2 Comparison of Posttest Mean Scores in School 2

The analysis of covariance results for student science achievement on posttest in school 3 are described in Table 4.

Table 4 Analysis of Covariance Results for Posttest Scores in School 3

Level	Group	N	Unadjusted M	Adjusted M	MD	F	p	Partial Eta Squared
Remembering	Experimental	27	8.37	8.37	0.41	2.399	.128 (ns)	.047
	Control	25	7.96	7.96				
Understanding	Experimental	27	10.78	10.79	2.29	40.974	.000***	.455
	Control	25	8.52	8.50				
Applying	Experimental	27	8.85	8.83	2.37	18.702	.000***	.276
	Control	25	6.44	6.46				
Analyzing	Experimental	27	7.78	7.76	2.30	16.422	.000***	.251
	Control	25	5.44	5.46				
Total	Experimental	27	36.04	36.01	7.15	25.088	.000***	.339
	Control	25	28.84	28.86				

Note. ns = not significant

*** $p < .001$

As shown in Table 4, there was no significant difference between experimental group and control group for the posttest mean scores of remembering level questions. Therefore, it can be interpreted that the formal instruction could improve remembering level questions like cooperative mastery learning model.

The results pointed out that the posttest mean score of the experimental group was significantly higher than those of control group for lower level questions. Therefore, it can be interpreted that cooperative mastery learning model enhanced students' understanding of science concepts, and students' ability to use abstractions to describe particular ideas.

ANCOVA results for higher level questions showed that there was statistically significant. Therefore, it can be interpreted that cooperative mastery learning model had a significant effect on the ability of students in detecting how the parts relate to one another and to overall structure in school 3.

As shown in Table 4, it was found that there was a significant difference between the experimental and control groups for the overall achievement at $p < .000$ level, ($F(1, 49) = 25.088$, $p = .000$, partial eta squared = .339). Therefore, it can be interpreted that the use of cooperative mastery learning model had a significant effect on student science achievement in school 3.

The mean comparison for posttest scores in school 3 is illustrated in Figure 3.

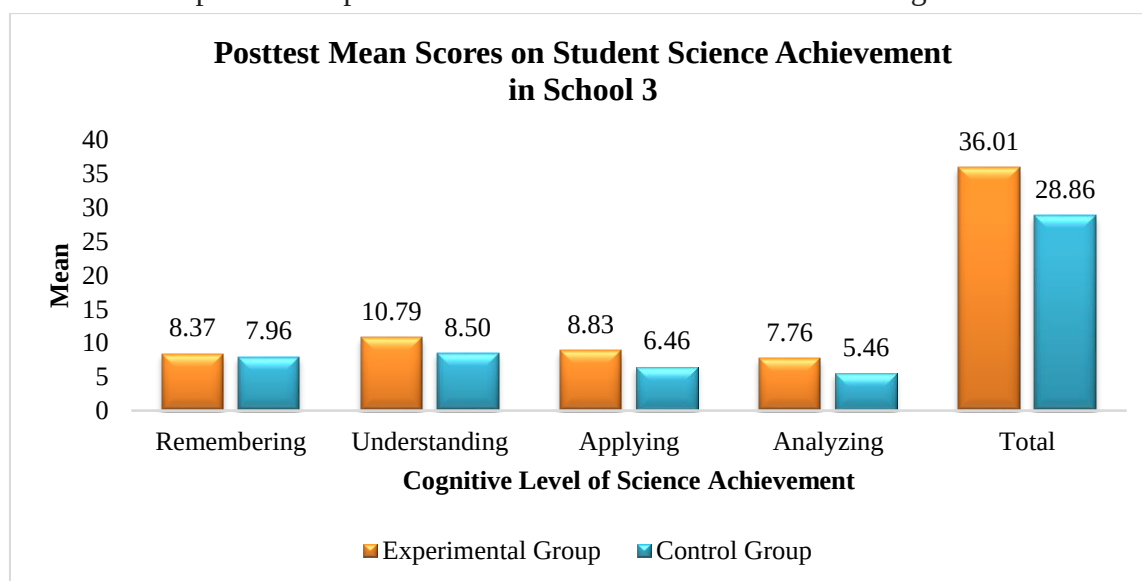


Figure 3 Comparison of Posttest Mean Scores in School 3

Table 5 shows the analysis of covariance results for student science achievement on posttest in school 4.

Table 5 Analysis of Covariance Results for Posttest Scores in School 4

Level	Group	N	Unadjusted M	Adjusted M	MD	F	p	Partial Eta Squared
Remembering	Experimental	27	8.33	8.34	-0.04	.065	.799 (ns)	.001
	Control	28	8.39	8.38				
Understanding	Experimental	27	11.56	11.53	3.05	46.336	.000***	.471
	Control	28	8.46	8.48				
Applying	Experimental	27	10.19	10.18	2.75	36.191	.000***	.410
	Control	28	7.43	7.43				

Level	Group	N	Unadjusted M	Adjusted M	MD	F	p	Partial Eta Squared
Analyzing	Experimental	27	7.22	7.21	2.03	16.508	.000***	.241
	Control	28	5.18	5.18				
Total	Experimental	27	37.30	37.27	7.78	77.720	.000***	.599
	Control	28	29.46	29.49				

Note. ns = not significant

*** $p < .001$

As shown in Table 5, the adjusted mean value of the one-way analysis of covariance for the respective levels of school 4 are presented. The results showed that there was no significant difference between the experimental group and the control group for the posttest mean scores of remembering level questions. Therefore, it can be interpreted that the formal instruction could retrieve facts, terms and basic concepts on remembering level questions like cooperative mastery learning model.

However, the posttest mean score of experimental group was significantly higher than those of control group for lower level questions. Therefore, it can be interpreted that cooperative mastery learning model had a significant effect on students' ability to understand facts, ideas and concepts by organizing, comparing, interpreting, giving descriptions, stating the main ideas, and apply acquired knowledge, facts, concepts, techniques and rules in new situations more than those of control group.

There was a significant difference between the posttest mean scores of experimental and control groups for higher level questions. Therefore, it can be interpreted that cooperative mastery learning model had a significant effect on the students' ability to differentiate and organize the facts and concepts in learning science.

The mean comparison for posttest scores in school 4 is illustrated in Figure 4.

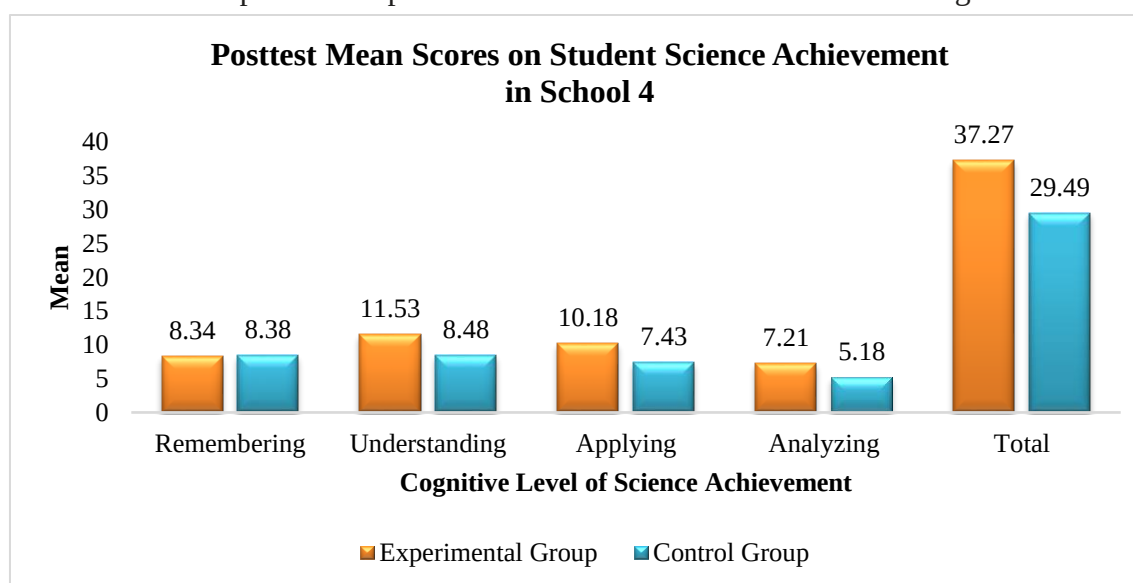


Figure 4 Comparison of Posttest Mean Scores in School 4

As shown in Table 5, it was found that there was a significant difference between the experimental and control groups for the overall achievement at $p < .000$ level, ($F(1, 52) = 77.720$,

$p = .000$, partial eta squared = .599). Therefore, it can be interpreted that the use of cooperative mastery learning model had a significant effect on student science achievement in school 4.

Discussion

According to the results from the pretest scores in the selected schools, there was no significant difference between the experimental groups and the control groups. When the pretest scores were considered as a covariate, the one-way analysis of covariance (ANCOVA) results for posttest scores showed that there were no significant differences between the achievement of the experimental groups and the control groups in the remembering level questions in all schools.

However, the results from ANCOVA showed that the experimental groups performed significantly better than the control groups on understanding, applying, and analyzing level questions. Therefore, it can be interpreted that the use of cooperative mastery learning model significantly enhanced the students' science achievement in answering lower level and higher level questions in the selected schools. The result of the study is consistent with other research studies (Keter, Barchok, & Ng'eno, 2014; Altun, 2015; Catherine, WanjaNjagi, & Kamweru, 2021). They showed that students who received cooperative learning, mastery learning and cooperative mastery learning improved overall science achievement than those of the students who did not receive. The result of this study is in accordance with the results of Hussain and Suleman (2016). They found that the students from the experimental group outperformed in the achievement on all levels of cognitive domain: knowledge, comprehension, application, analysis, synthesis, and evaluation. According to the data, this learning model would improve overall science achievement. Therefore, it supports the hypothesis that there is a significant difference in the overall science achievement between middle school students who receive instruction with the cooperative mastery learning model and those who do not receive it.

Suggestions

Suggestions for the Middle School Science Teachers: The effectiveness of cooperative mastery learning largely depends on methodological culture and competencies of teachers. Professional expertise is based on the belief that the performance of a vital function in society requires immense knowledge and specialized skills, which must be acquired through prolonged education and experience (Khin Zaw, 2001b). The teachers encompass the required knowledge for teaching different ages and stages and level-appropriated subject content competency-professional knowledge and understanding. They should know what cooperative learning and mastery learning are and, how to organize the groups and manage them effectively. Moreover, teachers should divide the concepts to be taught into small discrete units and make sure each child master each unit before moving to the next.

Suggestions for the School Administrators: One key aspect for pupils to work together cooperatively is to consider the actual physical set-up of the classroom. Well-designed classroom defines learning patterns and supports transitions from one type of activity to another (MacConville & Rae, 2006). Therefore, school administrators should provide a well-designed classroom setting (the right environment) for implementing the cooperative mastery learning model.

Recommendations

Based on the findings of the study, the following recommendations are made for further researches.

To conduct this study, the sample schools were randomly selected from two regions. Therefore, further study should be carried out in the other states and regions in Myanmar.

The research is administered to Grade 6 students on the content areas: concepts for physics (Force) and biology (Living Things, Cell and Cell Structure, Reproduction). During the short duration, the teachers have to deliver the science concepts as possible as they can. Thus, further studies should be investigated other science concepts.

It is highlighted that concepts in teaching science should be mastered for the improvement and achievement of the receiving the content. Science process skills should be used in taking science activities.

Conclusion

The main purpose of this study is to investigate the effectiveness of cooperative mastery learning model on student achievement in middle school science teaching. Non-equivalent control group design, one of the quasi-experimental designs, was used in this study. Two research hypotheses were used to investigate the effectiveness of cooperative mastery learning model on student achievement in middle school science teaching. This study showed that the students who received cooperative mastery learning model were significantly better than those who did not receive it in all schools. Thus, this study showed that cooperative mastery learning model could achieve high performance of the students in answering lower and higher level questions.

According to the results of the findings, cooperative mastery learning model is one of the most suitable teaching methods in teaching science at the middle school level. Therefore, it can be concluded that students who receive cooperative mastery learning model had a significant science achievement at the middle school level.

Acknowledgements

We would like to express our appreciation to Dr. Kay Thwe Hlaing, Rector of Yangon University of Education, Dr. Nyo Nyo Lwin, Dr. May Myat Thu and Dr. Khin Khin Oo, Pro-rectors of Yangon University of Education, for their permission to conduct this research. And special thanks go to Dr. Myat Myat Thaw, Rector of Sagaing University of Education, Dr. Khin Hnin Yee and Dr. Cho Kyi Than, Pro-rectors of Sagaing University of Education, for their administrative support for this study. We also wish to express profound and sincere thanks to Dr. Khin Mar Khine (Professor and Head, Department of Curriculum and Methodology, Yangon University of Education) for her administrative support and guidance. Furthermore, we also wish to express our deepest appreciation to Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Sagaing University of Education) for her constructive suggestions.

References

- Altun, S. (2015). The effect of cooperative learning on students' achievement and views on the science and technology course. *International Electronic Journal of Elementary Education*, 7 (3), 451-468.
- Ambrose, S. A., Bridges, M. W., DiPietro, M., Lovett, M. C. & Norman, M. K., (2010). *How learning works: Seven research-based principles for smart teaching*. USA: Jossey-Bass.
- Anderson, L. W. (1975). *Major assumptions of mastery learning*. The annual meeting of the Southeast Psychological Association. Atlanta, Georgia (ERIC Document reproduction Service No. ED150172).

- Catherine, K. N., WanjaNjagi, M., & Kamweru, P. K. (2021). Effect of cooperative mastery learning approach on secondary school student's achievement. *IOSR Journal of Research and Method in Education*, 11 (5), 30-37.
- Collette, A. T., & Chiappetta, E. L. (1989). *Science instruction in the middle and secondary schools* (2nd ed.). Columbus: Merrill Publishing Company.
- Cruickshank, D. R., Jenkins, D. B., & Metcalf, K. K. (2009). *The act of teaching* (5th ed.). New York: Mc Graw Hill.
- Deubel, P. (2003). An investigation of behaviorist and cognitive approaches to instructional multimedia design. *Journal of Educational Multimedia and Hypermedia* 12 (1), 63-90.
- Guskey, T. R. (1990). Cooperative mastery learning strategies. *The Elementary School Journal*, 91 (1), 33-42.
- Hussain, I., & Suleman, Q. (2016). Effect of Bloom's mastery learning approach on students' academic achievement in English at secondary level, *Journal of Literature, Language, and Linguistics*, 23, 35-43.
- Jolliffe, W. (2007). *Cooperative learning in the classroom: Putting it into practice*. London: Paul Chapman Publishing.
- Joyce, B., & Weil, M. (1980). *Models of teaching* (2nd ed.). New Jersey: Prentice-Hall Inc.
- Keter, K. J., Barchok, H. K., & Ng'eno, J. K. (2014). Effects of cooperative mastery learning approach on students' motivation to learn chemistry by gender. *Journal of Education and Science*, 5 (8), 91- 97.
- Khin Zaw. (2001a). *Cybernetic analysis of learning theories*. PhD Programme Course Material. Yangon: YIOE.
- Khin Zaw. (2001b). *DS6: Theoretical pedagogy (I1): Ethics*. PhD Programme Course Material. Yangon: YIOE.
- Killen, R. (2016). *Effective teaching strategies: Lessons from research and practice* (7th ed.) South Melbourne: Cengage Learning Australia.
- Kivunja, C. (2015). *Teaching, learning and assessment*. South Melbourne: Oxford University Press.
- Lall, M. (2020). *Myanmar's education reforms: A pathway to social justice?* London: UCL Press.
- MacConville, R., & Rae, T. (2006). *Teaching peer support for caring and cooperation: A six-step method*. London: Paul Chapman Publishing.

THE EFFECTS OF INTERACTIVE METHOD IN TEACHING ENGLISH GRAMMAR AT THE UPPER SECONDARY LEVEL

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Abstract

The purpose of this study is to study the effects of interactive method in teaching English grammar at the upper secondary level. The research design that was used in this study was nonequivalent control group design, one of the quasi-experimental designs. The instruments used in this study were pretest and posttest. The participants in this study were (72) Grade Ten students from No. (1) Basic Education High School and (81) Grade Ten students from No. (4) Basic Education High School in Magway Township, Magway Region. The two intact groups in each school were assigned into experimental groups and control groups. The participants were pretested before the treatment. The experimental group was taught by using interactive method while the control group was taught by using conventional method. After the treatment period, a posttest was administered to both groups. The collected data was analyzed by using independent samples *t* test. It was found that the students who were taught by interactive method achieved significantly higher scores in grammar achievement test. So, it can be concluded that the interactive method brings positive effects on students' grammar achievement at the upper secondary level. The results of this study provided that interactive method is effective in teaching English grammar.

Keywords: interaction, interactive method, English language, Grammar, Group work

Introduction

No one can deny that language is one of the most important factors in the learning process. Every language is important. Language is one of the most important parts of any culture. It is the primary source of communication. It is not only the method to share our ideas and thoughts with others but also the way by which people communicate with one another, build relationships, and create a sense of community. And so, language is a crucial means for communication and interaction (Flottum, 2017). Among them, English is the world language and so it helps the learners everywhere.

English is the language of international communication. Moreover, English gives access to more entertainment and more access to the internet. And then, English makes it easier to the travel. On the other hand, English can make the learners smarter. Learning English is an important point forward to all of your goals. Moreover, knowing English increases the chances of getting a good job in a multinational company. Of course, people think that learning English, the international language, is the best option. And so, English is an excellent choice (Ilyosovna, 2020).

Mastering English grammar is one of the important components in mastering English. Practically, learners are taught rules of language commonly known as sentence patterns in the teaching of grammar. The knowledge of grammatical rules enables learners to know and apply how such sentence patterns should be put together. In addition, grammar can help them become a better communicator. Grammar also plays a vital role in building confidence when speaking or writing in language. The learners can make the sentences more meaningful and easier to understand with good grammar. Understanding proper grammar allows the learners to communicate more effectively in English.

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Brown (2001) examined that interaction is an important word for language teachers. On the other hand, in teaching English, interactive method helps students not only exchange information, but also gain practical communication skills in the language they are studying. There are many teaching strategies that promote interaction. Teachers use various methods in the classroom to improve the achievement of grammar. Among them, interactive method facilitates collaboration learning technique that potentially enhances the learning experience and acts active cooperation of students.

Purpose of the Study

The purpose of this study is to investigate the effects of interactive method in teaching English grammar at the upper secondary level.

The specific objectives of the study are as follows:

- to find out whether interactive method can affect the students' English grammar achievement or not.
- to compare the grammar achievement of students who are taught by interactive method and that of those who are not.
- to make suggestions and recommendations for the application of interactive method in teaching English grammar at the upper secondary level.

Research Questions

The research questions for the study are as follows:

1. What are the significance differences in the grammar achievement of students who are taught by the interactive method and that of those who are not?
2. What are the differences in the grammar achievement of students who are taught by interactive method and that of those who are not taught by interactive method on word changing items?
3. What are the differences in the grammar achievement of students who are taught by interactive method and that of those who are not taught by interactive method on multiple-choice items?
4. How does the grammar achievement of students who are taught by interactive method differ with that of those who are not taught by interactive method on cloze type items?
5. How does the grammar achievement of students who are taught by interactive method differ with that of those who are not taught by interactive method on rearrangement items?
6. How does the grammar achievement of students who are taught by interactive method differ with that of those who are not taught by interactive method on transformation items?

Definition of Key Terms

The key terms of this study are as follows:

Interaction: Interaction is the collaborative exchange of thoughts, feelings, or ideas between two or more people resulting in a reciprocal effect on each other (Brown, 2001).

Interactive method: An interactive method is a form of learning and communicative activity in which students are involved in the learning process and reflect on what they know and what they are thinking (Giorgdze & Dgebuadze, 2017).

English language: English is West Germanic language of the Indo-European language family that is closely related to the Frisian, German, and Dutch (in Belgium called Flemish) (Potter & Crystal, 2024).

Grammar: Grammar is the description of the rules for forming sentences, including an account of the meanings that these forms convey (Thornbury, 1999).

Group work: Group work is a generic term covering a multiplicity of techniques in which two or more students are assigned a task that involves collaborative and self-initiated language (Brown, 2001).

Scope of the Study

This study was restricted to the students at No. (1) Basic Education High School and No. (4) Basic Education High School in Magway Township, Magway Region. The participants in this study were Grade Ten students from selected schools during the (2023-2024) Academic Year.

Review of Related Literature

The Importance of English Language

English is one of the most important languages of the world in numbers of speakers and in its uses for international communication. People think that learning English, the international language, is the best option. Of course, English is an excellent choice. With the help of developing technology, English has been playing a major role in many sectors including medicine, engineering and education, which, in my opinion, is the most important area where English is needed. If one wants to come up in life, knowledge of English is necessary. It is the major window of the modern world. There are many valuable reasons to learn the English language (Baugh & Cable, 2005).

Importance of Grammar

The primary purpose of grammar is to improve the speaking and writing skills of the learner. Further, grammar is thought to furnish the basis for a set of language skills: listening, speaking, reading and writing. In listening and speaking, since learning the grammar of a language is considered necessary to acquire the capability of producing grammatically acceptable utterances in the language, grammar plays a crucial part in grasping and expressing spoken language. In reading, grammar enables learners to comprehend sentence interrelationship in a paragraph, a passage and a text. Grammar allows the learners to put their ideas into intelligible sentences in the context of writing so that they can successfully communicate in a written form. In foreign language learning, grammar instruction holds an important place. Grammar skills will make great contribution to language competence. Without grammar, language acquisition will be confusing. Without grammar skills, learners will fail to use the language correctly knowledge (Mart, 2013).

Interactive Method

An interactive method is a form of learning and communicative activity in which students are involved in the learning process and reflect on what they know and what they are thinking (Giorgdze & Dgebuadze, 2017). It implies very specific and predictable goals. The main goals of interactive methods are:

- stimulation of educational and cognitive motivation;
- development of independence and activity;
- fostering analytical and critical thinking;

- formation of communication skills;
- self-development of students (Yuldashevna, 2019).

The meaning of interactive methods is to achieve a new understanding of a phenomenon or process and an understanding of the connection between phenomenon that previously seemed disparate. Interactive methods are a modern of open discussion that develops the ability to debate, argue and resolve conflicts peacefully (Orshanskyi et al., 2020).

Research Method

This section presented research method including research design, population and sample size, research instruments, data collection procedure, and data analysis.

Research Design

This study aimed to investigate the effects of interactive method in teaching English grammar at the upper secondary level. In this study, a quantitative research method was used to compare the student's achievement in teaching English grammar. The design used in this study was, nonequivalent control group design, one of the quasi-experimental designs.

Population and Sample Size

This study was geographically restricted to Magway Township, Magway Region. The sample schools were No. (1) Basic Education High School and No. (4) Basic Education High School to carry out this study. A sample of (72) Grade Ten students was selected from No. (1) Basic Education High School and a sample of (81) students from No. (4) Basic Education High School (see Table 1).

Table 1 Population and Sample Size

Name of school	No. of Population	No. of Sample
S1	124	72
S2	142	81
Total	266	153

Note. S1= No. (1) Basic Education High School, Magway;

S2= No. (4) Basic Education High School, Magway.

Research Instruments

This study consisted of a pretest and a posttest. Before the treatment, a pretest was used on both groups to measure students' basic grammar knowledge. A posttest was used to measure students' grammar achievement after the treatment.

Procedure

For theoretical information, relevant data was collected through educational journals, books, the internet. Based on these data, literature review was made. In order to carry out an experimental study, the nonequivalent control group design was used. For studying the effects of interactive method in teaching English grammar at the upper secondary level, two schools were selected from Magway and two teachers from these selected schools were requested to cooperate with this study. At the start of the study, the students from each school were divided into two groups, an experimental group and a control group. Both groups were administered the pretest to compare prerequisite entry skills of the groups. The scores of the pretest were compared by using independent samples *t* test to determine group equivalence between the experimental and control groups. According to the *t* values, it was found that the students in both groups were equivalent in grammatical knowledge before the treatment.

The experimental groups were taught with the think-pair-share and jigsaw techniques and the control groups were taught with conventional method of teaching. The treatment duration was two weeks from (24.9.2023) to (7.10.2023). At the end of the treatment period, both groups were administered the posttest. The posttest was administered on October 10, 2023 in both schools. The data was analyzed by using independent samples *t* test. The suggestions and recommendations were made according to findings.

Data Analysis

The data obtained from the posttest was analyzed with Computer-based Statistical Package for Social Sciences (SPSS). The pretest scores of the experimental and control groups were compared by using independent samples *t* test. According to this result, the levels of the two groups were the same before the treatment. Therefore, the posttest scores of the two groups were compared by using independent samples *t* test to find out whether there was a significant difference the two groups from each selected school.

Research Findings

This was concerned with research findings based on the data regarding with the students' grammar achievement.

Findings of Students' Grammar Achievement on the Pretest

For this study, a pretest was administered in order to examine the equivalence of the two groups (experimental groups and control groups) before the treatment period. The data obtained from the pretest were recorded systematically. And then these scores were analyzed by using independent samples *t* test to examine the difference between the two groups (Mills & Gay, 2016). The results can be seen in Table 2.

Table 2 *The Results of *t* values for Students' Grammar Achievement on the Pretest*

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	35	34.94	10.18	1.51	0.61	70	.546 (ns)
	Control	37	33.43	10.88				
S2	Experimental	51	35.80	8.45	0.33	0.20	79	.841 (ns)
	Control	30	35.47	4.63				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

ns = not statistically significant.

According to the results as shown in Table 2, the mean of the experimental and control groups was nearly the same in each selected school. There were no significant differences between the experimental group and control group of each selected school depending on $p = .546$ and $p = .841$. Based on the results of pretest, comparison of mean between the two groups on the pretest scores can clearly be seen in Figure 1.

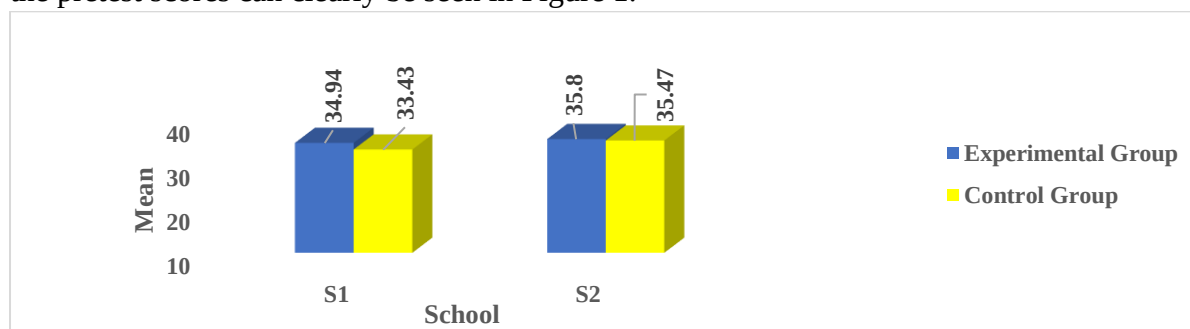


Figure 1. Comparison of mean for pretest scores.

In Figure 1, there was no significant difference between the experimental and control groups for the pretest. This means that the two groups were equivalent. Thus, independent samples *t* test was used to compare the achievement of students on the posttest.

Findings of Students' Grammar Achievement on the Posttest

At the end of the treatment period, a posttest was administered to measure the achievement of students in teaching English grammar. The answer papers were marked and the data obtained from the posttest were recorded systematically. Independent samples *t* test was used to find out the differences between the groups in each selected school (see Table 3).

Table 3 The Results of *t* values for Students' Grammar Achievement on the Posttest

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	35	35.89	9.12	12.11	6.71	70	.000***
	Control	37	23.78	5.93				
S2	Experimental	51	39.92	6.40	11.42	8.50	79	.000***
	Control	30	28.50	4.73				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

****p* < .001.

The mean of the experimental groups in both schools were higher than those of the control groups. According to the *t* values for overall posttest grammar achievement of S1 and S2 (*t* (70) = 6.71, *p* < .001 and *t* (79) = 8.50, *p* < .001), it showed that there was a significant difference in the achievement of grammar between the two groups on the posttest. The values of mean on the posttest can clearly be viewed in Figure 2.

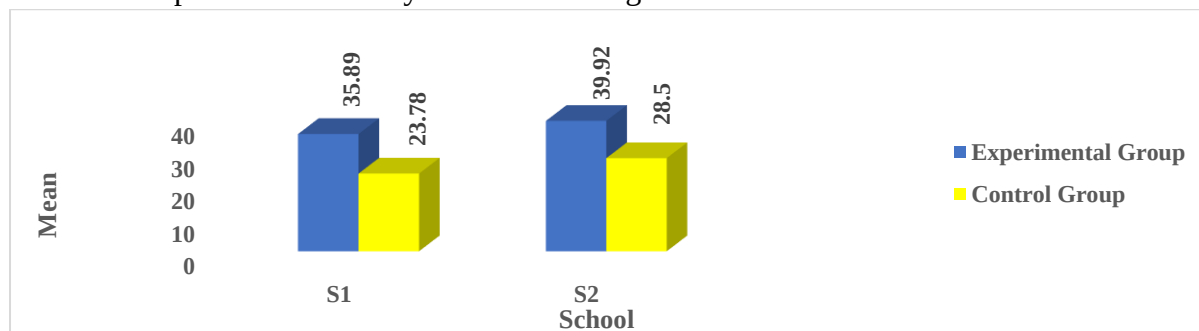


Figure 2. Comparison of mean for overall posttest.

It can be interpreted that interactive method had a significant effect on the grammar achievement of students from two experimental groups. Therefore, the use of interactive method positively contributed to the teaching of grammar at the upper secondary level.

Findings of Students' Grammar Achievement on the Word Changing Items

Table 4 The Results of *t* values for Students' Grammar Achievement on the Word Changing Items

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	35	7.49	2.17	1.98	3.29	70	.002**
	Control	37	5.51	2.84				
S2	Experimental	51	8.14	1.72	1.67	5.02	79	.000***
	Control	30	6.47	.78				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

p* < .01. *p* < .001.

As shown in Table 4, the mean of the experimental groups was significantly higher than those of control groups. According to t values for scores on word changing items of S1 and S2 ($t(70) = 3.29, p < .01$ and $t(79) = 5.02, p < .001$), it indicated that there was a significant difference in the achievement of grammar between the two groups in both schools on the word changing items.

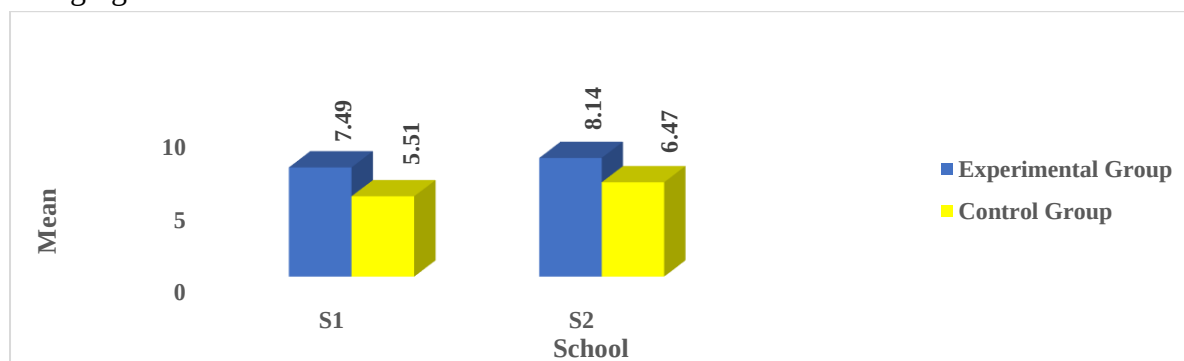


Figure 3. Comparison of mean for word changing items.

It is obvious that students who are taught with interactive method performed better in word changing items than those who are not. Thus, it can be interpreted that interactive method is more effective in learning grammar at the upper secondary level than conventional method.

Findings of Students' Grammar Achievement on the Multiple-Choice Items

Table 5 *The Results of t values for Students' Grammar Achievement on the Multiple-Choice items*

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	35	7.06	1.71	2.2	5.55	70	.000***
	Control	37	4.86	1.64				
S2	Experimental	51	8.78	1.30	3.58	12.23	79	.000***
	Control	30	5.20	1.22				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

*** $p < .001$.

According to the results as shown in Table 5, it was found that the mean of the experimental groups in both schools was higher than those of the control groups. According to t values for scores on the multiple-choice items of S1 and S2 ($t(70) = 5.55, p < .001$ and $t(79) = 12.23, p < .001$), it showed that there was a significant difference in the achievement of grammar between the two groups from both schools on the multiple-choice items.

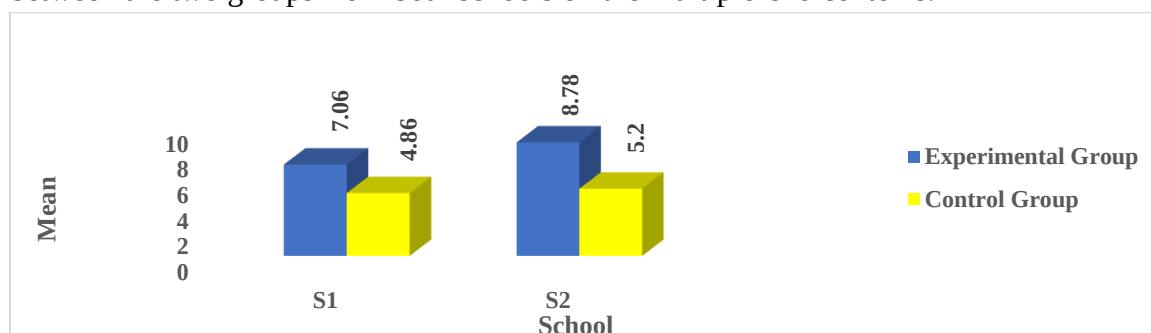


Figure 4. Comparison of mean for multiple-choice items.

It is assumed that interactive method had a positive effect in the students' grammar achievement on the multiple-choice items.

Findings of Students' Grammar Achievement on the Cloze Type Items

Table 6 *The Results of t values for Students' Grammar Achievement on the Cloze Type Items*

School	Group	n	M	SD	MD	t	df	p
S1	Experimental	35	7.34	2.65	2.02	3.14	70	.002*
	Control	37	5.32	2.80				
S2	Experimental	51	8.00	2.16	1.13	2.10	79	.039*
	Control	30	6.87	2.62				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

* $p < .05$, ** $p < .01$.

In Table 6, the experimental groups' mean was higher than those of control groups. According to t values for scores on cloze type items of S1 and S2 ($t(70) = 3.14$, $p < .01$ and $t(79) = 2.10$, $p < .05$), it found that there was a significant difference between the two groups in both schools on the cloze type items. The value of mean on the cloze type items can clearly be seen in Figure 5.

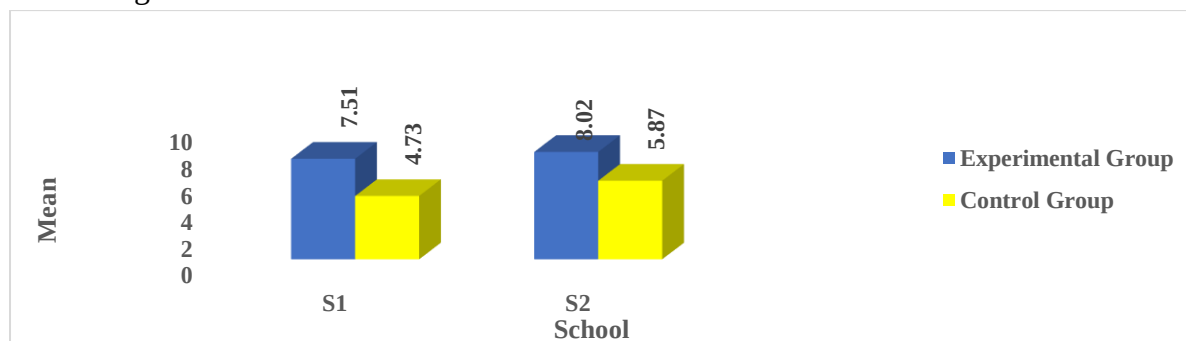


Figure 6. Comparison of mean for cloze type items.

It can be interpreted that interactive method was more effective in cloze type items than conventional method. Therefore, interactive method can improve students' abilities to acquire grammatical knowledge in learning English at the upper secondary level.

Findings of Students' Grammar Achievement on the Rearrangement Items

Table 7 *The Results of t values for Students' Grammar Achievement on the Rearrangement Items*

School	Group	n	M	SD	MD	t	df	p
S1	Experimental	35	7.51	2.29	2.78	4.71	70	.000**
	Control	37	4.73	2.69				
S2	Experimental	51	8.02	1.72	2.15	5.30	79	.000***
	Control	30	5.87	1.85				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

*** $p < .001$.

In the rearrangement items, the mean of the experimental groups was significantly higher than those of the control groups in both selected schools. According to t values for scores on the rearrangement items of S1 and S2 ($t(70) = 4.71$, $p < .001$ and $t(79) = 5.30$, $p < .001$), it showed

that there was a significant difference between the experimental and control groups from each school on the rearrangement items. It can clearly be seen in Figure 6.

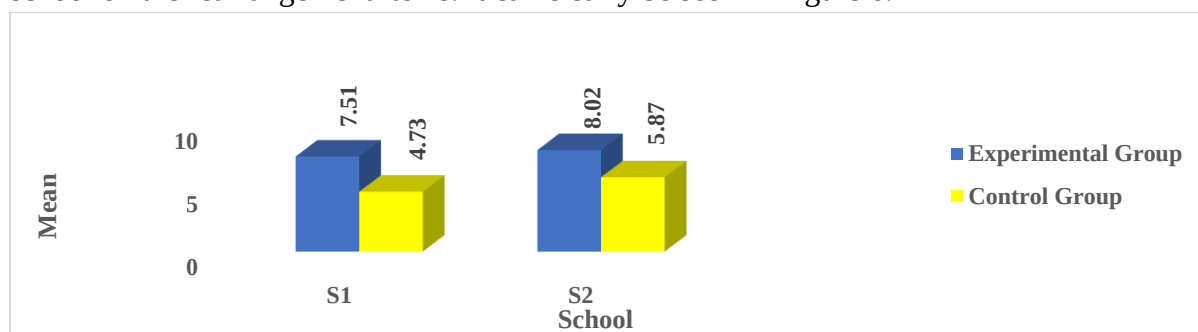


Figure 6. Comparison of mean for rearrangement items.

It is obvious that students who are taught with interactive method performed better in rearrangement items than those who are not. Thus, it can be interpreted that interactive method is more effective in learning grammar at the upper secondary level than conventional method.

Findings of Students' Grammar Achievement on the Transformation Items

Table 8 *The Results of t values for Students' Grammar Achievement on the Transformation Items*

School	Group	n	M	SD	MD	t	df	p
S1	Experimental	35	6.49	2.56	3.14	6.11	70	.000***
	Control	37	3.35	1.74				
S2	Experimental	51	6.98	2.20	2.88	5.70	79	.000***
	Control	30	4.10	2.19				

Note. S1 = No. (1) Basic Education High School, Magway;

S2 = No. (4) Basic Education High School, Magway.

*** $p < .001$.

As shown in Table 8, the mean of the experimental groups was significantly higher than those of control group in both selected schools. According to t values for scores on the transformation items of S1 and S2 ($t(70) = 6.11$, $p < .001$ and $t(79) = 5.70$, $p < .001$), it indicated that there was a significant difference in the achievement of grammar between the two groups from both schools on the transformation items.

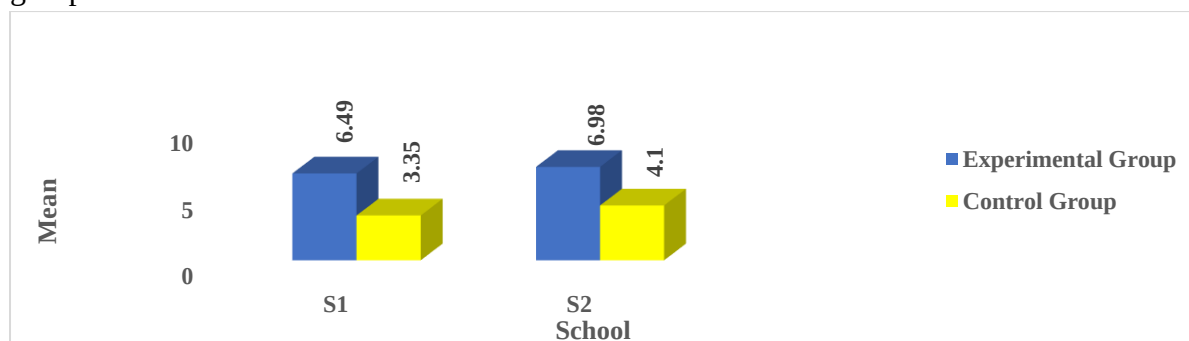


Figure 7. Comparison of mean for transformation items.

Interactive method could bring the students achievement in relation to the transformation items. It can be concluded that the use of interactive method is an effective way in presenting students' thinking skills, ideas and information.

According to these results, it is concluded that the use of interactive method had a significant effect on the grammar achievement of the students. And so, interactive method

positively contributed to English teaching at the upper secondary level. Therefore, interactive method can make effective learning in the grammar achievement of the students.

Discussion and Suggestion

Discussion

This study was carried out to study the effects of interactive method in teaching English grammar at the upper secondary level.

Discussion for Research Question (1)

The scores of posttests were analyzed in detail for the purpose of measuring students' grammar achievement in teaching English Grammar. From the results of the posttest scores on grammar achievement questions, the students who were taught by interactive method were significantly higher than those who were not. Thus, it can be interpreted that using interactive method had a positive effect on the students' grammar achievement.

Discussion for Research Question (2)

The scores of posttests were analyzed in detail for the purpose of measuring students' grammar achievement in teaching English Grammar. From the results of the posttest scores on word changing items, the students who were taught by interactive method were able to retain information and to determine the usage of verbs much longer than the students with conventional method of teaching.

Discussion for Research Question (3)

The mean of multiple-choice items for experimental groups was significantly higher than the scores for control groups in both schools. As the results mentioned above, interactive method can improve students' intention, interest and motivation than conventional teaching methods. And, this method also helped the students to choose possible results.

Discussion for Research Question (4)

According to the means of cloze type items, there was a significant difference between the students' performance who received the interactive method and that of the students who do not. Therefore, interactive method helped students to develop critical thinking and reasoning skills.

Discussion for Research Question (5)

For rearrangement items, there were significant differences between the two groups in both selected schools. According to the results, it is obvious that the use of interactive method can improve students' engagement in the teaching-learning process and increase the achievement of students. And so, interactive method creates an interactive environment and facilitates collaboration learning technique that potentially enhances the learning experience. Moreover, it helped the students to analyze the parts of sentences.

Discussion for Research Question (6)

There was a significant difference between the control and experimental groups on transformation items. It showed that the mean of transformation items for experimental groups was significantly higher than the scores for control groups in selected schools. For this facts, interactive method led to greater communication among members of a learning group when collaboration works well and enhanced the students to study and analyze the sentences carefully in a grammatical way (Yuldashevna, 2019).

According to these findings, students from the experimental group improve not only on the academic performance but also in the social and communication skills. Therefore, this study will be beneficial to some extent in the teaching and learning process of English grammar (Fahim & Seidi, 2013).

Suggestions

Based on the results of this study, some suggestions for English teachers who will use interactive method are offered.

1. The teachers should create interactive environment.
2. The teachers should prepare the lessons well and know the procedure of interactive method and then consider factors such as time duration, size of the class, etc.
3. The teachers should provide students to participate actively in their learning so that learning becomes meaningful and joyful.
4. The teachers should have the grammatical knowledge to give students the grammatical concepts and efficacy to choose the right methods.

Moreover, the following recommendations are suggested for further studies.

1. The studies should be carried out in another townships with a larger sample to obtain more reliable results because this study was geographically restricted two schools from Magway.
2. The studies should be conducted for the different subjects at different levels because this study was conducted within a short period and for English at the upper secondary level.
3. The teachers should apply other interactive activities in further studies.
4. The teachers should conduct further research for both qualitative and quantitative data because this study was conducted only for quantitative data.

According to the research findings, it was found that interactive method has many benefits for education. So, teachers should teach English grammar by using interactive method to promote their pupils' academic performance, to learn from peers and teachers for developing social skills and abilities, and to organize their thoughts.

Conclusion

Based on the finding of the results, interactive method helps the students to improve their learning in various ways. Interactive method can help the students to know more grammatical patterns and to apply the grammatical concepts in a real-life situation. The interactive method can arouse the students' interest and encourage the students to be active participants in the educational process. And so, in the teaching of English grammar, interactive method can be considered as active method. For those facts, interactive method can be effective tool for teaching English to the students.

In the educational process, interactive method provides personal and professional benefits for teachers and personal and educational benefits for learners. By knowing the benefits and usefulness of the interactive method, the teachers should use this method properly and systematically in real situations. The students will understand and get more interest in the lesson taught by interactive method. And so, interactive teaching method is one of the most important areas for improving the training of students in a modern professional educational institution. Thus, interactive method is a special form of teaching methods for improving English grammar and educational process.

Acknowledgements

Firstly, we would like to offer my respectful gratitude to Dr. Myat Myat Thaw, Rector, Sagaing University of Education, for her right permission for M.Ed. degree through the careful and systematic research study. We are greatly indebted to Dr. Khin Hnin Yee, Pro-rector of Sagaing University of Education, and Dr. Cho Kyi Than, Pro-rector of Sagaing University of Education, for their permission to conduct the study. We are deeply grateful to Dr. Soe Than, Professor (Retired), Head of Department of Curriculum and Methodology, for his continuous guidance, extraordinary tolerance, and benevolence. Moreover, we wish to record my endless thanks to Dr. Wai Wai Oo, Professor, Head of Department of Curriculum and Methodology, for their precious advice and continuous encouragement to this study.

References

- Baugh, A. C., & Cable, T. (2005). *A history of the English language* (5th ed.). Landon: Taylor & Francis e-library.
- Brown, H. D. (2001). *Teaching by principles: An interactive approach to language pedagogy* (2nd ed). New Vistas: Pearson Education.
- Fahim, M., & Seidi, A. (2013). Interaction and interactive English teaching in the high school level. *Theory and Practice in Language Studies*, 3(6), 932-937.
- Flottum, K. (2017). *Language, culture and society*. Retrieved from <https://armacad.info/bergen-summer-research-school-language-culture-and-society-norway>
- Giorgdze, M., & Dgebuadze, M. (2017). Interactive teaching methods: Challenges and perspectives. *IJAEDU-International E-Journal of Advances in Education*, 11(9), 544-548.
- Ilyosovna, N. A. (2020). The importance of English language. *International Journal on Orange Technologies (IJOT)*, 2(1), 22-24.
- Mart, C. T. (2013). Teaching grammar in context: Why and how? *Theory and Practice in Language Studies*, 3(1), 124-129.
- Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). Harlow: Pearson Education Limited.
- Potter, S., & Crystal, D. (2014). *English language*. Paris: Encyclopaedia Britannica.
- Orshanskyi, L., Krasnopolskyi, V., Fednova, I., Vysochan, L., Novalska, T., & Ivantsiv, O. (2020). Interactive teaching methods as a change in the purpose of modern education. *A Multifaceted Review Journal in the Field of Pharmacy*, 11(10), 549-555.
- Thornbury, S. (1999). *How to teach grammar*. Essex: Pearson Education Limited.
- Yuldashevna, A. S. (2019). Importance of interactive teaching methods in professional education. *European Journal of Research and Reflection in Educational Sciences*, 7, 666-670.

THE EFFECTS OF READING STRATEGIES ON GRADE SEVEN STUDENTS' READING COMPREHENSION SKILLS IN ENGLISH

Moe Pwint Phyu¹ and Hnin Zarni Wai²

Abstract

This paper aimed to investigate the effects of reading strategies on Grade Seven students' reading comprehension skills in English for the academic year 2023-2024. The study applied one of the Quasi-experimental designs, viz, the nonequivalent control group design to determine the effects of reading strategies. The sample schools were No. (5) Basic Education High School and No. (12) Basic Education High School, Mandalay. Participants in this study were 90 Grade Seven students at No. (5) Basic Education High School, Mandalay and 60 Grade Seven students at No. (12) Basic Education High School, Mandalay. The posttest items were constructed based on the content assigned for this study for measuring the types of questions such as True/ False items, Gap-Filling items, Multiple-choice items, and Short questions. The collected data was analyzed by using inferential statistics, such as independent samples *t* test, to find out the effects of reading strategies on Grade seven students' reading comprehension skills in English. Research findings pointed out that the students were good at comprehending English text at literal, reorganization, and inferential levels, but they were low at comprehending English text at the evaluation level. This research was a good one for the teachers and students who would like to focus on the effects of reading strategies on Grade Seven students' reading comprehension skills in English.

Keywords: reading, comprehension, reading comprehension, skill, strategy

Introduction

Teaching and learning English pose significant challenges for both teachers and students because English is a foreign language. There are four skills in the language learning process namely listening, speaking, reading, and writing. Reading is one of the important skills in English and it gives many benefits to people. Reading cannot be separated from comprehension because reading requires comprehension of meanings stated in the passage or text. Comprehension is the understanding of the meaning of the written and covers the conscious strategies that lead to understanding (Kurniawan, 2018). Moreover, Lems, Miller, and Soro (2010) stated that teachers apply different reading strategies to teach reading comprehension skills. These strategies include a set of word-reading strategies, phrase-and sentence-level reading strategies, paragraph-and discourse-level reading strategies, strategies for active reading of an informational text, and strategies for understanding narrative text .

Statement of the Problem

Reading is a complex cognitive process that involves the integration of various skills and strategies to comprehend written text effectively. Reading comprehension is an essential skill for students to succeed in both English and other areas. Despite spending years in school, it has been observed that students struggle to make significant improvements in their reading comprehension skills and overall academic achievement in English. The lack of proficiency in reading

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comprehension skills not only hampers their mastery of the English language but also adversely affects their performance in other subjects taught in English. Students' difficulties in reading comprehension impact their English proficiency and performance in other subjects. Challenges include limited access to resources, language barriers, and insufficient emphasis on critical reading skills. This study aims to investigate the impact of reading strategies on Grade Seven students' English reading comprehension skills.

Purposes of the Study

This study is to investigate the effects of reading strategies on Grade Seven students' reading comprehension skills in English. The specific objectives of the study are:

- find out the effects of reading strategies on Grade Seven students' reading comprehension skills in English.
- examine the levels of reading comprehension skills in English on Grade Seven students.
- make suggestions based on the results of the study to improve teaching reading comprehension skills in English.

Hypotheses of the Study

The following hypotheses will guide this study:

1. There are significant effects of reading strategies on Grade Seven students' reading comprehension skills in English.
2. There are significant differences in the levels of reading comprehension skills in English between the students who are taught reading strategies and those who are not.

Definition of Key Terms

This study is guided by the following definition of key terms.

Reading: Reading is a process of looking at a written or printed symbol and translating it into an appropriate sound. This spoken symbol is further associated with an object for which it stands (Elizabeth & Rao, 2014).

Comprehension: A process of gaining meaning on three levels (a) literal level of reading for explicit meaning, (b) interpretative level of reading for implicit meaning, (c) evaluative level of reading for critical insight (Shukla, 2012).

Reading Comprehension: Reading comprehension is the act of understanding and interpreting the information within a text (Shanahan, 2005).

Skill: The capacity to perform particular tasks or to achieve particular goals, often acquired through long periods of training and practice (Shukla, 2012).

Strategy: Strategies are specific methods of approaching a problem or task, modes of operation for achieving a particular end, and planned designs for controlling and manipulating certain information (Brown, 2000).

Scope of the Study

The following points indicate the scope of the study.

- The study involved a sample of Grade Seven students from No. (5) Basic Education High School (Mandalay) and No. (12) Basic Education High School (Mandalay).
- Participants were selected using a simple random sampling technique, ensuring representation from different language proficiency levels and educational backgrounds.

Significance of the Study

Oakhill, Cain, and Elbro (2014) stated that reading comprehension is important, not just for understanding text, but for broader learning, success in education, and employment. Panjaitan, Putri, and Anni (2019) said that reading strategies can enhance understanding of the content information presented in a text, improve attention and concentration while reading, increase students' motivation, create interest, and make reading in more active process. Applying reading strategies in reading will help the students to more comprehend the text and recall the information that is needed from the text. Therefore, this study was conducted to investigate on the effects of reading strategies on Grade Seven students' reading comprehension skills in English.

Review of Related Literature

Reading is a complex cognitive process that involves decoding written symbols (letters, words, etc.) and understanding the meaning conveyed by those symbols. Several models attempt to explain the process of reading and how it works.

1. Bottom-Up Model

According to Grabe and Stoller (2013), the "bottom-up model suggests that all reading follows a mechanical pattern in which the reader creates a piece-by-piece mental translation of the information in the text, with little interference from the reader's background knowledge". Second, this model requires readers to apply the vocabulary-by-vocabulary decoding process, which is considered a slow process that requires a lot of time and attempts from the reader to understand a text.

2. Top-Down Model

A gestalt, "top-down" theory of reading encourages more emphasis on comprehension, with less emphasis on subskill practice and tests and on word-by-word accuracy (May, 1986).

3. The Interactive Model

Building on the work of Baha (2017), Stanovich (1980) argued that this model gathers the features of the bottom-up and the top-down models and gives reading more meaning. They use their knowledge of the subject theme, their pre-experiences of written words, their reading, and their expectations to make predictions about the reading text. So, the textual details are the best way the recognize the words and the letters the text contains. The most important advantage of this model is that the communicative activities and the reading skills are integrated.

Reading Comprehension Strategies

Lems, Miller, and Soro (2010) have identified reading comprehension strategies for the proficient reader: a set of word reading strategies, phrase-and sentence-level reading strategies, and paragraph-and discourse-level reading strategies. Klingner, Vaughn, and Boardman (2007) also stated that reading comprehension strategies are described as follows: strategies for active reading of the informational text, strategies for understanding narrative text, and metacognitive strategies.

Levels of Reading Comprehension

In order to assess reading comprehension, teachers should use several methods and no single technique can truly measure students' reading skills. A reading comprehension test may subsume activities such as gap-filling, short questions, multiple choice questions, true or false questions, and yes-no questions (Habib, 2016).

Barrett's Taxonomy (Barrett, 1976 as cited in Reeves, 2012) comprises five main 'comprehension' levels as opposed to the Revised Bloom's six cognitive process levels. These are (1) Literal Comprehension; (2) Reorganization; (3) Inferential Comprehension; (4) Evaluation; and (5) Appreciation. It can be inferred that it is important to build strong literal, reorganization in lower-order cognitive processes and inferential reading comprehension in the middle-order cognitive processes as a foundation for students in the higher-order cognitive processes.

Research Method

Research Design

The design used in this study was the quasi-experimental design, viz, the nonequivalent control group design to measure the effects of reading strategies on Grade Seven students' reading comprehension skills in English (Mills & Gay, 2016). In this design, two treatment groups were pretested, administered treatment, and posttested.

Instruments

To measure the effects of reading strategies on Grade Seven students' reading comprehension skills, the following instruments were employed.

Pretest

To test the reading comprehension skills of the students, a lesson from the Grade Seven English textbook was selected. Therefore, Unit (4, 5, and 6) were taken in the Grade Seven English Textbook from the Ministry of Education (2020). All the items were included in the pretest before teaching to establish a baseline of students' initial reading comprehension skills.

Posttest

In this study, the posttest was used to investigate the effects of reading strategies on Grade Seven students' reading comprehension skills in English. The posttest items were constructed based on the content assigned for this study for measuring the types of questions as (5) True/False items, (5) Gap-filling items, (10) Multiple-choice items, and (15) Short questions. The

allocated time for the test was an hour and the given mark was 50. These questions were constructed from Units (7, 8, and 9) in Grade Seven English Textbook.

Population and Sample Size

The samples were confined to Grade Seven students in the 2023-2024 Academic Year. The sample of our work was restricted to Chanayethazan Township, Mandalay Region. The sample schools were from No. (5) Basic Education High School (Mandalay) and No. (12) Basic Education High School (Mandalay). The participants in this study were 90 Grade Seven students at No. (5) Basic Education High School (Mandalay) and 60 Grade Seven students at No. (12) Basic Education High School (Mandalay).

Procedure

For theoretical information, relevant data were collected through educational journals, books, and the Internet. Then, the literature review was made based on the obtained data. To carry out an experimental study, a nonequivalent control group design was used to measure the effects of reading strategies on Grade Seven students' reading comprehension skills in English. Permission to conduct the study was obtained from the Headmistress of the school and the Township Education Officer from the Chanayethazan Office. A research schedule was agreed upon within which data will be collected and when the study was conducted. This was done by visiting the classrooms before the pilot and main study. The students were selected to conduct the study. This aimed to create security and a relaxed atmosphere during the study.

In this study, a pilot study was conducted to try out the instruments, to see whether the instruments were appropriate for the students, to test whether there were identifiable ambiguities in the structure of the questions to make improvements, and to get the validity of the instruments. Therefore, the (38) students of Grade Seven from Practising Middle School (Mandalay) were selected for the pilot study.

No. (5) Basic Education High School (Mandalay) and No. (12) Basic Education High School (Mandalay) were selected by a simple random sampling technique. The experimental group received reading strategies such as (a) A Set of Word Reading Strategies, (b) Strategies for Active Reading of Informational Text, and (c) Strategies for Understanding Narrative Text while the control group had to learn the same materials conventionally for two weeks in each school. Each group taught in one period for 45 minutes and Seven periods per week. A posttest was held at the end of the treatment period. The collected data will be analyzed by using appropriate statistical method, such as independent samples *t* test to find out the effects of the reading strategies and measure the levels of reading comprehension.

Data Analysis

To be able to determine whether there were significant differences between the experimental group and the control group, the posttest scores of the two groups were used. To analyze the quantitative data, the Statistical Package for the Social Sciences (SPSS) version (22) was used. After collecting the required data, the data was analyzed by inferential statistics. The independent samples *t* test was used to find out the effects of reading strategies on Grade Seven

students' reading comprehension skills in English. Data analysis and findings for this study will be thoroughly discussed in the next chapter.

Research Findings

Table 1 *The Results of Independent Samples t Test for Pretest Scores of Grade Seven Students in selected Schools*

School	Group	n	M	SD	MD	t	df	Sig (2-tailed)
S 1	Experimental	46	27.48	4.28	.93	.82	88	.413
	Control	44	26.55	6.32				
S 2	Experimental	31	26.81	3.11	.91	.77	58	.442
	Control	29	25.90	5.70				

Note. S1= No 5, Basic Education High School (Mandalay); S2= No 12, Basic Education High School (Mandalay); ns= not statistically significant.

According to the results of Table 1, there were no significant differences between the entry behaviors of the experimental group and control group in selected schools regarding the reading comprehension skills on the pretest before intervention. The results obtained from the pretests on selected schools can be seen in Figure 1.

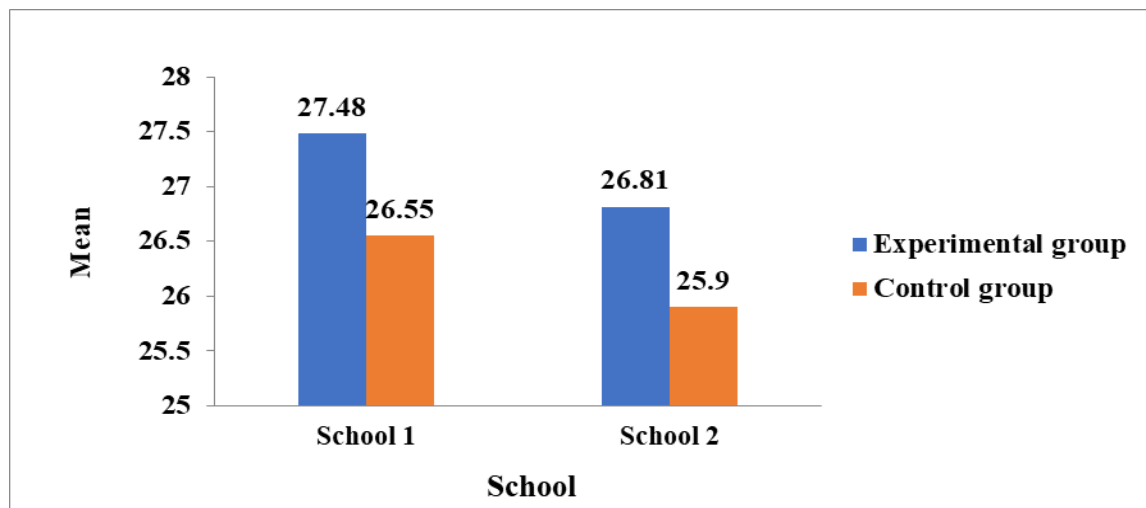


Figure 1. Mean comparison for reading comprehension skills on overall pretest.

It can be indicated that both groups in each school were equivalent in basic knowledge of reading comprehension skills. There were no significant differences between the entry behaviors of the experimental group and control group in selected schools.

Table 2 The Results of Independent Samples *t* Test for Posttest Scores of Grade Seven Students in selected Schools

School	Group	n	M	SD	MD	t	df	Sig (2-tailed)	η_p^2
S 1	Experimental	46	34.35	4.61	6.39	3.57	88	.001	0.13
	Control	44	27.95	11.19					
S 2	Experimental	31	35.29	4.43	9.11	5.32	58	.000	0.33
	Control	29	26.17	8.37					

Note. S1= No. 5, Basic Education High School (Mandalay); S2= No. 12, Basic Education High School (Mandalay). ** $p < .01$. *** $p < .001$.

An independent samples *t* test was conducted to compare the posttest for reading comprehension skills. There was significant difference in scores for experimental group ($M = 34.35$, $SD = 4.43$) and control group ($M = 27.95$, $SD = 11.9$; $t(88) = 3.57$, $p = .001$, two-tailed). The magnitude of the differences in the means (mean difference = 6.39, 95% *CI*: 2.5 to 9.95) was very large (eta squared= 0.13). The result indicates that there was a statistically significant gain in scores for the reading comprehension skills.

Based on the results as shown in Table 4.2, there was a significant difference in the posttest scores between the two groups on Grade Seven students' reading comprehension skills in English. An independent samples *t* test was conducted to compare the posttest for reading comprehension skills. There was significant difference in scores for experimental group ($M = 35.29$, $SD = 4.43$) and control group ($M = 26.17$, $SD = 8.37$; $t(58) = 5.32$, $p = .000$, two-tailed). The magnitude of the differences in the means (mean difference = 5.32, 95% *CI*: 5.69 to 12.55) was very large (eta squared= 0.33). This result suggests that students provided more correct answers to the reading comprehension questions in the posttest than in the pretest.

Based on the posttest results, it shows the mean comparison of Grade Seven students' reading comprehension skills on the posttest in the selected schools in Figure 2.

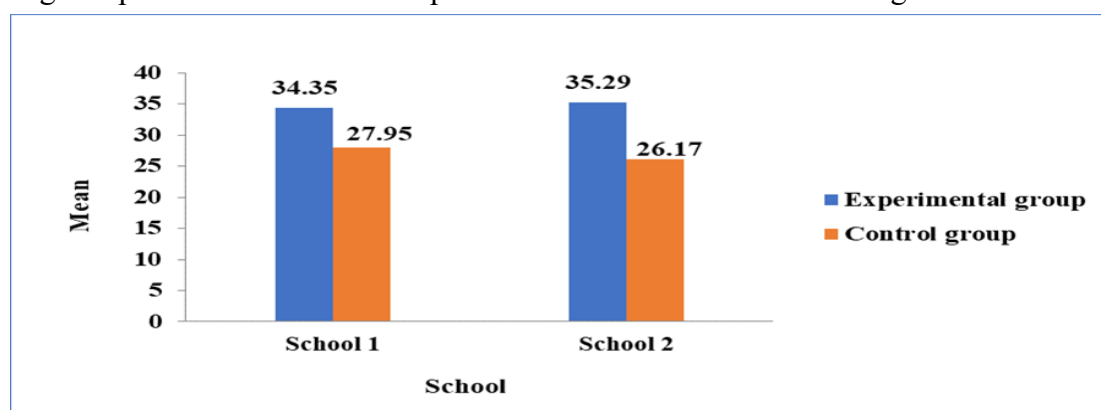


Figure 2. Mean comparison for reading comprehension skills on overall posttest.

It can be indicated that reading strategies had significant effects on students' reading comprehension skills in English among Grade Seven students, as indicated by the observed

differences between the experimental groups and control groups within both S1 and S2. The study carried out analyses at each level of the comprehension questions in order to acquire the reading comprehension skills, such as the capacity to identify the main concept, respond to factual inquiries, and summarize the reading comprehension text. Therefore, based on these results, there were significant effects of reading strategies on reading comprehension skills in English is strongly supported and accepted. This study suggests a strong relationship between the reading strategies and reading comprehension skills among Grade Seven students.

Table 3 *The Results of Independent Samples *t* Test for Reading Comprehension Level Scores of Grade Seven Students in School 1*

School	Level	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)	η_p^2
S1	Literal	EG	46	9.89	2.29	2.14	3.86	88	.000***	.152
		CG	44	7.75	2.94					
	Reorganization	EG	46	12.93	2.68	2.61	3.08	88	.003***	.115
		CG	44	10.32	5.05					
	Inferential	EG	46	6.72	1.37	.92	2.49	88	.015**	.064
		CG	44	5.80	2.07					
	Evaluation	EG	46	4.83	1.37	.73	1.83	88	.069 (ns)	.030
		CG	44	4.09	2.32					
	Total	EG	46	34.37	4.60	6.41	3.58	88	.001***	.165
		CG	44	27.95	11.19					

Note. EG = Experimental Group; CG = Control Group; ns = not statistically significant.

** $p < .01$. * $p < .05$. *** $p < .001$.

According to the results of Table 3, an independent samples *t* test was conducted to compare the posttest for literal comprehension level. There was significant difference in scores for experimental group ($M = 9.89$, $SD = 2.29$) and control group ($M = 7.75$, $SD = 2.29$; $t(88) = 3.86$, $p = .000$, two-tailed). The magnitude of the differences in the means (mean difference = 2.14, 95% *CI*: 2.5 to 9.95) was very large (eta squared = 0.14). This process can be impacted by a wide range of other factors, including the students' capacity to read about what they comprehend and remember what they have read. For the reorganization comprehension level, an independent samples *t* test was conducted to compare the posttest for reorganization comprehension level. There was significant difference in scores for experimental group ($M = 12.93$, $SD = 2.68$) and control group ($M = 10.32$, $SD = 5.05$; $t(88) = 3.08$, $p = .003$, two-tailed). The magnitude of the differences in the means (mean difference = 2.61, 95% *CI*: 0.93 to 4.30) was very large (eta

squared= 0.10). This result can be showed by the fact that summarizing a text requires more than just text comprehension helps to explain this outcome.

For the inferential comprehension level, an independent samples *t* test was conducted to compare the posttest for inferential comprehension level. There was significant difference in scores for experimental group ($M = 6.72$, $SD = 1.37$) and control group ($M = 5.80$, $SD = 2.07$; $t(88) = 2.49$, $p = .015$, two-tailed). The magnitude of the differences in the means (mean difference = 0.92, 95% *CI*: 0.19 to 1.66) was very large (eta squared= 0.06). This result can be explained by the fact that prediction requires more than just text summarization. For the evaluation comprehension level, an independent samples *t* test was conducted to compare the posttest for evaluation comprehension level. There was no significant difference in scores for experimental group ($M = 4.83$, $SD = 1.37$) and control group ($M = 4.09$, $SD = 2.32$; $t(88) = 1.83$, $p = .069$, two-tailed). The magnitude of the differences in the means (mean difference = 0.73, 95% *CI*: - 0.05 to 1.53) was very large (eta squared= 0.03). This result can be explained by the fact that the evaluation of fact or requires more than merely predicting the outcomes of the text.

Based on the results of the reading comprehension levels in School 1, it can be found clearly in Figure 3.

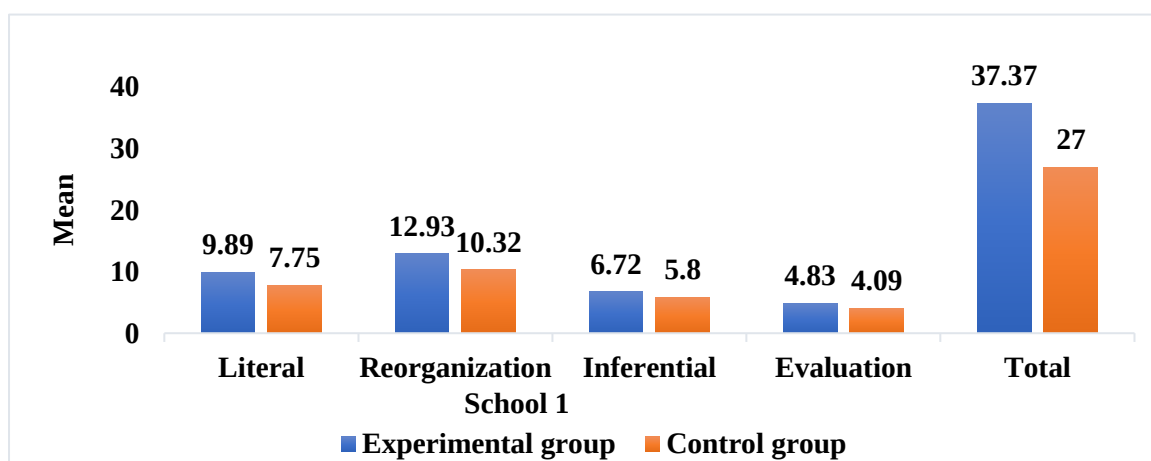


Figure 3. Mean comparison of overall posttest on the reading comprehension levels in School 1.

According to Figure 3, it can be interpreted that the experimental group performed better than the control group on literal comprehension, reorganization, and inferential comprehension levels in School 1. It can be concluded that the hypothesis was accepted for reading comprehension levels (literal, reorganization, and inferential) but there might be rejected for evaluation comprehension based on the results provided. The main reasons for this difficulty are interference from their mother tongue and insufficient reading practice in early chapter-end tests.

Table 4 The Results of Independent Samples *t* Test for Reading Comprehension Level Scores of Grade Seven Students in School 2

<i>School</i>	<i>Level</i>	<i>Group</i>	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)	η_p^2
S2	Literal	EG	31	11.23	1.45	4.15	7.08	58	.000***	.607
		CG	29	7.07	2.90					
	Reorganization	EG	31	12.81	2.56	2.35	3.12	58	.002***	.221
		CG	29	10.45	3.19					
	Inferential	EG	31	6.84	1.41	1.52	3.58	58	.001***	.210
		CG	29	5.31	1.87					
	Evaluation	EG	31	4.39	2.01	1.01	1.80	58	.077 (ns)	.055
		CG	29	3.38	2.32					
	Total	EG	31	35.26	4.43	9.05	5.28	58	.000***	.698
		CG	29	26.21	.36					

Note. EG = Experimental Group; CG = Control Group; ns = not statistically significant.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4 shows that the different treatments given to the experimental group and control group resulted in significantly different reading comprehension skills. An independent samples *t* test was conducted to compare the posttest for literal comprehension level. There was significant difference in scores for experimental group ($M = 11.23$, $SD = 1.45$) and control group ($M = 7.07$, $SD = 2.90$; $t(58) = 7.08$, $p = .000$, two-tailed). The magnitude of the differences in the means (mean difference = 4.15, 95% *CI*: 2.98 to 5.33) was very large (eta squared = 0.46). This process can be impacted by the other factors, including the students' capacity to read about what they comprehend and remember what they have read. For the reorganization comprehension level, an independent samples *t* test was conducted to compare the posttest for reorganization comprehension level. There was significant difference in scores for experimental group ($M = 12.81$, $SD = 2.56$) and control group ($M = 10.45$, $SD = 3.19$; $t(58) = 3.12$, $p = .002$, two-tailed). The magnitude of the differences in the means (mean difference = 2.35, 95% *CI*: 0.87 to 3.85) was very large (eta squared = 0.15). This result can be showed by the fact that summarizing a text requires more than just text comprehension helps to explain this outcome.

For the inferential comprehension level, an independent samples *t* test was conducted to compare the posttest for inferential comprehension level. There was significant difference in scores for experimental group ($M = 6.84$, $SD = 1.41$) and control group ($M = 5.31$, $SD = 1.87$; $t(58) = 3.58$, $p = .001$, two-tailed). The magnitude of the differences in the means (mean difference = 1.52, 95% *CI*: 0.67 to 2.38) was very large (eta squared = 0.18). This result can be explained by the fact that prediction requires more than just text summarization. For the evaluation comprehension level, an independent samples *t* test was conducted to compare the

posttest for evaluation comprehension level. There was no significant difference in scores for experimental group ($M = 4.39$, $SD = 2.01$) and control group ($M = 3.38$, $SD = 2.32$; $t(58) = 1.80$, $p = .077$, two-tailed). The magnitude of the differences in the means (mean difference = 1.01, 95% CI : -0.11 to 2.12) was very large (eta squared = 0.05). This result can be explained by the fact that the evaluation of fact or requires more than merely predicting the outcomes of the text.

Based on the results of the reading comprehension levels in School 1, it can be found clearly in Figure 4.

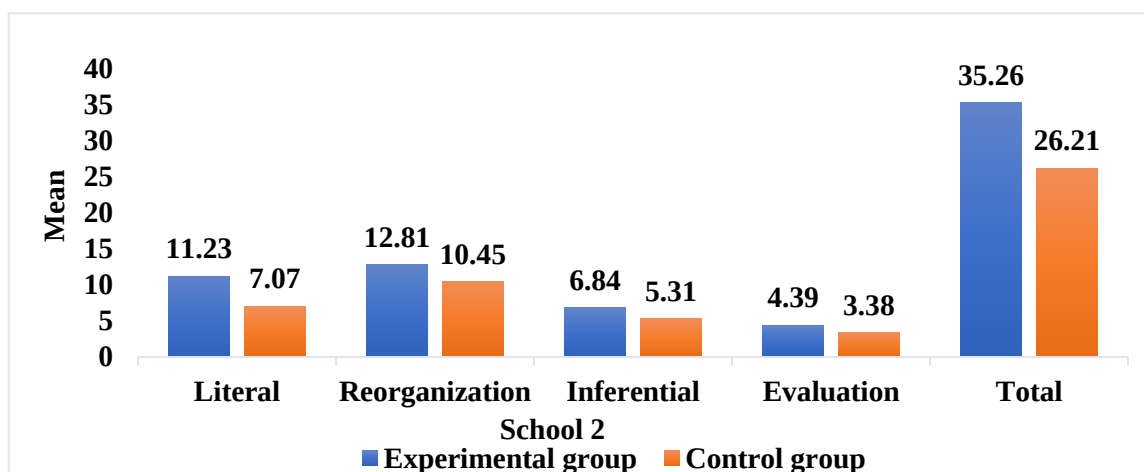


Figure 4. Mean comparison of overall posttest on the reading comprehension levels in School 2.

According to Figure 4, it can be interpreted that the experimental group performed better than the control group on literal comprehension, reorganization, and inferential comprehension levels in School 2. Therefore, there were significant differences in reading comprehension levels such as literal, reorganization, and inferential comprehension levels, in English among Grade Seven students was supported and accepted. This study suggests that the use of reading strategies significantly improved these specific comprehension levels in school 2.

However, the hypothesis might be rejected as there was no significant difference between the experimental and control groups for evaluation comprehension level. The result indicates that there was no statistically significant difference on the students' ability to make an evaluative judgment of fact or opinion. The main reasons for this difficulty are interference from their mother tongue and insufficient reading practice in early chapter-end tests. It can be concluded that the hypothesis was accepted for reading comprehension levels (literal, reorganization, and inferential) but there might be rejected for evaluation comprehension based on the results provided.

Discussion, Suggestions and Conclusion

Discussion

This study was conducted to investigate the effects of reading strategies on Grade Seven students' reading comprehension skills in English. The discussion of the research findings focuses on the relation of the results of quantitative studies.

For the first hypothesis, it was investigated whether there were statistically significant differences between the experimental group and the control group in the pretest and posttest scores. The results of this study indicated that there were significant differences between the two groups. Therefore, it can be concluded from the findings that using reading strategies to teach comprehension has a positive effect on students' academic performance.

Secondly, the results of this study showed that in both schools, there were significant differences between the experimental and control groups at the .000 level with regard to the overall posttest. The results of studies on vocabulary and reading comprehension (Kusumawati & Widiati, 2017), informational text knowledge and reading strategies and reading comprehension (Banditvilai, 2020) and Mistar, Zuhairi and Yanti (2016), and narrative text knowledge and reading comprehension (Sanam, Pereira, Gaspar, and Costa, 2021) also supported these findings. These studies demonstrated that teachers could help students develop successful reading strategies by teaching them reading comprehension skills.

According to the second hypothesis, the present study focused on the four categories from Barrett's (1976 as cited in Reeves, 2012) taxonomy of reading comprehension, namely literal comprehension, reorganization comprehension, inferential comprehension and evaluation. These findings were suggested to contribute to the field of study by giving insight into how literal, reorganization, and inferential reading comprehension as the lowest level of comprehension have important roles in students' language development.

For School 1 and 2, the analysis of the significance of the differences between the experimental group and the control group found the value ($p < .001$) for literal comprehension, the value ($p < .01$) for reorganization, ($p < .05$ and $p < .01$) for inferential comprehension level, and ($p > .05$) for evaluation level respectively. Therefore, the students from these schools were able to comprehend the English text well at literal, reorganization, and inferential levels, but they were low at comprehending English text for evaluation level. This result is in agreement with those obtained by Mistar, Zuhairi and Yanti (2016) and Ali, Javed, and Shabbir (2017) who gauged ESL students' capabilities in literal reading comprehension, reorganization, reading comprehension, and inferential reading comprehension.

According to the present study, the students' ability of literal, reorganization and inferential comprehension levels from given passages were significantly enhanced through teaching in the use of reading strategies. Thus, reading strategies should be incorporated into regular reading instructions so that students will acquire effective reading strategies to facilitate good comprehension skills.

When considering word reading strategies, preparing for the reading and word walls and labelling aided in literal comprehension level by activating prior knowledge and reinforcing vocabulary. Literal comprehension level forms the foundational level of reading comprehension. According to this study, students can effectively comprehend and accurately recall the fundamental information found in a text, which helps them to expand their knowledge. Prediction, story recipes, summarizing, note-taking, and questioning contribute to various levels

of comprehension: reorganization, inferential, and evaluative in both narrative and informational texts by understanding the storyline and characters, grasping factual information, making inferences, and critically analyzing the content. Reorganization comprehension level involves synthesizing and summarizing information. This study may indicate that it integrates various reading skills, including literal comprehension and higher-order cognitive processes, to foster a more comprehensive understanding of the material.

Inferential comprehension involves middle-order cognitive processes as a foundation for students in the higher-order cognitive processes, such as drawing conclusions, making predictions, and interpreting cause and effect. It encourages students to actively engage with texts, fostering curiosity and inquiry. The finding of this study indicates that reading strategies integrate inferential thinking with other comprehension levels, fostering a more comprehensive understanding of texts. Evaluation comprehension level often involves independent judgment of fact or opinion, and personal interpretation. It may be suitable during the early stages of reading development, allowing students to gradually develop and refine their evaluative level as they progress in their reading comprehension skills. Each strategy contributes to different levels of comprehension in both narrative and informational texts.

To sum up, this study highlighted the significant role of diverse reading strategies in enhancing comprehension across different text types. Besides, reading strategies serve as pivotal tools in fostering different levels of comprehension: literal, reorganization, inferential, and evaluative within narrative and informational texts.

Suggestions

Based on the findings of the study, a few suggestions can be made to the teachers, students, administrators, curriculum designers, and further researchers.

Key points about teachers will include the following.

- Language teachers at primary and secondary levels should adopt reading strategies to teach the English language to improve the reading comprehension level of students.
- Language teachers should explore the effects of reading strategies on primary, secondary, and university students' reading comprehension skills for a long period.
- Language teachers should plan a suitable lesson with reading strategies to assist students in developing their lower or higher-level comprehension skills for their fullest reading potential.
- Language teachers should use questions in general to foster higher-order comprehension skills such as evaluation, and appreciation.

For students, identifying their reading comprehension levels and reading strategies can empower them to improve and develop effective reading habits. Therefore, students should have adequate practice and are more likely to continue enriching their vocabulary and better comprehension, seek knowledge and information, seek out reading opportunities independently, think critically, question ideas, and evaluate information throughout their lives, becoming lifelong learners.

Curriculum designers should discuss how reading strategies can be adapted for students with diverse learning styles and needs and should explore how to assess students' proficiency in employing these strategies effectively.

Researchers should conduct further research to explore the efficacy of these strategies in enhancing reading comprehension and explore how these strategies can be adapted for different age groups, reading abilities, and cultural contexts. The researchers should investigate the long-term impact of consistent use of reading strategies on reading comprehension skills.

To sum up, teachers, curriculum designers, and researchers play vital roles in advocating, implementing, and researching the efficacy of these strategies to foster comprehensive literacy skills and critical thinking among students.

Conclusion

The main purpose of this study was to investigate the effects of reading strategies on Grade Seven students' reading comprehension skills. The findings suggested that the reading strategies positively impact students' reading comprehension skills with significant differences observed between the experimental and control groups in terms of pretest and posttest scores. Various reading strategies, such as activating prior knowledge, word reading strategies, prediction, story recipes, summarizing, note-taking, and questioning were found to enhance Grade Students' comprehension levels across different text types. Besides, the students could comprehend the English text well at literal, reorganization, and inferential levels, but they were low at comprehending English text for evaluation level.

Moreover, reading strategies can be adapted to meet the diverse needs of learners based on individual students' reading levels, learning styles, and strengths. Besides, incorporating these strategies into teaching reading comprehension skills helps create a supportive learning environment that prepares students for academic challenges and lifelong learning. Therefore, these reading strategies empower both students and teachers, fostering a positive learning environment that promotes literacy and prepares students for future academic and life challenges. This study was a good one for the teachers and students who would like to focus on the effects of reading strategies on Grade Seven students' reading comprehension skills in English.

Acknowledgements

We would like to express our deepest gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education) for her rightful permission for M.Ed. degree through the careful and systematic research study and Dr. Khin Hnin Yee (Pro-rector, Sagaing University of Education) and Dr. Cho Kyi Than (Pro-rector, Sagaing University of Education) for allowing to present this paper. We wish to thank our external examiner, Dr. Soe Than, Professor and Head of Department (Retired), Department of Curriculum and Methodology, Sagaing University of Education, for his invaluable suggestions, encouragement and patience with me throughout the process. Special gratitude to the respectable teacher, Dr. Wai Wai Oo (Professor, and Head of Department of Curriculum and Methodology, Sagaing University of Education) for her ongoing support, guidance, patience and endless encouragement throughout the entire educational journey. Finally, we would like to express our gratitude and special thanks to all who support and encourage me.

References

- Ali, A., Javed, M., & Shabbir, G. (2017). Assessing ESL students' literal, reorganization and inferential reading comprehension abilities. *Journal of Educational Research, Dept. of Education, IUB, Pakistan* 20(2), 42-53. Retrieved from <https://www.researchgate.net/publication/346557342>
- Baha, O. A. (2017). Reading models: A review of the current literature. *International Journal of English, Literature and Social Science (IJELS)*. 2(3), 44-49. doi: 10.24001/ijels.2.3.6
- Banditvilai, C. (2020). The Effectiveness of Reading Strategies on Reading Comprehension. *International Journal of Social Science and Humanity*, 10(2), 46-50. doi:10.18178/ijssh.2020.V10.1012
- Elizabeth, M. E. S., & Rao, D. B. (2014). *Methods of teaching*. New Delhi: Discovery Publishing House.
- Grabe, W., & Stoller, F. L. (2013). *Teaching and researching reading* (2nd ed.). Oxon: Routledge.
- Habib, M. (2016). Assessment of reading comprehension. *Revista Romaneasca Pentru Educa ie Multidimensionala*, 8(1), 125-147. doi:10.18662/rrem/2016.0801.08
- Klingner, J. K., Vaughn, S., & Boardman, A. (2007). *Teaching reading comprehension to students with learning difficulties*. New York: The Guilford Press.
- Kurniawan, D. (2018). *Teachers' techniques in teaching reading comprehension at sman 1kota sungai penuh in academic year 2017/2018*. Retrieved June 18, 2023, from [https://repository.unja.ac.id/3941/1/%28Article%29%20Teachers%20teachiques%](https://repository.unja.ac.id/3941/1/%28Article%29%20Teachers%20teachiques%20)
- Kusumawati, E., & Widiati, U. (2017). The effects of vocabulary instructions on students' reading comprehension across cognitive styles in esp. *Journal of Education and Practice*. 8(2), 175-184. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1131724.pdf>
- Lems, K., Miller, L. D., & Soro, T. M. (2010). *Teaching reading to English language learners: Insights from linguistics*. New York: The Guilford Press.
- May, F. B. (1986). *Reading as communication: An interactive approach* (2nd ed.). Ohio: Merrill Publishing Company.
- Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and applications* (11th ed.). Harlow: Pearson Education Limited.
- Mistar, J., Zuhairi, A., & Yanti, N. (2016). Strategies training in the teaching of reading comprehension for EFL students in Indonesia. *English Language Teaching*. 9(2), 49-56. doi:10.5539/elt.v9
- Oakhill, J., Cain, K., & Elbro, C. (2014). *Understanding and teaching reading comprehension: A handbook*. London: Routledge.
- Pallant, J. (2016). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS* (6th ed.). New York: McGraw-Hill Education.
- Reeves, C. (2012). *Developing a framework for assessing and comparing the cognitive challenge of home language examinations*. Pretoria: UMALUSI. Retrieved from <https://files.eric.ed.gov/fulltext/EJ1071046.pdf>
- Sanam, A. I., Pereira, S., Gaspar, A., & Costa, A. D. (2021). Using narrative text to improve students' reading comprehension skill of Grade eleven students. *Journal of Innovative Studies on Character and Education*. 4(2), 181-191. Retrieved from https://www.researchgate.net/publication/354100030_USING_NARRATIVE_TE
- Shanahan, T. (2005). *The national reading panel report: Practical advice for teachers*. Naperville: Learning Point Associates.
- Shukla, R. (2012). *Dictionary of education*. New Delhi: A.P.H Publishing Corporation.
- Snow, C. E. (2002). *Reading for understanding: Towards a research and development program in reading comprehension*. Santa Monica: RAAND.

THE EFFECTS OF PROCESS WRITING APPROACH ON GRADE TEN STUDENTS' WRITING SKILLS IN ENGLISH

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Abstract

The purpose of the current study is the effects of the process writing approach on Grade Ten students' writing skills in English. In this study, explanatory sequential research (Quan→qual) design was used. For quantitative research, the design used was one of true experimental designs, pretest-posttest control group design, and for qualitative research, interview was conducted and observation checklist was applied to study the effect of process writing skill in the classroom. Participants of the research were Grade Ten students from two high schools in Taungoo Region, No. (2) Basic Education High School and No. (7) Basic Education High School. There were two groups in this study: control group and experimental group. The former group was taught with usual method (ITPR) and the experimental group was taught with process writing approach. To examine the outcomes (group observation checklist for process writing approach), was used. Independent-samples *t* test was used to analyze for qualitative study. And the summative rating method was used to analyze (group observation checklist for process writing approach) and thematic analysis was used to analyze the interview protocol. The findings of the study indicated that there was a significant difference between the basic writing skills, paragraph writing skills, and essay writing skills of the mean values of the experimental and control groups. Moreover, the findings of the students' observation checklist pointed out that there was a positive outcome in the process writing approach. Therefore, the process writing approach helps students to improve the writing skills of English language learning.

Keywords: Approach, writing, writing skills, process writing, process writing approach

Introduction

Education is facilitating learning, or acquiring knowledge, skills, values, morals, beliefs, habits, and personal development. It is also considered to shape the socio-economic and cultural forces and determine the direction of their growth. In knowledge-dominant societies, language is essential to fulfill the aim of education and is a set of tools used for communicating. English is used to communicate in many areas of life. So, it is an international language. In English language teaching, there are four skills, such as listening, speaking, reading, and writing. Among them, writing is the most difficult skill because it requires writers to have a great deal of lexical and syntactic knowledge as well as principles of organization to produce good writing. Therefore, it could be said that writing is an integrated skill and is an important, constructive, and complex process (Singh, 1991).

Although there are many teaching methods, it cannot be recognized which one is the best teaching method for students. This is because all the methods have particular strengths and weaknesses. Therefore, this study will highlight the achievement of writing skills in English for Grade Ten students through the use of a process writing approach.

Language consists of four kinds of skills; they are listening, speaking, reading, and writing. Listening and reading are referred to as receptive skills, while speaking and writing are referred to as productive skills. Writing is the skill that is possessed by human beings to produce

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ideas and thoughts. In writing, people can share their experiences, explain opinions, and suggest or persuade the reader to write. The educators need to complete their writing tasks, like sentence writing exercises, paragraph writing exercises, and essay writing exercises.

Writing skills in English are very important in modern times. Having a good writing ability in English is essential in the modern world. Teachers need to provide the students with productive skills and communicative activities in teaching writing skills. In teaching writing, some of the students face the problem of how to write by using their ideas, developing their ideas, and organizing their ideas to form a good paragraph. A teacher cannot teach the students to write by looking only at what the students have written (Gebhard, 1996).

Peter and Singaravelu (2021) mentioned that there are many problems in teaching writing skills. Students fail to choose the correct vocabulary in the content. Not many words were used by the students in the composition. Besides, major grammatical problems are in the usage of subject-verb agreement, active voice, passive voice, prepositions, articles, pronouns, and tenses were also found in sentence structures. Moreover, sentence structure is also a common problem for the student. Furthermore, there were innumerable problems with punctuation which led to the deviation of the meaning of the content. Finally, the repetition of ideas makes the reader bored and leads to a shortage of content.

According to Fowler (1965), English language teachers tried to improve students' writing skills by finding new teaching approaches. They developed a new approach to teaching writing, a process approach instead of a product approach, a traditional approach. They researched to test this approach. Research showed the process approach is much better than the product approach. They could solve the difficulties in teaching writing by using a process approach. Now, it is widely used in teaching writing.

In teaching writing, the product is considered to be the end. The process of how to write or produce a good product is ignored. Even giving outlines to write about a subject is not enough to promote students' writing skills. The writing ability calls for more than cutting and copying from others' readily written essays and rearranging these pieces of writing. They can study others' essays to learn their style of writing. As a result, many students find it difficult to write an essay themselves. In this study, the process writing approach reveals how to overcome these problems and enhance the student's writing abilities.

Purpose of the Study

The main purpose of this research is to study the effect of the process writing approach on Grade Ten students' writing skills in English. The specific objectives are as follows:

1. to study a process writing approach and teaching learning activities for writing skills in English language teaching
2. to investigate the effectiveness of process writing approach in teaching writing skills in English language teaching
3. to make suggestions and recommendations for the improvement of students' writing skills in English language teaching.

Research Questions

1. To what extent does the process writing approach improve the basic writing skills of students?
2. To what extent does the process writing approach improve the paragraph writing skills of students?
3. To what extent does the process writing approach improve the essay writing skills of students?
4. How can the process writing approach improve the overall writing skills of students?

Definition of Key Terms

Approach: A set of correlative assumptions dealing with the nature of language and the nature of language teaching and learning (Anthony, 1963).

Writing: Writing is a way to produce language and express idea, feeling and opinion (Harmer, 2004).

Writing Skills: Writing Skills is the ability to convey information or expression of original ideas consecutively within a new language (Rivers, 1981).

Process Writing: Process writing is an approach to teaching writing that allows the teacher and the students to go through the process of producing a text together (Tompkins, 2013).

Process Writing Approach: The process writing approach is the emphasis in writing instruction on the process involved in creating a product and the teacher has shifted from merely evaluating the end product to working with students throughout the writing process (Tompkins, 2013).

Review of Related Literature

As a teacher, philosophy is his beliefs about why, what, and how he teaches, who teaches, and the nature of learning. A teacher can make a difference in the life of his students and a consistent educational philosophy can make a difference in the teaching of the individual teacher. Since, this study is based on Vygotsky's social constructivism, constructivism, and progressivism.

Many English language developments regard Vygotsky's views concerning the sociocultural aspects of learning as important constructs concerning English language development (Rea & Mercuri, 2006). Accordingly, when students can integrate their backgrounds, experiences, and schemas into the learning environment, they are better able to make connections with the targeted learning objectives (Snow & Katz, 2010). Teachers can do this by creating lessons that allow children to freely discuss ideas among peers, and by encouraging them to share their personal experiences in writing. In addition, teachers must assign value to their students' sociocultural spheres of reference by demonstrating respect for and interest in their familial histories and backgrounds (Snow & Katz, 2010).

Social constructivism confirms that knowledge develops as a result of social interaction and is not an individual possession but a shared experience. Kelly (2012) suggests that social constructivism could be applied in the classroom using such instructional methods as case studies, research projects, problem-based learning, brainstorming, collaborative learning, group work, guided discovery learning, and simulation among others.

Constructivism theory was propounded by Jerome Bruner in 1996 (Olorode & Jimoh), (2016). This theory affirms that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. Furthermore, progressive education movement originated in the late 19th century due to the traditional, didactic educational methods that were prevalent at the time. Proponents of progressive education believed that students should be actively engaged in their learning and should be taught how to think, not just what to think. According to John's philosophy on education, he believed that the students themselves should be active participants during class time with opportunities for hands-on involvement, which focuses on experiential learning over preparation based only on lectures or reading assignments. Progressive ideas on education include an emphasis on process rather than product, education as life rather than as preparation for life, and the teacher's role as an advisor rather than a dictator (Hessong & Weeks, 1991).

Stages of the Process Writing Approach

According to (Barnes, Morgan, & Weinhold, 1997; D. Craves, 1994; Perf, 1994) there are five stages of the writing process. They are prewriting, drafting, revising, editing, and publishing (Tompkins, 2013).

Stage 1: Prewriting

Prewriting is the getting-ready-to-write stage. Writers start the writing process before they have completely thought out their topic. They begin tentatively talking, reading, and writing to discover what they know and decide what direction they want to take (Flower & Hayes, 1994). Prewriting has probably been the most neglected stage in the writing process; however, it's as crucial to writers as a warm-up is to the audience. Students are involved in these activities during this stage.

Stage 2: Drafting

Students focus on getting their ideas down on paper during the drafting stage. They write in another line to leave space for revision; teachers often make a small mark on every other line of students' papers as a reminder to skip lines as students draft their compositions. Students label their drafts by writing 'rough draft' in blue ink at the top of the paper or by putting them with a rough draft stamp; this label indicates to the writer, other students, not mechanics. As students write rough drafts, teachers should not emphasize correct spelling or neatness.

Stage 3: Revising

Revising is the time when writers clarify and refine the ideas in their compositions. Novice writers often break the writing process cycle as soon as they finish a rough draft, believing that the writing task is complete once they have written their ideas. Revision is not just polishing; making the requirement to meet the needs of readers by adding, substituting, deleting, and rearranging material. The word revision means "seeing again", and in this stage, students see their compositions more objectively with the help of classmates and the teacher.

Stage 4: Editing

Students polish their compositions during editing. Until this stage, the focus has been on the content, but now it has changed to mechanics, and students try to correct capitalization, punctuation, and spelling errors so their writing will be easier to read.

Stage 5: Publishing

Students bring their configurations to life by publishing them. When they share their writing with classmates, other students, parents, and community members, students come to think of themselves as authors.

Method

This research aims to investigate the effects of the process writing approach on Grade Ten students' writing skills. To conduct this study, one of the mixed-method research designs (Quan→qual) research design was used.

Research Design

To conduct this research, one of the mixed-method research designs (Quan→qual) was used. The process writing approach was used in the treatment for the experimental group. This research design was more heavily weighted toward the quantitative side, and the qualitative analysis and interpretation can help to explain or elaborate on the quantitative results. If so, for a quantitative study, the design used was a pretest-posttest control group design.

Population and Sample Size

In this study, two high schools were selected by using random sampling method for the quantitative study and the qualitative study. These two high schools were No.2 Basic Education High School Taungoo and No.7 Basic Education High School Taungoo. Therefore, the population and sample size for the two selected schools were presented in the following tables.

Table 1 Population and Sample Size for the Quantitative Study

School	No. of Population	Group	No. of Sample
S1	180	Control	30
		Experimental	30
S2	150	Control	30
		Experimental	30
Total	330		120

Note.S1 = No. (2) Basic Education High School, Taungoo;

S2 = No. (7) Basic Education High School, Taungoo.

Table 2 Population and Sample Size for the Qualitative Study

Selected School	No. of the population in the Experimental Group		No. of Participant	
	No. of Teacher	No. of Student	No. of Teacher	No. of Student
S1	3	30	1	3
S2	3	30	1	3
Total	6	60	2	6

Note.S1 = No. (2) Basic Education High School, Taungoo;

S2 = No. (7) Basic Education High School, Taungoo.

Instruments

The instruments for the quantitative study were pretest and posttest. Observation checklists and interview questions were used for the qualitative study.

Procedure

Firstly, in order to evaluate the feasibility and reliability of the instruments for a full-scale study, the pilot experiment is conducted. The experimental study was conducted in two selected schools in October 2023. At the beginning of the study, all participants in both groups were administered a pretest to check the equivalence of the two groups. After the treatment period, a posttest is administered to all students in experimental groups and control groups to measure their writing achievement. The experimental study was finished in October 2023. The qualitative data collection process will be carried out in October 2023. The total number of three experienced observers carried out the observations throughout all the periods. The instrument of the observation, the observation checklist form is applied in the last two periods of the instruction.

Findings

Finding of Students' Achievement in the Pretest

To check the group equivalence of the experimental study, the pretest was conducted before the treatment. The obtained data from the pretest was analyzed by using the independent samples *t*-test as shown in Table 3.

Table 3. *t*-Values for Writing Skills Achievement of Pretest

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	30	29.27	2.02	-0.86	.129	58	.129
	Control	30	30.13	2.33				
S2	Experimental	30	31.57	1.22	-0.16	.630	58	.630
	Control	30	31.73	1.43				

Note. S1= No.2 Basic Education High School;

S2= No. 7 Basic Education High School.

ns = not significant.

Table 3 shows the means of the control and the experimental groups on pretest writing achievement scores. The result indicates that the mean of the two selected schools was not a statistically significant difference between the experimental and the control groups. Therefore, it was found that initial knowledge about the writing of two groups in both schools is nearly equivalent. To be clearer, it can be shown as a graph illustration.

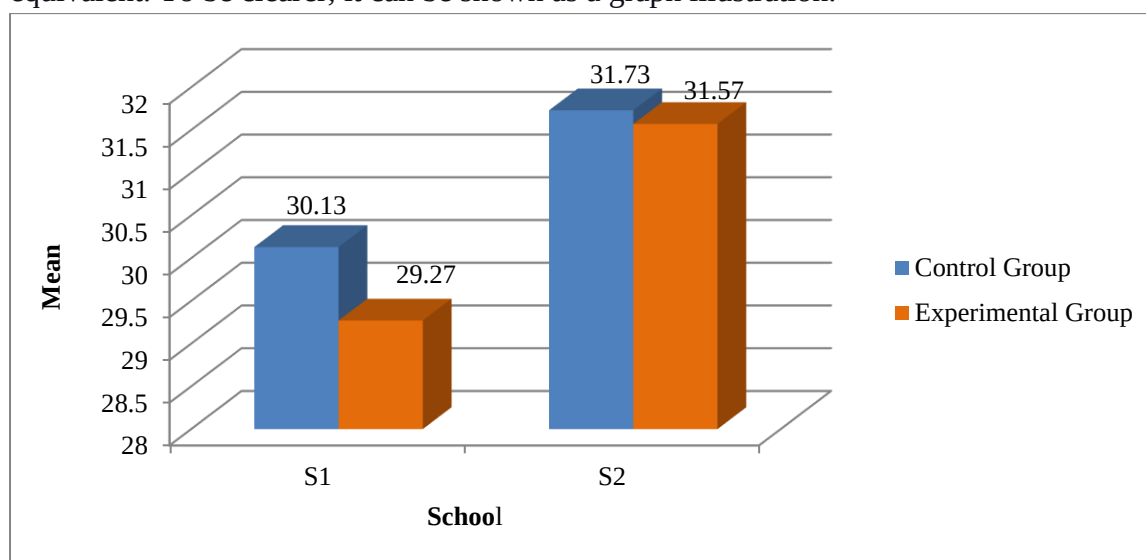


Figure 1. Graphic Illustration of mean on pretest.

Figure 2 illustrates that there was no significant difference between the control group and the experimental group from selected schools. Therefore, it can be interpreted that the initial ability of the students was the same at the beginning of the study. Therefore, it is suitable to analyze the data from the posttest with the independent-sample *t*-test.

Findings from Quantitative Study

Table 4 shows that the mean of the two groups in basic writing skills of the posttest was (10.5) for the control group and (13.37) for the experimental group in No.2 Basic Education High School and (10.57) for the control group and (12.67) for the experimental group in No.7 Basic Education High School. Therefore, the mean of the experimental group was significantly higher than the mean of the control group ($p < .001$) in both schools. It can be interpreted that the process writing approach helps the students to correct spelling, capitalization, punctuation, and sentence structures.

Table 4 *t*-Values for Basic Writing Achievement in Posttest

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	30	13.37	0.96	2.87	11.06	58	.000***
	Control	30	10.50	1.04				
S2	Experimental	30	12.67	1.03	2.10	7.86	58	.000***
	Control	30	10.57	1.04				

Note. S1= No.2 Basic Education High School;

S2= No. 7 Basic Education High School.

*** $p < .001$.

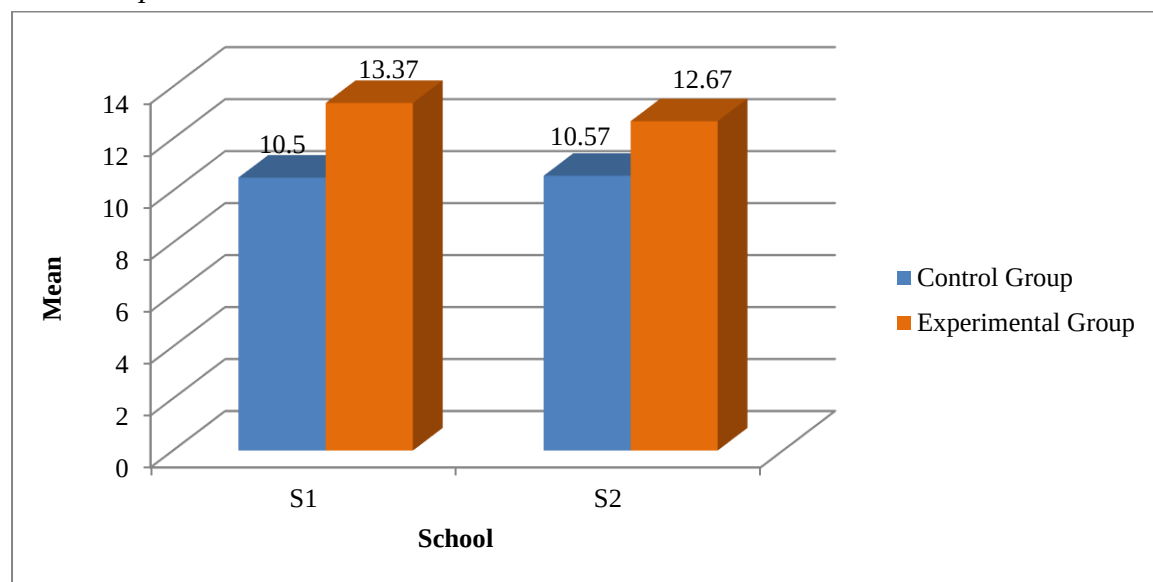


Figure 2. Graphic Illustration of mean in basic writing skills.

Table 5 shows that the mean of the two groups in paragraph writing skills of the posttest were (9.27) for the control group and (11.47) for the experimental group in No.2 Basic Education High School and (10.27) for the control group and (11.23) for the experimental group in No.7 Basic Education High School.

Table 5 *t-Values of Paragraph Writing Skill Achievement in Posttest*

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	30	11.47	.819	2.20	8.570	58	.000***
	Control	30	9.27	1.143				
S2	Experimental	30	11.23	.858	1.07	4.563	58	.000***
	Control	30	10.27	.950				

Note. S1= No.2 Basic Education High School;

S2= No. 7 Basic Education High School.

*** $p < .001$.

Therefore, the mean of the experimental group was significantly higher than the mean of the control group ($p < .001$) in both schools. It can be interpreted that the process writing approach provides a framework for organizing their ideas in a logical order.

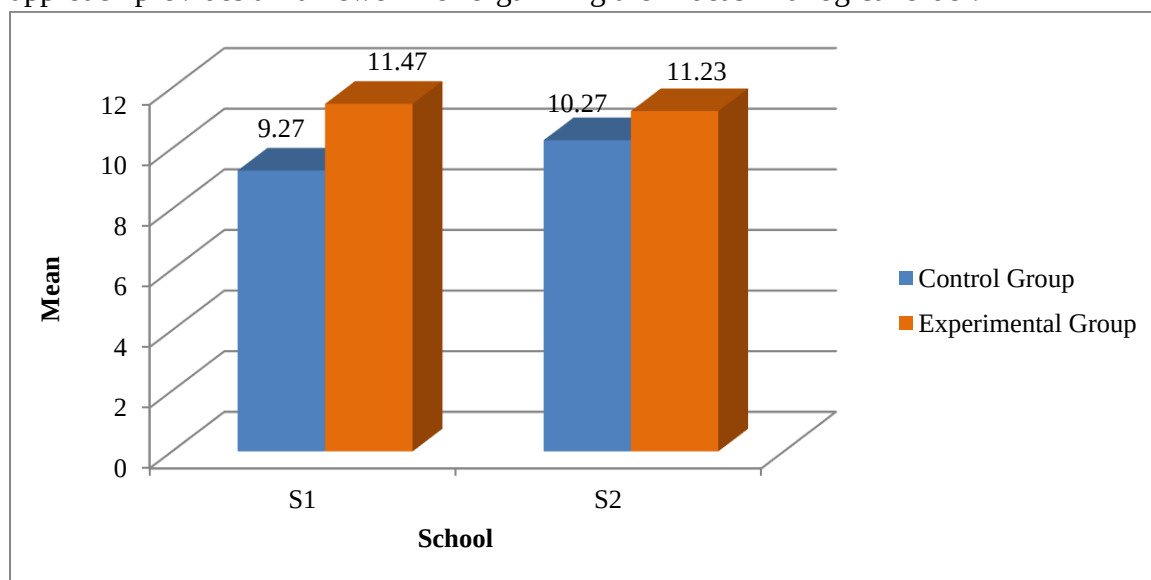
**Figure 3.** Graphic Illustration of mean in paragraph writing skills.

Table 6 shows that the mean of the two groups in essay writing skills of the posttest were (8.23) for the control group and (15.23) for the experimental group in No.2 Basic Education High School and (11.03) for the control group and (15.47) for the experimental group in No.7 Basic Education High School. Therefore, the mean of the experimental group was significantly higher than the mean of the control group ($p < .001$) in both schools. It can be interpreted that the process writing approach helps the students to write a topic sentence, supporting sentences, and conclusion sentence with a consistent flow.

Table 6 *t-Values of Essay Writing Skill Achievement in Posttest*

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	30	15.23	1.040	7.00	27.413	58	.000***
	Control	30	8.23	.935				
S2	Experimental	30	15.47	1.224	4.43	16.043	58	.000***
	Control	30	11.03	.890				

Note. S1= No.2 Basic Education High School;

S2= No. 7 Basic Education High School.

*** $p < .001$.

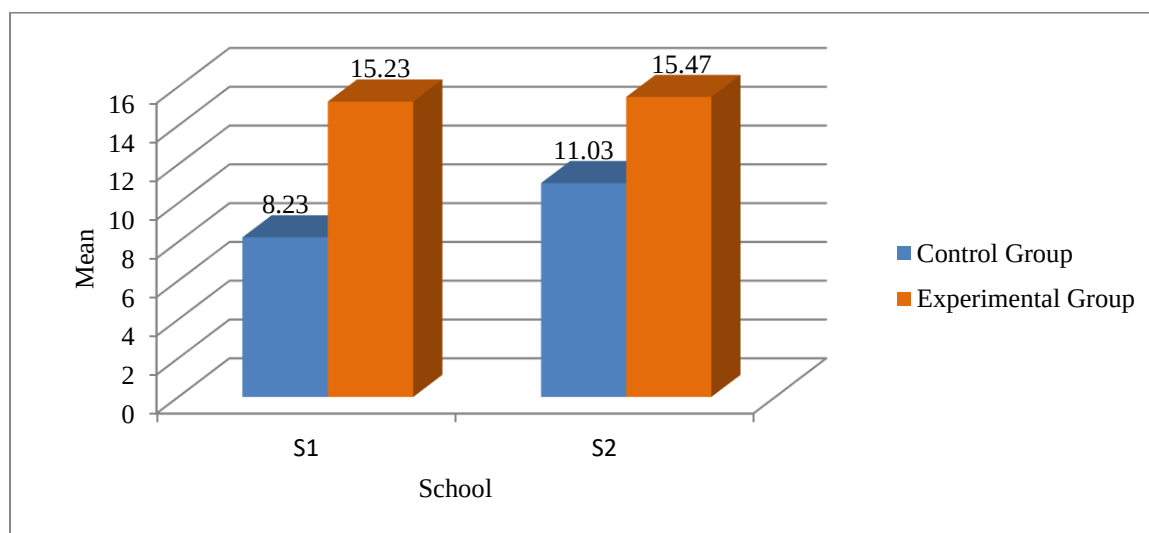


Figure 4. Graphic Illustration of mean in essay writing skills.

Table 7 shows that the mean of the two groups in overall writing skills of the posttest were (28.00) for the control group and (40.07) for the experimental group in No.2 Basic Education High School and (31.77) for the control group and (39.37) for the experimental group in No.7 Basic Education High School. Therefore, the mean of the experimental group was significantly higher than the mean of the control group ($p < .001$) in both schools. It can be interpreted that the process writing approach has a significant effect on the student's writing skills.

Table 7 *t-Values of Overall Writing Skills Achievement in Posttest*

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
S1	Experimental	30	40.07	1.337	12.07	27.470	58	.000***
	Control	30	28.00	2.000				
S2	Experimental	30	39.37	1.712	7.60	16.881	58	.000***
	Control	30	31.77	1.775				

Note. S1= No.2 Basic Education High School;

S2= No. 7 Basic Education High School.

*** $p < .001$.

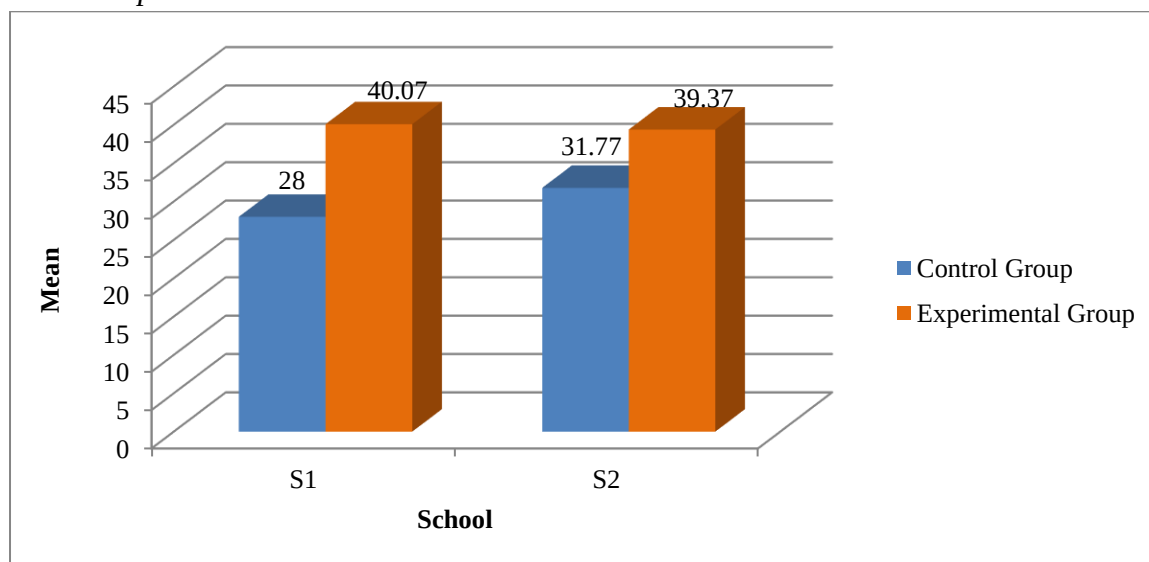


Figure 5. Graphic Illustration of mean in overall writing skills.

In short, the process writing approach to teaching writing has a profound impact on the improvement of high school students' English language writing skills.

Findings of Qualitative Study

The finding of group observation checklist and interview questions support for the finding from the qualitative study.

Findings of Group Observation Checklist

Group observation checklists for the process writing approach consisted of (20) items. It focused on five stages of the process writing approach: the prewriting stage, drafting stage, revising stage, editing stage, and publishing stage. In order to study teaching and learning activities during treatment through the process writing approach, group observations were conducted. Three rating scales (0, +1, and -1) were used in the group observation checklist. Checklists can be scored by assigning weights of +1 and -1 to the behaviors rated, whether the behaviors are positively or negatively stated. After the weights are summed and averaged across items, a decision can be made as to whether the average score indicates a positive or negative outcome (Borich, 2011). As data coding, coding numbers +1, 0, and -1 were used respectively. According to the summated rating method, the outcome of the observation checklist can be calculated by adding the total scores of the items and then dividing the total number of the items. For instance, the average of the twenty items on this scale would be $(+14) + (-6) = 8,8 / 20 = 0,4$, indicating a slightly positive outcome but the average of the twenty items on this scale would be $(+10) + (-10) = 0, 0/20 = 0$, indicating a neutral value.

The behaviors of student engagement in the process writing approach were observed from the group evaluation observation.

- The findings of group evaluation from S1 can be interpreted that Group (1) was a neutral value. However, responding to the group observation checklist for Group (2) from Group (6) was a positive outcome.
- The findings of group evaluation from S2 can be interpreted that all of the groups have positive outcomes.

According to Table 8, the emerging themes of the students' interviews can be interpreted as the following themes.

Table 8 Emerging Themes from Data Pieces of Students' Interview

Data	Category	Theme
• Easier to organize idea • Providing a structured framework • Providing a structural way to organize and enhance clarity • Organizing thought and fostering clarity • Quite effective • Positive impact on a writing journey	Contribution to organizing ideas and providing a structured framework	The Effect of the Process Writing Approach
• what she wants to write • a well-founded foundation for subsequent composition • laying the groundwork for a well-structured composition • thinking carefully before putting words on paper	Follow directions before writing	Lesson Clarity

Data	Category	Theme
• basic writing skills were developed • emphasizing clarity and coherence in student expressions • emphasis on fostering clarity and coherence in students' expressions • expressing ideas more effectively	Cycles of review, testing, and feedback	Task Orientation
• moderate confidence • pretty confidence	Confidence in writing skill	Student Feeling
• figuring out how to address • arising from addressing diverse learning styles • accommodating diverse learning styles • cannot express her ideas grammatically • a bit challenging	Addressing different kinds of learning styles	Classroom Management
• making writing simpler for students • Provide a systematic and adaptable framework for student development • offering valuable insights and adaptable frameworks to address difficulties • getting insight into making writing skills • contributing to a more refined and proficient approach to writing skills	Display of student products and projects Opportunities for independent practice and application	Performance Outcomes and Higher Thought Process

Discussion

The majority of high school students assumed that English was a difficult subject. To investigate the effects of the process writing approach, quantitative research was conducted by research questioning. Qualitative research was also carried out group observation checklist and interview protocol toward a process writing approach to support quantitative data.

The result of this study described that there were statistically significant differences between the experimental groups and the control groups on the scores of basic writing skills achievement in two selected schools. This result was consistent with the findings of Abdullah, Zain, Wahab, and Idrus (2020) who found that basic writing skills encourage and prepare 21st-century learners for future endeavors.. Furthermore, this result was in harmony with the findings of Yin Nwet & Myo Win (2018) who mentioned that there were significant differences between the groups that were instructed through the proposed process approach and the groups who received teacher-led instruction in each school on the scores of the basic writing achievement.

The result of this study described that there were statistically significant differences between the experimental groups and the control groups on the scores of the paragraph writing skills achievement in two selected schools. This result of the study was in line with the findings

of Adula (2018) who stated that the process writing approach increased the provided the students with the chance to use the exciting ideas and cooperate with their peers.

The result of this study described that there were statistically significant differences between the experimental groups and the control groups on the scores of the essay writing skills achievement in two selected schools. This result of the study was consistent with the findings of Yazadani (2014) who examined that the students have a positive impact on enhancing their writing proficiency. Moreover, this result was in line with the findings of Adula (2018) who stated that essay-writing skill encourages students to engage in gathering details, exchanging drafts with others, and checking spelling by using peer-writing activities.

The result of this study mentioned that there were statistically significant differences between the experimental groups and the control groups on the scores of the overall writing skills achievement in two selected schools. This result was in harmony with the findings of Bayat (2014), who observed that process writing activities improve students' written expressions in terms of cohesion, grammatical, rhetorical structures and content, information gathering, and creativity. In addition, this result is in line with the findings of Abdullah, Zain, Wahab, and Idrus (2022), who found that writing skills increase students had a more structured, systematic writing experience, as they were able to apply the skills of reading, writing, and critical thinking in their writing.

Based on the findings of the study, some suggestions are provided to improve the writing skills in English language teaching. Firstly, both teachers and students need to understand the real aim of essay writing to achieve this. From this study, it is clear that the process approach is an effective method of teaching writing. Using this new approach may be one of the solutions for teachers to overcome the problem of essay writing, make real improvements in students' writing skills, and make it meaningful in essay writing in schools. Moreover, to teach writing effectively, there are some important things to be considered. Firstly, teaching writing classrooms should have certain books for students and teachers. Reference books such as English dictionaries and sample essays are the two requirements for teaching writing classes. There should be kept school library for students to search for the required information for their essays.

Peer checking and group assignment, an alternative to individual assignment in the process writing approach can release teachers from the over-workload of giving individual feedback. Teachers can give group assignments according to the experiences and interests of the students. In developing paragraph writing skills, teachers should be introduced to guided writing: giving an outline, substituting words or phrases, and rearranging the sentences in chronological order. For developing essay writing skills, teachers should be introduced to free writing such as giving different kinds of topics. Finally, for the purpose of implementing such a writing program, teachers who are change agents should use the process writing approach in teaching writing and the art of writing. It is known that there is no fixed method to teach students and we have to adopt a suitable method according to the circumstance and situation. In considering so, the process writing approach should be included as one of the options.

Conclusion

Education is the most powerful weapon to success in modern society and helps a person to get knowledge and improve confidence in life. Learning a language is exciting for students and

also has wonderful benefits for students at school and in life. Writing skill plays a vital role in language learning because it is critical in helping people convey their thoughts, ideas, and information efficiently and accurately.

Writing is one of the most required lifelong language skills to serve in academic areas and in real life situations. Writing plays a major role in helping us to gain recent information, such as in writing e-mail, business letter, dissertation, thesis conference presentation, test of writing standardized English proficiency as in TOFEL for the students and being involved in global network. Therefore, the students attempted to describe the incredibly complex system of transforming thought into written communication, treating writing and speaking as creative and communicative process. It means guiding students through the writing process, not just grading their written products. It means helping them learn how to communicate effectively in various situations.

To sum up, the process writing approach seems to be an attainable solution to the problems that teachers and students are facing in teaching and learning writing skills. Process writing approach, just like any other method, also has its own advantages and disadvantages, so it is important for teachers to recognize them and use this method as effectively as possible. Unlike the formal method of teaching, the learning environment that the process writing approach creates provides a good foundation for the writing journey, discussion, and the ability to express one's own ideas and share them. Therefore, this study hopefully raises awareness of teachers about the process writing approach and its positive effect on students' writing skills in English language learning.

Acknowledgements

We would like to express our gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) for their arrangement and permission to carry out this study. Moreover, my special thanks go to all my teachers in the Department of Curriculum and Methodology, Sagaing University of Education, for their giving expedient suggestions. Our deepest gratitude goes to the teachers and students in Taungoo Region for their active participation in this study.

References

- Abdullah, H., Zain, A. M., Wahab, N. A., & Idrus, M. M. (2022). A process approach in the teaching of writing: Saving 21st century learners from writer's block. *Universal Journal of Educational Research*, 8(12), 7160-7174.
- Adula, H. S. (2018). The practice of process approach in writing classes: Grade eleven learners of Jimma preparatory and Jimma University community preparatory school in focus. *International Journal of English and Literature*, 9(5), 39-49.
- Bayat, N. (2014). The effect of the process writing approach on writing success and anxiety. *Educational Sciences: Theory & Practice*, 14(3), 1133-1141.
- Fowler, M. E. (1965). *Teaching language, composition, and literature*. New York: Macmillan Publishing Company.
- Gerhard, J. G. (1996). *Teaching English as a foreign or second language*. Chicago: The University of Michigan Press.
- Hessong, R. F. & Weeks, T. H. (1991). *Introduction to the foundation of education* (2nd ed.) New York. Macmillan.
- Kelly, M. (2012). *The prewriting stage of the writing process*. Retrieved from <https://www.thoughtco.com/prewriting-stage-of-the-writing-process-8492>

- Olorodr, J. J. & Jimoh, A.G. (2016). Effectiveness of guided discovery learning strategy and gender sensitivity on students' academic achievement in financial accounting in colleges of Education. *International Journal of Academic Research in Education and Review*. 4(6), 182189.
- Tompkins, G. E. (2013). *Language Arts Patterns of Practice* (8th ed.). Boston. Pearson.
- River, W. M. (1981). *Teaching foreign language skills*. Chicago: The University of Michigan Press.
- Rea, D., & Mercuri, S. (2006). *Research-based strategies for English language learners: how to reach goals and meet standards*. Portsmouth, NH: Heinemann.
- Singh, R.R. (1991). Education for the twenty-first century: Bangkok: UNESCO Principal Regional Office for Asia and the Pacific.
- Snow, M. & Katz, A. (2010). *English language development: Foundations and implementation in kindergarten through grade five*. New York: Hippocrene.
- Yazdani, S. (2014). *Improving willingness to communicate of intermediate Iranian EFL learners through process-based writing instruction*. Iran: Islamic Azad University.
- Yin Nwet & Myo Win. (2018). An investigation into the impact of process approach to teaching writing in Myanmar language at the high school level. *Journal of Myanmar Academic Arts and Science*. 16(9) A.

RELATIONSHIP BETWEEN KNOWLEDGE OF FORMATIVE ASSESSMENT OF TEACHER EDUCATORS AND THEIR TEACHING PRACTICES IN EDUCATION DEGREE COLLEGES

Kyu Kyu Swe¹ and Wai Wai Oo²

Abstract

The main purpose of the study is to investigate the relationship between knowledge of formative assessment of teacher educators and their teaching practices in Education Degree Colleges. The design used in this study is quantitative research design and descriptive research method. Data were mainly collected through quantitative research methods that were used to find out knowledge of formative assessment of teacher educators and their teaching practices. By using a simple random sampling method, (213) teacher educators from four Education Degree Colleges were selected to participate. Two instruments: a questionnaire of knowledge of formative assessment of teacher educators and a questionnaire of their teaching practices were employed. In pilot testing, the reliable value of knowledge of formative assessment of teacher educators was (0.885) and that for teaching practices of formative assessment was (0.924) using Cronbach's Alpha. The data obtained were analyzed by using descriptive statistics (means, standard deviations, and correlation), one-way ANOVA, and Pearson product-moment correlation. The results showed that there was a positive high correlation ($r=.712$, $p<.01$) between knowledge of formative assessment of teacher educators and their teaching practices in Education Degree Colleges. It can be concluded that the more teacher educators know formative assessment, the more they use it in their teaching.

Keywords: Assessment, Formative Assessment, Teacher Educator, Teaching Practices, Knowledge

Introduction

Assessment in education is the process of gathering, interpreting, recording, and using information about pupils' responses to an educational task (Harlen et al., 1992, as cited in Kivunja, 2015). Today, assessment has long been a part of the educational landscape to measure the achievement or abilities of students, but assessment diverged into two categories with different roles in the late sixties- summative and formative.

Formative assessment is a practice in the classroom that is formative to the extent that evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded, than they would have taken in the absence of the evidence that was elicited (Black & William, 2009). Formative assessment is a vital aspect of a child's learning process and should be used to plan and inform instruction (Shephard, 2008). Moreover, formative assessment is a collection of tasks and strategies that give teachers a way to regularly gather information on student understanding during the learning process so it can positively affect student achievement (Stiggins & Dufour, 2009, Stiggins, 2014, as cited in Kenyon, 2019).

By using formative information, teachers can identify individual learning needs and tailor instruction to meet these needs (Black & William, 2009). Therefore, teachers should use formative assessment to improve teaching-learning processes. In addition, Alkharusi (2011) stated that all the formative assessment practices are carried out by teachers, based on their

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formative assessment knowledge. Thus, the knowledge and skill of formative assessment are important for teachers and those who are involved in it.

Purposes of the Research

The main purpose of the study is to investigate the relationship between knowledge of formative assessment of teacher educators and their teaching practices in the classroom. The specific objectives are as follows:

- To investigate the knowledge of formative assessment of teacher educators
- To find out the teaching practices of teacher educators in the classroom
- To measure the relationship between knowledge of formative assessment of teacher educators and their teaching practices in the classroom
- To make suggestions and recommendations for improving the knowledge of formative assessment based on the results of the study

Research Questions

The following research questions are organized based on the purposes of the study.

1. What is the knowledge of formative assessment of teacher educators?
2. What are the differences in knowledge of formative assessment of teacher educators in terms of gender and teaching experience?
3. What are the most frequently used teaching practices of teacher educators?
4. To what extent is there a significant relationship between knowledge of formative assessment of teacher educators and their teaching practices?

Definition of Key Terms

The following are the conceptual definitions of key terms in this study. They are:

Assessment: Assessment is the collection of relevant information that may be relied on for making decisions (Fenton, 1996).

Formative Assessment: Formative assessment is defined as all the activities where teachers are involved to make the teaching-learning process more productive and to eradicate (Black & William, 1998).

Teacher Educator: Teacher educator refers to all those who are formally involved in initial teacher education or in-service teachers' professional development (European Commission, 2013).

Teaching Practice: Teaching practice is a form of apprenticeship or internship that ushers one into the teaching profession (Brown & Brown, 1990).

Knowledge: Knowledge is defined as the meaningful links people make in their minds between information and its application in action in a specific setting (Dixon, 2000).

Scope of the study

This study is geographically restricted to four Education Degree Colleges in Upper Myanmar. Participants were (213) teacher educators in Mandalay, Meiktila, Taunggyi, and Pakokku Education Degree Colleges.

Review of Related Literature

The relationship between knowledge of formative assessment of teacher educators and their teaching practices is grounded in social development theory and the theory of planned behavior.

Social Development Theory

Formative assessment by Black and William (1998) is based on the social development theory, which is grounded in constructivism. Vygotsky (1978) stated that students actively develop knowledge and understanding over time in an interactive social learning context guided by a teacher. Students' knowledge and skills can improve through formative assessment because students and teachers interact with one another during this process. Although the student and the teacher both have roles in formative assessment, this study focused on the role of the teacher. The social development theory highlights the contributions of teachers who have already developed the skills and knowledge needed to assist students in their learning (Vygotsky, 1978). Therefore, this study was intended to explore the knowledge of teacher educators' formative assessment and how to improve their knowledge to assist students' learning according to Vygotsky (1978).

Theory of Planned Behavior

Ajzen (1985) explored the theory of planned behavior. It can explain how knowledge and beliefs influence teaching practices. According to this theory, teacher educators' knowledge and attitudes towards formative assessment, their recognized control over its use, and their subjective norms influence their intention to apply formative assessment. Moreover, teacher educators convert their formative assessment knowledge into actual teaching practices, where a positive attitude and strong belief in the efficacy of formative assessment leads to its frequent and effective use.

The Nature of Formative Assessment

Formative assessment means all the activities where teachers are involved to make the teaching-learning process more productive and to eradicate the hurdle (Black & William, 1998). In this section, formative assessment is described with six parts to learn more. They are the purpose of formative assessment, stages of formative assessment, strategies of formative assessment, essential elements of formative assessment, techniques of formative assessment, and benefits of formative assessment.

(1) Purpose of Formative Assessment: Bloom, Mandus, and Hastings (1971, as cited in Kivunja, 2015) state that the main purpose of formative assessment is to help both the learner and the teacher focus on the particular learning necessary for the movement to mastery. According to the Eberly Center (2014), the goal of formative assessment is to monitor student learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning.

(2) Stages of Formative Assessment: Formative assessment is used by teachers every day. It may occur during all stages of the lesson plan. The three stages of formative assessment are before instruction, during instruction, and after instruction (Andrade & Cizek, 2010).

(3) Strategies of Formative Assessment: The framework represented by William and Thompson (2007) suggests that formative assessment or assessment for learning can be conceptualized as consisting of five key strategies.

1. clarifying, sharing, and understanding learning intentions and criteria for success;
2. engineering effective classroom discussions, questions, and tasks that elicit evidence of learning;
3. providing feedback that moves learners forward;
4. activating students as instructional resources for one another; and
5. activating students as the owners of their learning.

(4) Essential Elements of Formative Assessment: There are four essential elements in formative assessment; (1) identifying the gaps, (2) feedback, (3) students' involvement, and (4) learning progression (Andrade & Cizek, 2010).

(5) Techniques for Using Formative Assessment: Formative assessment information can be culled from different information-gathering activities including traditional classroom tests, observation, oral questioning, class discussion, group work with peer feedback, portfolios, projects, homework, and student self-assessment (Andrade & Cizek, 2010).

(6) Benefits of Formative Assessment: There are many benefits when formative assessments are used in classrooms. Because formative assessment supports students to align their learning goals with the aim and objectives of the coursework or training. It preserves the learning goal in the minds of everyone and instructors can help students to resolve any challenges they face before they get off track. It advances the overall learner performance. As teachers monitor learners' progress, they can handle the feedback to improve the learning experience and ultimately, the learner's performance. It is an effective way to upgrade students' motivation. Formative assessment urges learners to smash their goals by consistently tracking their progress toward specific knowledge objectives. By tracking learners' progress using different formative assessment methods, the teacher can spawn personalized learning experiences for the students. It supports understanding the unique needs of students and knowing the best ways to support them on their learning journeys. It allows the instructors to make data-driven decisions. Using the data gathered from frequent learning checks, the instructor can prepare valid and informed decisions that are grounded in real-time experiences. It supports instructors in adjusting their teaching methods to better suit the needs of the learners (William, 2017).

Teacher Skills for Using Formative Assessment

Heritage (2007) suggested that the four specific skills are all defined as pedagogical knowledge. The specific skills for practicing formative assessment that teachers need to be able to do are 1) creating the conditions for the formative assessment, 2) using student self-assessment, 3) being able to interpret evidence of student learning and 4) matching instruction to the gap.

(1) Creating the Conditions: According to Heritage (2007), two things need to happen if students are going to be involved in assessment. First, a classroom culture must be created by teachers that support self-and peer assessment. Second, the skills to build a community of learners must be had as a teacher, characterized by a recognition and appreciation of individual differences. Students listen to classroom norms respectfully to one another, respond positively

and constructively, and appreciate the different skill levels among peers will enable all students to feel safe in the learning environment and to learn with and from one another. Above all, teachers will need the skills to model the “safety” norms of the classroom in their behavior.

(2) Student Self-Assessment: Teachers must teach students to assess their learning and the learning of others. This involves helping students to set goals and criteria for success, reflect on their own and others’ understanding, and to evaluate learning according to the criteria. (Heritage, 2007).

(3) Interpreting Evidence: Teachers’ skills in drawing inferences from students’ responses are crucial to the effectiveness of formative assessment. No matter what the assessment strategy - observation, dialogue, asking for a demonstration, or a written response - teachers must examine students’ responses from the perspective of what they show about their conceptions, misconceptions, skills, and knowledge. This involves a careful analysis of the responses about the criteria for success. In essence, teachers need to infer the just right gap between the current learning and desired goals, identifying students’ emerging understanding or skills to build on these by modifying instruction to facilitate growth (Heritage, 2007).

(4) Matching Instruction to the Gap: According to Heritage (2007), it is axiomatic to formative assessment that, if the next instructional steps to close the gaps are too hard for the student, frustration will almost certainly result, and if they are too easy, boredom and disaffection are potential outcomes. Therefore, teachers need the skills to translate their interpretations of the assessment results into instructional actions that are matched to the learning needs of their students. In summary, teachers must not only have the theoretical knowledge of formative assessment but also the skills to use it more effectively.

Research Method

Population and Sample Size

This study was conducted in the Mandalay Region, Magway Region, and Shan State. The sample education degree colleges for this study were selected by using a simple random sampling technique. Four Education Degree Colleges were selected as sample colleges. Although there are 302 teachers in four education degree colleges, only 213 questionnaires have been returned. Table 1 shows the number of the sample size in the selected colleges.

Table 1 Population and Sample Size

Education Degree College	No. of Teacher		
	Male	Female	Total
Mandalay	6	74	80
Meiktila	5	47	52
Pakokku	2	30	32
Taunggyi	5	44	49
Overall	18	195	213

Research Design

The research design used in the study is correlational research design which is one of the descriptive research designs and it involves the collection of information from a sample of individuals by asking them to respond to the survey questions.

Instruments

In this study, there are two types of instruments for collecting data about knowledge of formative assessment and their teaching practices. These are questionnaires for teacher educators' knowledge about formative assessment and questionnaires for their teaching practices in the classroom. The personal information form included questions about teacher educators' gender, teaching experience years, teachers' qualifications, and training programs.

In this study, a questionnaire for knowledge of formative assessment of teacher educators was modified from a questionnaire by Alkharusi (2011). The questionnaire on knowledge of formative assessment of teacher educators included five dimensions. They are Purposes of Formative Assessment, Benefits of Clear Learning Outcomes, Strategies and Important Factors of Formative Assessment, Challenges to Using Formative Assessment, and Administrator Support. There were (40) five-point Likert scale items in this instrument. All items were positive items. These items were rated as follows, 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree.

The teaching practices questionnaire was developed by Johnson (2016). The questionnaire for teacher educators' teaching practices comprises five dimensions. They are Types of Formative Assessment, Communicating Assessment, Assessment Standards and Criteria, Student-Involved Assessment, and Non-Achievement-Based Grading Factors. There were (38) five-point Likert scale items in this instrument. These items were rated as follows, 1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always.

Data Collection Procedures

First of all, the relevant data and information were collected from the library and internet sources. The instruments were constructed under the guidance of the supervisor to investigate knowledge of formative assessment of teacher educators and their teaching practices. The content validity was determined by experienced teachers. Some of the items were revised according to the pilot results. After getting the validity and reliability of the instrument, the questionnaires were distributed to the target teacher educators in selected Education Degree Colleges. Then, the collected data was analyzed and interpreted.

Data Analysis

After collecting the required data, quantitative data analysis was performed by using the Statistical Package for Social Sciences (SPSS) version (22). Data was analyzed by using descriptive statistics, independent samples *t-test*, a one-way ANOVA, and Pearson product-moment correlation coefficient. Descriptive statistics was used to examine knowledge of formative assessment of teacher educators and their teaching practices. An independent samples *t-test* was used to compare knowledge of formative assessment of teacher educators in terms of gender and one-way ANOVA was used to compare teaching experience in years and qualifications. Moreover, Pearson product-moment correlation was used to explore the relationship between knowledge of formative assessment of teacher educators and their teaching practices.

Findings

The quantitative research data were examined using independent samples *t*-test, one-way ANOVA, and Pearson product-moment correlation. The quantitative research findings are described in the following.

Findings of Research Question (1)

To know the knowledge of formative assessment of teacher educators among the selected education degree colleges, descriptive statistics was used. The means and standard deviations for teacher educators' knowledge of formative assessment on each dimension are shown in Table 2.

Table 2 Means and Standard Deviations for Knowledge of Formative Assessment of Teacher Educators on Each Dimension

EDCs	n	M/SD	Dimension					Overall
			D1	D2	D3	D4	D5	
EDCs	213	M	4.06	4.10	4.20	3.92	3.97	3.88
		SD	0.291	0.301	0.375	0.587	0.762	0.324

Note. D1 = Purposes of Formative Assessment, D2 = Benefit of Clear Learning Outcomes, D3 = Strategies and Important Factors of Formative Assessment, D4 = Challenges of Using Formative Assessment, D5 = Administrators Support.

The total mean of dimension three was the greatest. Thus, the teacher educators in the selected EDCs are rich in knowledge about the strategies and important factors of formative assessment. However, the total mean of dimension four was the lowest. Therefore, teacher educators in EDCs are weak in understanding the challenges of using formative assessment and the ways to overcome these challenges. However, most teacher educators in EDCs are knowledgeable about the formative assessment because the overall mean is 3.88. Based on the means of the knowledge of formative assessment of teacher educators in EDCs, Figure 1 was illustrated.

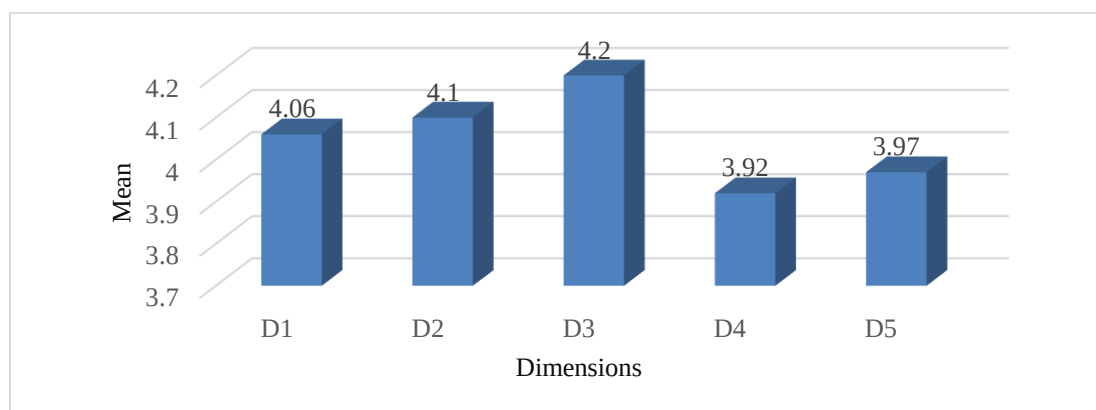


Figure 1. Comparisons of means for knowledge of formative assessment of teacher educators on each dimension.

Findings of Research Question (2)

Analysis for Knowledge of Formative Assessment of Teacher Educators in terms of Gender

The independent samples *t*-test was used to determine the knowledge of formative assessment of teacher educators in terms of gender. The results of the independent sample *t*-test were performed to determine whether there was a significant difference in terms of gender

among the knowledge of formative assessment of teacher educators in EDCs. The results of the *t*-test are given in Table 3.

Table 3 *t*-Values for Knowledge of Formative Assessment of Teacher Educators in terms of Gender

Dimension	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i> (2-tailed)
D1	Male	18	3.88	0.423	-0.19	-1.870	211	.078
	Female	195	4.07	0.272				
D2	Male	18	3.85	0.488	-0.27	-2.318	211	.032*
	Female	195	4.12	0.268				
D3	Male	18	3.89	0.446	-0.34	-3.729	211	.000***
	Female	195	4.22	0.356				
D4	Male	18	3.56	0.637	-0.40	-2.836	211	.005*
	Female	195	3.96	0.572				
D5	Male	18	3.61	0.737	-0.39	-2.105	211	.036*
	Female	195	4.00	0.757				
Overall	Male	18	3.62	0.424	-0.29	-2.818	211	.011*
	Female	195	3.90	0.303				

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 3 shows that there was a significant difference between the knowledge of formative assessment of teacher educators in terms of gender. According to the findings, the average means (3.90) for females were slightly more significant than the average means (3.62) for males. Figure 2 shows the comparison means for knowledge of formative assessment of teacher educators in terms of gender.

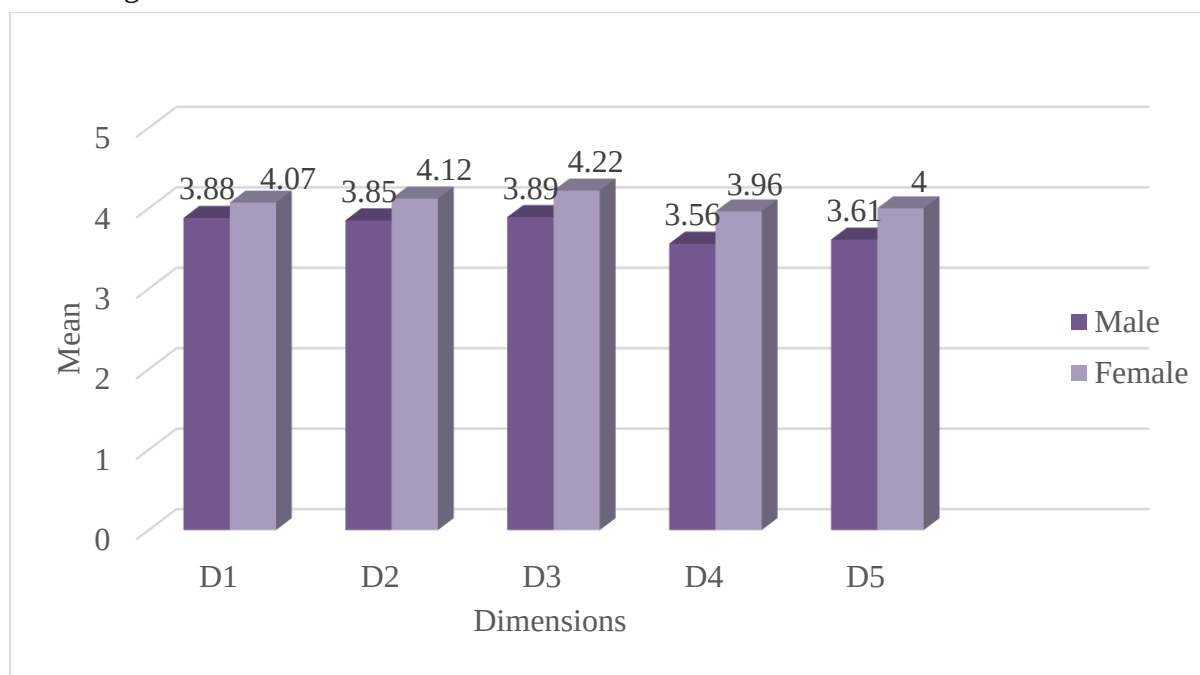


Figure 2. Comparisons of means for knowledge of formative assessment of teacher educators in terms of gender.

Analysis for Knowledge of Formative Assessment of Teacher Educators in terms of Teaching Experience

In terms of years of teaching experience, the respondents were spread out into five groups of experience. To know the differences in teacher educators' knowledge of formative assessment in terms of teaching experience, descriptive statistics were used. Table 4 illustrates the means and standard deviation of knowledge of formative assessment of teacher educators in terms of teaching experience.

Table 4 Means and Standard Deviations for Knowledge of Formative Assessment of Teacher Educators in terms of Teaching Experience

Teaching Experience (Years)	<i>n</i>	<i>M/SD</i>	D1	D2	D3	D4	D5
0-5	30	<i>M</i>	4.00	4.06	4.09	3.81	3.79
		<i>SD</i>	0.240	0.305	0.281	0.550	0.739
6-10	40	<i>M</i>	4.10	4.14	4.30	4.01	4.19
		<i>SD</i>	0.348	0.309	0.391	0.623	0.677
11-15	52	<i>M</i>	4.24	4.21	4.50	4.21	4.38
		<i>SD</i>	0.186	0.193	0.236	0.617	0.753
16-20	44	<i>M</i>	4.00	4.04	4.04	3.83	3.74
		<i>SD</i>	0.208	0.271	0.306	0.536	0.704
Above 20	47	<i>M</i>	3.92	4.02	3.98	3.70	3.66
		<i>SD</i>	0.334	0.374	0.352	0.458	0.673
Overall	213	<i>M</i>	3.79	3.96	4.12	3.77	3.70
		<i>SD</i>	0.285	0.351	0.203	0.293	0.285

According to the results shown, teacher educators who have more than 20 years of experience have the lowest knowledge of formative assessment. To explore whether a significant difference between the knowledge of formative assessment of teacher educators in terms of teaching experience, one-way ANOVA was used. Table 5 illustrates the result of one-way ANOVA.

Table 5 ANOVA Result for Knowledge of Formative Assessment of Teacher Educators in terms of Teaching Experience

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Between Groups	5.551	4	1.388	17.277	.000***
Within Groups	16.706	208	0.800		
Overall	22.256	212			

Note. *** $p < .001$.

According to the results, there was a significant difference between different groups of teaching experience at the .001 level.

Finding of Research Question (3)

The means and standard deviations of teaching practices of teacher educators on each dimension were presented in the following table.

Table 6 Comparison of Means and Standard Deviations for Teaching Practices of Formative Assessment of Teacher Educators on Each Dimension

EDC	n	M/SD	Dimension				
			D1	D2	D3	D4	D5
EDC 1	52	M	3.99	4.00	3.65	3.89	3.85
		SD	0.488	0.418	0.663	0.363	0.743
EDC 2	80	M	4.41	4.36	4.19	4.30	4.57
		SD	0.325	0.457	0.450	0.337	0.500
EDC 3	49	M	3.78	3.74	3.89	3.91	3.62
		SD	0.415	0.638	0.769	0.685	0.859
EDC 4	32	M	4.08	4.05	3.55	3.86	3.94
		SD	0.549	0.510	0.759	0.428	0.812
Overall	213	M	4.11	4.08	3.89	4.04	4.08
		SD	0.492	0.555	0.682	0.497	0.804

Note. D1 = Types of Formative Assessment, D2 = Communicating Assessment, D3 = Assessment Standards and Criteria, D4 = Student-Involved Assessment, D5 = Non-Achievement-Based Grading Factors.

The total mean of dimension one was the greatest. Thus, the teacher educators in the selected EDCs are using all kinds of formative assessment in the classroom. However, the total mean of dimension three was the lowest. Therefore, teacher educators in EDCs are using formative assessment in the classrooms, but they do not set assessment standards and criteria.

Finding of Research Question (4)

To investigate the relationship between knowledge of formative assessment of teacher educators and their teaching practices, the Pearson product-moment correlation was analyzed. The result is shown in Table 7.

Table 7 Results of Correlation between Knowledge of Formative Assessment of Teacher Educators and their Teaching Practices

		Knowledge of Formative Assessment of Teacher Educators	Teaching Practices of Teacher Educators
Knowledge of Formative Assessment of Teacher Educators	Pearson	1	.712**
	Sig (2-tailed)		.000
	N	213	213
Teaching Practices of Teacher Educators	Pearson	.712**	1
	Sig (2-tailed)	.000	
	N	213	213

Note. ** Correlation is significant at the .01 level (2-tailed).

Table 7 shows that the knowledge of formative assessment of teacher educators and their teaching practices had a significant relationship ($r = .712, p < .01$). The strength of correlation was high according to Cohen (1988). The result stated that the direction of the correlation was positive. It can therefore be concluded that if the level of the knowledge of formative assessment is high, the level of teaching practice will be high or if the level of the knowledge of formative assessment is low, the level of teaching practice will be low.

Discussion and Conclusion

Discussion

Research question one investigated the knowledge of formative assessment of teacher educators in EDCs. The findings of the study pointed out that the mean values of teacher educators' knowledge of formative assessment were greater than 3.88 in all dimensions. The study results described that teacher educators have an average level of understanding of different aspects of formative assessment. These results are supported by the study of Riaz (2008) that teachers have formative assessment knowledge to enhance students' learning competencies toward higher attainments. On the contrary, these results didn't match with the result of Suah (2012) who studied primary school teachers and found that teachers have a low level of knowledge for formative assessment.

Research question two investigated the differences in knowledge of formative assessment of teacher educators in terms of teaching experience and gender. The findings of the study stated that the means of teacher educators who have (11-15) years of teaching experience were the highest and the means of over 20 years of experienced teacher educators were the lowest. The ANOVA results showed that there was a significant difference between teacher educators in terms of teaching experience. The study's results were consistent with Mertler's (2004) findings that some factors influence educators' knowledge, such as gender and major, education and assessment training, and teaching experience. The result findings indicated that the means of females were (3.90) greater than the means of males (3.62). So, female teacher educators are more knowledgeable and interested in formative assessment than male teacher educators. According to the result, this refused Alkharusi's research (2011) that male teachers tend to have a higher level of measurement and testing knowledge than female teachers.

Research question three explored the most frequently used teaching practices of teacher educators. The results of the study indicated that teacher educators frequently use MCQs, short answer questions, and other formative assessment forms in their classrooms. Both traditional and authentic methods of assessment are adopted by the majority of teacher educators. The results are not supported by McMillian (2008) who thought that traditional methods of assessment are easy to execute and mark; therefore, the majority of teachers prefer to use these methods in the assessment of their students' learning.

Research question four explored the relationship between knowledge of formative assessment of teacher educators and their teaching practices in EDCs. The result findings revealed that the knowledge of formative assessment of teacher educators was significantly, positively, and highly correlated with their teaching practices ($r = .712, p < .01$). The results suggested that knowledge of formative assessment positively contributes to the teaching practices of teacher educators. The research by Cauley and McMillian (2010) indicated that teacher

educators' assessment knowledge is associated with their classroom assessment practices. Similarly, the results supported the study of Bell and Ford (2007) where it was revealed that teachers' knowledge of formative and summative assessment has a strong impact on their teaching practices. Therefore, the current study's result was consistent with the above-mentioned studies. The results of this study confirmed that the more knowledge teacher educators have about formative assessment, the more they use it in the classroom.

Suggestions

Myanmar has changed the school curriculum according to grade level to achieve higher education standards today. Such reforms include the curricula of education degree colleges. As the curriculums change in EDC, it is found that the forms of assessment have also changed. Therefore, teacher educators of education degree colleges must know and master various forms of assessment. Teacher educators may have difficulties in using new forms of formative assessment. To resolve the difficulties that teacher educators face, the following recommendations are made.

1. Teacher educators do not have enough in-service training in formative assessment throughout their professional careers. Therefore, it is recommended that a series of workshops with the help of the Department of Teacher Education be arranged to enhance the knowledge and skills of teacher educators in formative assessment.
2. Teacher educators do not have enough resources to use formative assessment. Therefore, it is recommended that the administrators need to support resources.
3. Teacher educators did not properly establish the standards and criteria for formative assessment. Therefore, it is recommended that along with in-service training and workshops, they may also be designed for teacher educators on criteria and standards of formative assessment.
4. Teacher educators did not have enough time and space for formative assessment. Therefore, it is recommended that it is necessary to provide teacher educators and prospective teachers with sufficient time and space in their classrooms.
5. It is necessary to have an appropriate teacher-student ratio to be effective in formative assessment.

Conclusion

In today's educational reforms, formative assessment plays an important role. As the formative assessment is a continuous process, teachers are the main ones who have to continuously assess the student's performance throughout the year. Therefore, the knowledge and skills of teachers to conduct formative assessment techniques are particularly important. Teachers' knowledge, skills, and attitudes toward formative assessment affect teaching practices. Therefore, teachers must continuously improve their knowledge and skills of formative assessment. Moreover, teacher educators should be able to apply their knowledge of formative assessment to practice, no matter how difficult it may be. In addition, administrators also need to support teacher educators with the resources they need to conduct formative assessment activities. In addition to this, teacher educators should learn from books, documents, and online resources, although they have not been given training about formative assessment. In summary, formative assessment is important throughout students' learning process and should be given

attention by administrators, including teacher educators. In conclusion, this study is intended for teacher educators, administrators, and teachers of primary, secondary, and university to know about formative assessment thoroughly. And it hopes to gain knowledge that can be applied in the future.

Acknowledgments

We would like to express our respectful thanks to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education), who permit us to undertake this research. Then, our genuine respect and special thanks go to our supervisor, Dr. Soe Than, Professor Emeritus and Head of the Curriculum and Methodology Department, Sagaing University of Education, for his valuable advice and skillful guidance, attention to detail, and willingness to spend hours of working with us to shape our research and focus our writing throughout the study.

References

- Ajzen, I. (1985). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50 (2), 179-211.
- Alkharusi, H. (2011). An analysis of the internal and external structure of the teacher assessment literacy questionnaires. *The International Journal of Learning*, 18 (1), 515-518.
- Andrade, H. L., & Cizek, G. J. (2010). *Handbook of formative assessment*. London: Routledge.
- Bell, B. S., & Ford, J. K. (2007). Reactions to skill assessment: The forgotten factor in explaining the motivation to learn. *Human Resource Development Quarterly*, 8 (1), 33-62.
- Black, P., & William, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, 80 (2), pp. 139-48.
- Black, P., & William, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation, and Accountability (formerly: Journal of Personnel Evaluation in Education)*, 21 (1), 5.
- Brown, P. D., & Brown, N. R. (1990). *Effective Teaching Practice*. England: Stanley Thrones.
- Cauley, K. M., & McMillan, J. H. (2010). Formative assessment techniques to support student motivation and achievement. *Helderf Publications*, 8 (1), 1-6.
- Cohen, J. (1998). *Statistical power analysis for the behavioral sciences* (2nd ed.). New York: Lawrence Erlbaum Associates.
- Dixon, N. M. (2000). *Common knowledge: How companies thrive by sharing what they know*. Brighton, Massachusetts: Harvard Business School Press.
- Eberly Center. (2014). *Formative vs summative assessment: Teaching excellence and educational innovation*. Pittsburgh, Pennsylvania: Carnegie Mellon University.
- European Commission, (2013). *Supporting teacher educators for better learning outcomes*. Brussels: European Commission.
- Fenton, R. (1996). Performance assessment system development. *Alaska Educational Research Journal*, 2 (1), 13-22.
- Heritage, M. (2007). Formative assessment: What do teachers need to know and do? *Phi Delta kappn*, 89 (2). Retrieved from <http://www.pdkintl.org/kv89/k0710herhtm>
- Johnson, C. C. (2016). Formative assessment in the classroom: Finding from three districts. *Journal of Michael & Susan Dell Foundation*, 45-52.
- Keyon, B. J. (2019). *Teacher formative assessment use to check for understanding to adjust instruction*. Minneapolis, Minnesota: Walden University.
- Kivunja, C. (2015). *Teaching, learning, and assessment*. South Melbourne, Australia: Oxford University Press.
- McMillan, J. H. (2007). Classroom assessment: Principles and practice for standards-based instruction. *Educational Measurement: Issue and Practice*, 22 (4), 34-43.
- McMillian, J. H. (2008). *Assessment is essential for standards-based education*. California: Corwin Press.
- Mertler, C. A. (2004). Teachers' assessment literacy: Does classroom experience make a difference? *American Secondary Education*, 33 (1), 49-64.

- Pryor, J., & Torrance, H. (2001). Developing formative assessment in the classroom: Using action research to explore and modify theory. *British Educational Research Journal*, 27 (5), 615-631.
- Raiz, M. N. (2008). *Test construction: Development and standardization of psychological tests in Pakistan*. Pakistan: Higher Education Commission.
- Shepard, L. A. (2008). The role of assessment in a learning culture. *Educational Research*, 29 (7), 4-14.
- Suah, S. L. (2012). Investigating assessment practices of in-service teachers. *International Online Journal of Educational Science*, 4 (1), 91-106.
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- William, D. (2017). *Embedded formative assessment* (2nd ed.). Bloomington, IN: Solution Tree Press.
- William, D., & Thompson, M. (2007). *Integrating assessment with instruction: What will it take to make it work?* Mahwah, NJ: Erlbaum.

AN INVESTIGATION INTO THE IMPACT OF EXPERIENTIAL LEARNING ON SCIENCE PROCESS SKILLS IN TEACHING SECONDARY SCHOOL STUDENTS

Su Myat Phy¹ and Swe Swe Nyunt²

Abstract

The purpose of this study was to investigate the impact of experiential learning on science process skills in teaching secondary school students. Explanatory sequential design was conducted in this study. The research design for quantitative study was the non-equivalent control group design. Intrinsic case study design was used as the qualitative design. Instruments like pretest and posttest were used as the quantitative ones. Semi-structured interview questions were used as qualitative instruments. For the internal consistency reliability, Cronbach's alpha coefficient was used. The reliability coefficient for the pretest was 0.72, and for the posttest was 0.76. A random sampling method was used to choose four high schools from two regions. The purposive sampling method was applied for collecting qualitative data. Quantitative data was analyzed by one-way analysis of covariance. The results showed that basic science process skills of students who received instruction with experiential learning on science process skills model were higher than those of students who did not receive it. Qualitative data was analyzed by thematic analysis. Qualitative findings revealed that students and teachers who participated in the experimental groups preferred the learning situation, and were willing to apply the experiential learning on science process skills model. All these results showed that the experiential learning on science process skills model was supportive in teaching science to achieve academic mastery and to acquire basic science process skills.

Keywords: learning, experiential learning, process skill, science process skills, basic science process skills

Introduction

Education is to help the student to develop his personality, to adjust himself to the society in which he lives; to learn to live and work with others, and to grow up to be active and creative forces in society (Khin Zaw, 2001a). In Myanmar society, education is a critical building block for nation building, national unity and sustainable development (MoE, 2016). Learning is a result of experiences and individuals do not always learn in the same way (Kolb, 1984). Teachers use different approaches to help students acquire knowledge, skills and experience.

Different characteristics of students are reflected in their learning processes. Experiential learning emerged as a result of considering students' individual differences. Experiential learning is a process of learning through experiences (practice, experiment, discovery and so on) to develop the students' science process skills, improve the students' metacognitive skills, enhance the skills through the implementation of the knowledge to the real situations, and give the students' the ability to self-learning (Kolb & Kolb, 2006).

In implementing experiential learning procedures, the students actively construct the new knowledge by themselves on the grounds of the already existing knowledge and engage in authentic learning experiences. So, this study was conducted to investigate the impact of experiential learning on science process skills in teaching secondary school students.

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Purposes of the Study

The purposes of the study are described as follows:

1. To find out the impact of experiential learning on the science process skills in teaching secondary school students
2. To explore the attitudes of teachers and students towards experiential learning on science process skills model
3. To make suggestions for the improvement of teaching science according to the results of the study

Research Questions

The research questions are described as follows:

1. How do basic science process skills differ between secondary school students who receive instruction with experiential learning on science process skills model and those who do not receive it?
2. What are the attitudes of teachers towards experiential learning on science process skills model?
3. What are the attitudes of students towards experiential learning on science process skills model?

Definition of Key Terms

The following terms were used to describe specific concepts throughout the study.

Learning

Learning is defined as the process by which behavior is developed or altered through practice or experience (Khin Zaw, 2001b).

Experiential Learning

Experiential learning is a teaching learning strategy in which learners are actively involved in the planning of learning activities, in the gathering, analyzing and using the subject, and in construction of knowledge through grasping and transformation of experience (Deryakulu, Büyüköztürk & Özçınar, 2010).

Process Skill

Process skill is the learners' cognitive activity of creating meaning and structure from new information and experiences (National Research Council, 1996).

Science Process Skills

Science process skills are the core skills that enable the easy learning and persistency of sciences, and that provide the students to be responsible and active in their own learning (Harlen & Elstgeest, 1992).

Basic Science Process Skills

Basic science process skills are the skills that scientists and students use when they do science. These skills are foundational skills for the development of more complex integrated skills employed at higher levels of secondary education. These skills are observing, inferring, measuring, communicating, classifying and predicting (Rezba, Sprague, McDonnough & Matkins, 2007).

Scope

This study was conducted at Magway and Bago Regions. The populations in this study were science teachers who were teaching in Grade Six and Grade Six students from the selected schools in the academic year (2022-2023). Basic science process skills were used for this study. This study was to investigate the impact of experiential learning on science process skills in teaching secondary school students and the duration was three months.

Review of Related Literature

Science is the investigation and interpretation of natural phenomena which occur in the daily life. It does not simply sit down and pray for things to happen, but seeks to find out why things happen. It experiments and tries again and again and sometimes fails and sometimes succeeds. The modern world is very different from ancient world due to the contribution of science in human life. Science is the system of knowing about the universe through data collected by observation and controlled experimentation. It is a way of thinking, a way of understanding the world (Carin & Sund, 1989).

Teaching science should help human to discover humility on one hand and the ability to affect their own futures on the other (Trowbridge & Bybee, 1990). The purpose of science was to develop an understanding of the major generalizations of science and associated scientific attitudes, and to get the children to know their environment by observing everyday things around them. The emphasis was on getting the information about the environment from firsthand observations rather than from books (Victor, 1989).

Effective science teachers used a variety of teaching methods, chose the best for each lesson. The use of experiential learning helped to integrate concept and practical work in science teaching and learning. So, this study was foster to use experiential learning in teaching science for the improvement of secondary school students' science process skills.

The Nature of Experiential Learning

Teaching has been with a long time and human beings learn from experience, teaching has been carried on its conditions and effects. Thus, experience has been the source of knowledge (Khin Zaw, 2001b). Kolb (1984) believed that learning is the process whereby knowledge is created through the combination of grasping and transforming experience. Experiential learning is learning through experience or learning by doing.

Learning is a process, not in terms of outcomes. All learning is re-learning. Learning requires the resolution of conflicts. It is a holistic process of adaptation. It results from synergetic transactions between the person and the environment. Furthermore, it is the process of creating knowledge. Experiential learning was built on the above six propositions (Kolb & Kolb, 2005).

The purpose of experiential learning was to give the chance to the students to interact with peers or groups or with the real world. Students learned experiences by doing, discovering, reflecting and applying. Through these experiences, students could develop communication skills, science process skills and self-confidence, and gain and strengthen decision-making skills by responding to and solving real world problems and processes.

The Nature of Science Process Skills

Science process skills are activities that scientists execute when they study or investigate a problem, an issue or a question. These skills are used to generate content and to form concepts (Carin & Sund, 1989). Science process skills can be classified as basic science process skills and integrated science process skills. Basic science process skills were used in this study. Basic science process skills are observing, inferring, measuring, communicating, classifying and predicting.

Observing is using the senses to gather information about an object or event. Inferring is making an “educated guess” about an object or event based on previously gathered data or information. Measuring is using both standard and non-standard measures and estimates to describe the dimensions of an object or event. Communicating is using words or graphic symbols to describe an action, object or event. Classifying is grouping or ordering objects or events into categories based on properties or criteria. Predicting is stating the outcome of a future event based on a pattern of evidence (Padilla, 1990). After the intervention, the students of the experimental groups could be able to observe, infer, measure, communicate, classify and predict individually.

The Experiential Learning on Science Process Skills Model

The teaching model included three instructional phases. These phases are preparation, implementation, and evaluation. There are three components in the first phase. These are (i) orientation of intended learning outcomes, (ii) selection of instructional strategies and resources, and (iii) linkage with prior knowledge and experience. The second phase includes eight components. These are (i) introduction to lesson, (ii) planning for experiential learning activities, (iii) enhancing awareness of experience, (iv) providing classroom experience, (v) reviewing and reflecting on experience, (vi) debriefing, (vii) extraction, and (viii) formative assessment. The third phase includes summative assessment and feedback. The three phases of the teaching model are shown in the following Figure 1.

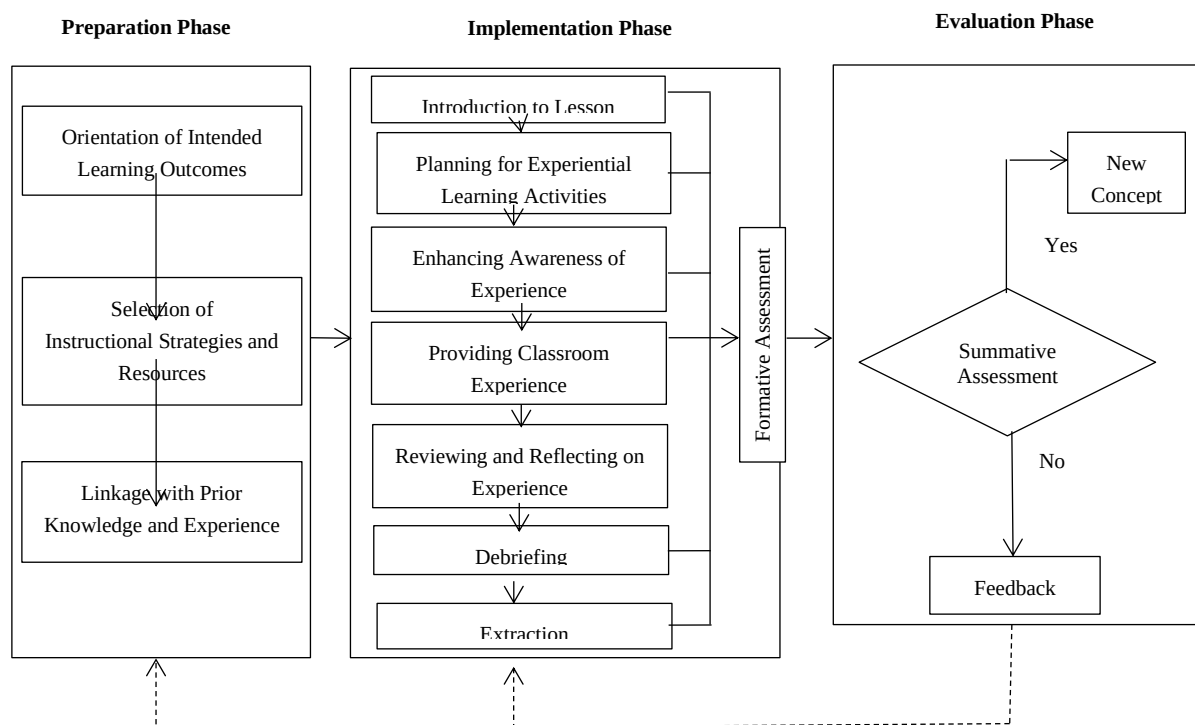


Figure 1. Experiential learning on science process skills model.

Research Method

Research Design

In this study, a mixed methods design was used. Among the basic mixed methods research designs, explanatory sequential research design was used for this study. The explanatory sequential design was illustrated in Figure 2.

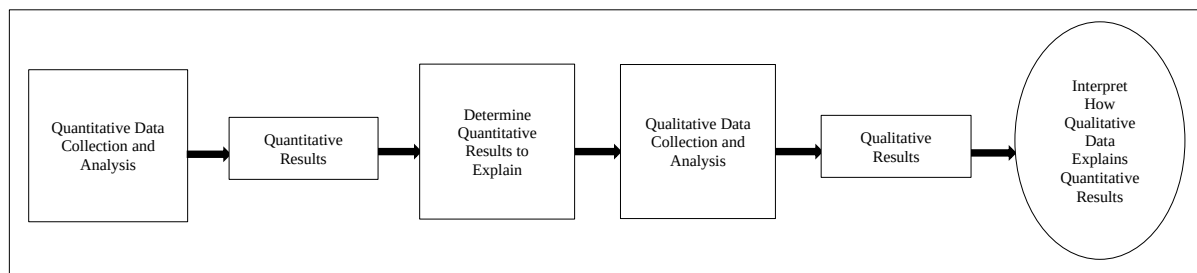


Figure 2. Explanatory sequential design.

Source: From Mills & Gay (2016).

Non-equivalent control group design, one of the quasi-experimental designs, was used for quantitative study. Intrinsic case study design, one of the case study designs, was used for qualitative study. Within the case study approach, typical qualitative data gathering strategies or methods include interviews, observations and document analysis (Punch, 2009). In this study, semi-structured interviews were used.

Population and Sample Size

In this study, a simple random sampling technique was used to select four basic education high schools. Among (352) Grade Six students from four schools, (271) students were selected as samples (see Table 1).

Table 1 *Population and Sample Size of Quantitative Study*

Region	Township	School	No. of Population	No. of Subject	
				Experimental	Control
Bago	Pyay	No. (1) BEHS, Pyay	109	37	36
	Shwedaung	BEHS, Shwedaung	49	28	21
Magway	Aunglan	No. (1) BEHS, Aunglan	136	46	45
	Sinbaungwe	BEHS, Sinbaung we	58	31	27
Total			352	142	129

Four middle school science teachers and eight Grade Six students from selected schools were purposely selected as samples for interview. The population and sample size of qualitative study was presented in the following Table 2.

Table 2 *Population and Sample Size of Qualitative Study*

Region	Township	School	No. of Teacher	No. of Student
			Interviewee	Interviewee
Bago	Pyay	No. (1) BEHS, Pyay	1	2
	Shwedaung	BEHS, Shwedaung	1	2

Region	Township	School	No. of Teacher	No. of Student
			Interviewee	Interviewee
Magway	Aunglan	No. (1) BEHS, Aunglan	1	2
	Sinbaungwe	BEHS, Sinbaungwe	1	2
		Total	4	8

Instruments

Pretest, posttest and interview questions were used as instruments in this study.

Pretest

The pretest was constructed to measure the entry behavior of the students. The pretest items were based on Chapter (1) Nature of Science, Chapter (2) Matter, Chapter (3) Force, Chapter (4) Living Things, and Chapter (5) Cell and Cell Structure of Grade Six science textbook. Ten multiple-choice items and ten short questions were used. Total marks were sixty and time was allowed for one and a half hour. The reliability coefficient for the pretest was 0.72.

Posttest

The posttest was constructed to measure the students' basic science process skills. The constructed items for each question were based on Chapter (6) Reproduction, Chapter (7) Planet Earth, Chapter (8) Ecosystem and Chapter (9) Elements, Compounds and Mixtures from Grade Six science textbook. It employed ten items in multiple-choice format and fourteen items with short questions. Total marks were sixty and time was allowed for one and a half hour. The reliability coefficient for the posttest was 0.76.

Interview Questions

Interview questions were developed to study the attitudes of teachers and students towards the application of experiential learning on science process skills model in the classroom. Semi-structured interview questions for teachers consisted of thirteen items, and then semi-structured interview questions for students were seven items.

Learning Materials

Learning materials were selected from the Grade Six science textbook. Some video clips, pictures, and quizzes were prepared to get students' attention and to arouse their motivation.

Procedure

Firstly, an experiential learning on science process skills model was developed. Based on the experiential learning on science process skills model, lesson plans were developed. Before the main study, a pilot study was conducted at No. (2), Basic Education High School, Aunglan. And then, the two high schools were selected randomly from each of the selected regions. The intervention period was for about three months. Before the treatment, pretest was administered to examine students' existing knowledge concerning science. Then, the experimental groups were taught with experiential learning on science process skills model and the control groups were taught with formal instruction. After the treatment period, all the students in the experimental and control groups were administered by posttest to examine getting basic science process skills.

Furthermore, the four teachers who taught the experimental groups and the eight students of the experimental groups were interviewed to obtain in-depth information on the opinions of

them. To conduct interview, it took about ten minutes for students and about twenty minutes for teachers.

Data Analysis

The data were analyzed by one-way analysis of covariance (one-way ANCOVA) and thematic analysis. One-way analysis of covariance adjusts posttest score for initial differences on the dependent variable (Mills & Gay, 2016). One-way analysis of covariance was used to determine whether there were significant differences between the basic science process skills test scores of two independent samples: one was experiential learning on science process skills model applied group and the other was unapplied group. The collected data from interview were analyzed by using thematic analysis.

Research Findings

Findings of Pretest

The data obtained from the pretest scores were analyzed by using one-way analysis of covariance (one-way ANCOVA) to determine whether there was a significant difference between entry behaviors of experimental groups and control groups. Table 3 was used to illustrate the analysis of covariance results for pretest scores.

Table 3 Analysis of Covariance Results for Pretest Scores

School	Group	N	M	SD	MD	F	p
S1	Experimental	37	44.00	6.29	5.39	1.179	.001**
	Control	36	38.61	7.51			
S2	Experimental	28	49.07	4.26	6.88	3.573	.000***
	Control	21	42.19	6.64			
S3	Experimental	46	47.67	5.28	4.89	3.625	.000***
	Control	45	42.78	6.56			
S4	Experimental	31	38.61	7.96	6.54	0.055	.002**
	Control	27	32.07	7.33			

Note. S1 = BEHS, Pyay; S2 = BEHS, Shwedaung; S3 = BEHS, Aunglan; S4 = BEHS, Sinbaungwe.

** $p < .01$. *** $p < .001$.

These data showed that there were significant differences between the entry behavior of experimental groups and control groups in four selected schools.

Findings of Research Question (1)

The research question (1) is “How do basic science process skills differ between middle school students who receive instruction with experiential learning on science process skills model and those who do not receive it?”. To answer this research question, the posttest scores of four selected schools were analyzed by using one-way analysis of covariance (one-way ANCOVA).

Findings of Posttest

Table 4 was used to show analysis of covariance results for posttest scores in school 1.

Table 4 Analysis of Covariance Results for Posttest Scores in School 1

Basic Science Process Skill	Group	N	M	SD	MD	F	p
Observing	Experimental	37	9.28	0.66	0.29	2.70	.105 (ns)
	Control	36	8.99	0.74			
Inferring	Experimental	37	8.91	1.25	1.17	9.04	.004**
	Control	36	7.74	1.79			
Measuring	Experimental	37	9.56	.64	0.02	0.01	.909 (ns)
	Control	36	9.54	1.03			
Communicating	Experimental	37	8.28	1.24	2.51	75.49	.000***
	Control	36	5.77	1.03			
Classifying	Experimental	37	9.11	1.15	0.42	1.45	.232 (ns)
	Control	36	8.69	1.61			
Predicting	Experimental	37	8.77	1.29	3.01	53.99	.000***
	Control	36	5.76	1.90			

Note. ns = not significant. ** $p < .01$. *** $p < .001$.

Based on the results, there were no significant differences between experimental group and control group for the posttest scores of observing skills, measuring skills and classifying skills. But, the posttest scores of experimental group were significantly higher than that of control group for inferring skills, communicating skills and predicting skills. Therefore, it can be interpreted that the students of experimental group could get experience, understand the lessons, and participate the hands-on activities and experiments more than those of control group. Table 5 was used to show analysis of covariance results for posttest scores in school 2.

Table 5 Analysis of Covariance Results for Posttest Scores in School 2

Basic Science Process Skill	Group	N	M	SD	MD	F	p
Observing	Experimental	28	8.94	1.29	1.33	11.99	.001**
	Control	21	7.61	0.80			
Inferring	Experimental	28	7.88	1.79	1.77	7.84	.007**
	Control	21	6.11	1.90			
Measuring	Experimental	28	8.11	1.88	0.40	0.46	.500 (ns)
	Control	21	7.71	1.51			
Communicating	Experimental	28	8.10	1.54	1.57	9.17	.004**
	Control	21	6.53	1.43			
Classifying	Experimental	28	7.48	1.64	0.92	3.04	.088 (ns)
	Control	21	6.56	1.51			
Predicting	Experimental	28	7.11	1.42	2.17	25.52	.000***
	Control	21	4.94	0.96			

Note. ns = not significant. ** $p < .01$. *** $p < .001$.

Based on the results, there were no significant differences between experimental group and control group for the posttest scores of measuring skills and classifying skills. But, the posttest scores of experimental group were significantly higher than that of control group for observing skills, inferring skills, communicating skills and predicting skills. Therefore, it can be interpreted that the students from experimental group could make inferences and predictions about their observations and design investigations to test their experiences more than those of control group. Table 6 was used to show analysis of covariance results for posttest scores in school 3.

Table 6 Analysis of Covariance Results for Posttest Scores in School 3

Basic Science Process Skill	Group	N	M	SD	MD	F	p
Observing	Experimental	46	9.10	0.68	0.16	0.28	.596 (ns)
	Control	45	8.94	1.82			
Inferring	Experimental	46	8.12	2.18	2.66	35.16	.000***
	Control	45	5.46	1.74			
Measuring	Experimental	46	9.79	0.65	0.89	15.90	.000***
	Control	45	8.90	1.24			
Communicating	Experimental	46	8.24	1.40	3.51	102.70	.000***
	Control	45	4.73	1.67			
Classifying	Experimental	46	9.36	1.16	1.39	25.01	.000***
	Control	45	7.97	1.27			
Predicting	Experimental	46	8.06	1.64	4.14	104.46	.000***
	Control	45	3.92	2.03			

Note. ns = not significant. *** $p < .001$.

Based on the results, there was no significant difference between experimental group and control group for the posttest scores of observing skills. But, the posttest scores of experimental group were significantly higher than that of control group for inferring skills, measuring skills, communicating skills, classifying skills and predicting skills. Therefore, it can be interpreted that the students from experimental group could construct ideas and concepts by using hands-on experience more than those of control group.

Table 7 was used to show analysis of covariance results for posttest scores in school 4.

Table 7 Analysis of Covariance Results for Posttest Scores in School 4

Basic Science Process Skill	Group	N	M	SD	MD	F	p
Observing	Experimental	31	8.84	0.85	0.36	1.70	.198 (ns)
	Control	27	8.48	1.15			
Inferring	Experimental	31	8.38	1.56	2.19	17.74	.000***
	Control	27	6.19	2.04			
Measuring	Experimental	31	9.78	1.25	1.83	10.96	.002**
	Control	27	7.95	2.50			
Communicating	Experimental	31	8.37	1.34	2.27	49.40	.000***
	Control	27	6.10	0.81			

Basic Science Process Skill	Group	N	M	SD	MD	F	p
Classifying	Experimental	31	8.95	1.28	2.86	40.59	.000***
	Control	27	6.09	1.89			
Predicting	Experimental	31	9.11	0.81	3.27	49.65	.000***
	Control	27	5.84	2.19			

Note. ns = not significant. ** $p < .01$. *** $p < .001$.

Based on the results, there was no significant difference between experimental group and control group for the posttest scores of observing skills. But, the posttest scores of experimental group were significantly higher than that of control group for inferring skills, measuring skills, communicating skills, classifying skills and predicting skills. Therefore, it can be interpreted that the students from experimental group could categorize the basic knowledge and ideas, predict the main ideas for the new situation, and create a display to communicate data and observation, and a graph for the presentation of data to others more than those of control group.

Findings of Research Question (2)

The research question (2) is “What are the attitudes of teachers towards experiential learning on science process skills model?”. In order to get in-depth data, four teachers who taught experimental groups in four schools were interviewed in this study. The data from teachers’ interviews were analyzed by thematic analysis. Thus, the emerging themes are opportunities for learning, improvement, effectiveness, and challenges.

Opportunities for learning: The students participated in group activities, discussed with group members, and then presented opinions well and made logical explanations. The teacher encouraged students to cultivate a spirit of self-reliance by using problem-solving strategies, inquiry, self-directed learning and brainstorming. So, giving learning opportunities for students could provide a successful teaching-learning process.

Improvement: The students got own creative skills, improved personal qualities, expressed the ways of thinking, and interested and preferred to do practical works by learning with the experiential learning on science process skills model. They engaged authentic learning experiences and heightened knowledge and experience concerning real-world by using multiple senses. So, the implementation of the experiential learning on science process skills model in the classroom could improve students’ learning.

Effectiveness: By engaging students in hands-on experiences and reflection, they were better able to become valuable experiences, develop reflective practice habits, and promote teamwork and communication skills. Thus, the use of the experiential learning on science process skills model was effective for meaningful learning.

Challenges: The teacher had challenges in implementing the proposed model. Requiring patience and guidance, having more than one right answer, causing loss of focus, insufficient experience and time are some difficulties for teachers. Although the implementation of the experiential learning on science process skills model was effective, the teachers had some difficulties in implementation.

Findings of Research Question (3)

The research question (3) is “What are the attitudes of students towards experiential learning on science process skills model?”. In order to get in-depth data, eight students who were in experimental groups from the selected schools were interviewed in this study. The data from students’ interviews were analyzed by thematic analysis. Thus, the emerging themes are active participation, autonomous, enrichment, and hands-on experience.

Active participation: The students worked in groups and discussed with group members. They also shared ideas, experiences and feedback with other members, and they actively participated in the group activities. Thus, students’ active participation is a theme to consider for using the experiential learning on science process skills model.

Autonomous: By learning with the experiential learning on science process skills model, the students faced with unknown situations and tasks in a real context. To finish those tasks, they need to identify self-awareness and skills, to find out self-access, to create and innovate, and to think critically and problem-solving. Those skills make students as autonomous students. Thus, students’ autonomous is a second theme to consider for using the experiential learning on science process skills model.

Enrichment: They obtained many opportunities such as freedom of thought and group discussion when they received with the instruction of experiential learning on science process skills model. They explored, learned and enriched information, knowledge and experience by continuing to learn based on previous knowledge and experience. Thus, the use of the experiential learning on science process skills model is enriched for students’ experiences.

Hands-on experience: Some students gained knowledge and experience from own practical work by learning with real things around the environment. It is because of their active participation in practical work. Then, they reapplied knowledge and experience in their real life. Thus, students’ hands-on experience is a theme to consider for using the experiential learning on science process skills model.

Discussion and Suggestions

Discussion

This study was conducted to investigate the impact of experiential learning on science process skills in teaching secondary school students.

Discussion for Research Question (1)

Pretest and posttest scores were analyzed by using one-way analysis of covariance to examine the students’ entry behavior and basic science process skills. For the observing skill questions, there were significant differences between the experimental group and the control group in school 2. But, there were no significant differences between experimental groups and control groups in school 1, school 3, and school 4. The mean scores of the experimental groups were higher than that of the control groups in school 1, school 3, and school 4. For the inferring skill questions, there were significant differences between experimental groups and control groups in all schools. For the measuring skill questions, there were significant differences between experimental groups and control groups in school 3 and school 4. But, there were no significant differences between experimental groups and control groups in school 1, and school 2. The mean scores of experimental groups were higher than that of control groups in school 1, and school 2.

For the communicating skill questions, there were significant differences between experimental groups and control groups in all schools. For the classifying skill questions, there were significant differences between experimental groups and control groups in school 3 and school 4. But, there were no significant differences between experimental groups and control groups in school 1, and school 2. The mean scores of experimental groups were higher than that of control groups in school 1, and school 2. For the predicting skill questions, there were significant differences between experimental groups and control groups in all schools. Therefore, it can be interpreted that the students who received instruction with experiential learning on science process skills model performed better in basic science process skills test after the intervention.

The findings of the study were in line with the findings of Alkan (2016). He found that experiential learning is a theory that is effective in academic achievement and scientific process skills. According to the data, the experiential learning on science process skills model could improve basic science process skills. Therefore, it supported the research question (1) that there was a significant difference in basic science process skills between secondary school students who received instruction with experiential learning on science process skills model and those who did not receive it.

Discussion for Research Question (2)

Interview questions were used to examine the attitudes of teachers towards using experiential learning on science process skills model. Data from interview questions were analyzed by thematic analysis. The teachers who participated in the interview showed positive attitudes towards using experiential learning on science process skills model. The teachers said that experiential learning on science process skills model improved students' performance and basic science process skills. All the teachers thought that experiential learning on science process skills model made their students active learners since it promoted their students' thinking skills, social skills, and motivation.

Many teachers agreed that the application of experiential learning on science process skills model promoted the new science curriculum since it had a lot of activities that needed the students to do actions, be active, search for information and work with other students. The results of the teachers' interviews found that all teachers who taught in experimental groups had many teaching experiences, and they all agreed that the teaching and learning steps in experiential learning on science process skills model were effective in science teaching. Therefore, it can be interpreted that experiential learning on science process skills model to implement in the classroom was convenient and effective.

This study was consistent with the research findings of the experiential learning method that affected early childhood science process skills at TK Da'arurahma Majalaya Academic Year 2019/ 2020 in the Covid-19 era. This research was carried out by Nafiqoh and Wulansuci in 2020. They found that Covid-19 did not affect the development of the scientific process in early childhood, although learning switches to being carried out online and carried out in the homes of individual students. This did not dampen the enthusiasm of children to carry out volcanic eruption activities. Therefore, it supported the research question (2) that the attitude of all the teachers had positive attitude towards experiential learning on science process skills model.

Discussion for Research Question (3)

Interview questions were used to examine the attitudes of students towards using experiential learning on science process skills model. Data from interview questions were analyzed by thematic analysis. The students who participated in the interview showed positive attitudes towards using experiential learning on science process skills model. The students said that experiential learning on science process skills model improved their performance and basic science process skills. So, it can be interpreted that most of the students accepted the usefulness of applying this model on improving their attitudes.

The result was in line with the study of Wurdinger and Carlson (2010), the data revealed that through experiential learning, students gained confidence in their own abilities, and discovered innovative ways to overcome obstacles. Experiential learning allowed students to experiment and discover solutions on their own. Therefore, it supported the research question (3) that the students who received instruction with experiential learning on science process skills model had positive attitude.

Suggestions

Based on the results of this study, some suggestions for Science teachers are offered.

- The teacher should arouse the students' curiosity regarding with the lesson and allow them to find out what happened.
- The teacher should assess the students' learning throughout the learning process by asking questions, observing their facial expressions and body language, and listening to their concept discussion.
- The teacher should be careful to give enough time to students for making activities, or searching information.
- The teacher should give the students the chance to perform action or search for information dealing with the topic being taught.

Conclusion

The research findings showed that experiential learning on science process skills model could benefit students in learning science. This is because learning with experiential learning on the science process skills model was more supportive of the development of basic science process skills than the formal instruction. According to the results of teachers' interviews, it was observed that teachers had not known or even used it in science teaching. However, after using the experiential learning on science process skills model, the teachers said that they saw the enthusiasm and motivation of students in their involvement in learning, despite the barriers they faced. Therefore, this experiential learning on science process skills model was effective in teaching science.

According to the results of students' interviews, it was found that experiential learning on science process skills model led to changes in students' thoughts about themselves and the learning environment. It was observed that students had good science process skills. As a result, students learn quickly and also retain information well through experiential learning activities. Thus, it can be interpreted that the use of experiential learning on science process skills model enhanced fostering the students' attitudes towards science learning, their interest and their

achievement in science. Therefore, this study showed that students learned by doing that, and being actively participated in learning leads to positive attitudes and increased interest in science learning.

Acknowledgements

First of all, we would like to express our respectful gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee and Dr. Cho Kyi Than (Pro-Rectors, Sagaing University of Education) for their kind permission to do this study. Secondly, we would like to express our honorable thanks to Dr. Khin Zaw (Retired Rector, Yangon University of Education) and Dr. Soe Than (Retired Professor and Head of Department, Department of Curriculum and Methodology, Sagaing University of Education) for their invaluable advices and necessary information for this study. Thirdly, we would like to express our honorable thanks to Dr. Wai Wai Oo (Professor and Head of Department, Department of Curriculum and Methodology, Sagaing University of Education), Dr. Thida Wai (Professor, Department of Curriculum and Methodology, Sagaing University of Education) and Dr. Khaing Khaing Lwin (Professor, Department of Curriculum and Methodology, Sagaing University of Education) for their suggestions throughout the study.

References

- Alkan, F. (2016). Experiential learning: Its effects on achievement and scientific process skills. *Journal of Turkish Science Education*, 13(2), 15-26.
- Carin, A. A., & Sund, R. B. (1989). *Teaching modern science* (5th ed.). London: Merrill Publishing Company.
- Deryakulu, D., Büyüköztürk, Ş., & Özçınar, H. (2010). Predictors of academic achievement of student 1st teachers with different learning styles. *International Journal of Human and Social Sciences*, 3(10), 5-9.
- Harlen, W., & Elstgeest, J. (1992). *UNESCO sourcebook for science in the primary school*. France: UNESCO Publications.
- Khin Zaw, Dr. (2001a). *Advanced educational psychology*. Ph.D. Programme Course Material. Yangon: Yangon University of Education.
- Khin Zaw, Dr. (2001b). *Cybernetic analysis of learning theories*. Ph.D. Programme Course Material. Yangon: Yangon University of Education.
- Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.
- Kolb, A. Y., & Kolb, D. A. (2005). Learning styles and learning spaces: Enhancing experiential learning in higher education. *Academy of Management Learning & Education*, 4(2), 193-212.
- Kolb, A. Y., & Kolb, D. A. (2006). *A review of multidisciplinary application of experiential learning theory in higher education*. Hauppauge, NY: Nova Publishers.
- Mills, G. E., & Gay, L. R. (2016). *Educational research: Competencies for analysis and application* (11th ed.). London: Pearson Education.
- Ministry of Education. (MoE). (2016). *National Education Strategic Plan (NESP), 2016-2021*. Yangon: The Ministry of Education.
- Nafiqoh, H., & Wulansuci, G. (2020). Experiential learning methods to improve young children's science process skills during Covid-19 Pandemic. *Advances in Social Science, Education and Humanities Research*, 538, 14-18.
- National Research Council. (1996). *National science education standards*. Washington, DC: National Academy Press.
- Padilla, M. (1990). *The science process skills: Research matters-to the science teacher*. Retrieved from <http://www.narst.org/publications/research/skill.cfm>
- Punch, K. F. (2009). *Introduction to research methods in education*. London: Sage.
- Rezba, R. J., Sprague, C., McDonnough, J. T., & Matkins, J. J. (2007). *Learning and assessing science process skills*. Iowa: Kendall Hunt Publishing Company.
- Trowbridge, L. W., & Bybee, R. W. (1990). *Becoming a secondary school science teacher* (5th ed.). London: Merrill Publishing Company.
- Victor, E. (1989). *Science for the elementary school* (6th ed.). New York: Macmillan Publishing Company.
- Wurdinger, S., & Carlson, J. (2010). *Teaching for experiential learning: Five approaches that work*. Lanham, MD: Rowman and Little Field Education.

THE EFFECTIVENESS OF PEER TUTORING METHOD IN TEACHING ECONOMICS AT THE UPPER SECONDARY LEVEL

Moe Moe Khaing¹ and Myat Hsu Win²

Abstract

The main purpose of this study was to investigate the effectiveness of peer tutoring method in teaching economics at the upper secondary level. The research design used in this study was a nonequivalent control group design, one of the quasi-experimental designs. In order to do this study, No. (1) Basic Education High School and No. (4) Basic Education High School from Meiktila Township were selected. The participants were (141) Grade Eleven students from the selected schools. Two classes were randomly selected and assigned to the control and experimental groups. Before the treatment, a pretest was administered to both groups. According to the pretest results, the two groups in school were equivalent. Then, the experimental group was exposed to peer tutoring method, while the control group was exposed to formal instruction for two weeks. After the treatment, both groups received a posttest. In order to test the research questions, the independent samples *t* test was used to analyze the differences between the two groups. The findings showed that the students who were taught by peer tutoring method was significantly higher in economics achievement than those who were not. This result proves that the use of peer tutoring method effects on student's economics achievement at the upper secondary level.

Keywords: Teaching, Economics, Peer Tutoring Method, Effectiveness, Achievement

Introduction

Education provides people with knowledge of the world around them. It develops in people a perspective of looking at life. It is the most important element in the evolution of the nation. Without education, one will not explore new ideas. It means one will not be able to develop the world because without ideas there is no creativity and without creativity, there is no development of the nation. Education is a tool that provides people with knowledge, skill, technique, and information, enabling them to know rights and duties toward family, society as well as the nation. Education expands vision and outlook to see the world. It develops the capabilities to fight against injustice, violence, corruption, and many other bad elements in society (Prasad & Gupta, 2020).

Economics enables both leaders and citizens to understand basic economics concepts, principles as well as to understand, appreciate and seek to improve the economic situation for their own social good. The understanding of economics is a prerequisite for good citizenship. The principal objective of teaching economics should be to provide the economics understanding necessary for responsible citizenship. Therefore, the teacher needs to teach economics by using modern teaching methods to attain the objectives of teaching economics.

Teaching methods that consider the interaction between teachers and students have a positive effect on students' learning. The most effective strategy that instructors use to benefit students' learning in the classroom is to encourage them to link their experience in learning in the past to the new knowledge in the present through class discussion and help them come up with new ideas that benefit them in their real-life problem-solving (Akpan & Beard, 2016). Peer

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tutoring is a form of active learning in which learners help each other and learn themselves by teaching (Bombardellia, 2016). Peer tutoring is not a single, undifferentiated educational strategy. It encompasses a broad sweep of activities. Peer tutoring promotes metacognition in which students achieve higher levels of thinking at a quicker rate than they might if they worked independently. Today, to properly encounter the wonderful developments of the third millennium, students should improve their skills of critical and creative thinking so that they can make proper decisions and solve complicated problems in their society (Dehghan, 2013).

Purposes of the Study

The main purpose of the study is to examine the effectiveness of peer tutoring method in teaching economics at the upper secondary school level. The specific objectives of this study are as follows:

- to find out whether peer tutoring method can effect on students' achievement in economics or not
- to investigate the students' economics achievement taught by peer tutoring method
- to provide suggestions for effective economics teaching based on the result of the study

Research Questions

The research questions for the study are as follows:

- Are there any differences between the economics achievement of high school students who received instruction with peer tutoring method and that of those who received formal instruction?
- Are there any differences between the economics achievement of high school students who received instruction with peer tutoring method and that of those who received formal instruction on remembering level?
- Are there any differences between the economics achievement of high school students who received instruction with peer tutoring method and that of those who received formal instruction on understanding level?
- Are there any differences between the economics achievement of high school students who received instruction with peer tutoring method and that of those who received formal instruction on applying level?
- Are there any differences between the economics achievement of high school students who received instruction with peer tutoring method and that of those who received formal instruction on analyzing level?

Scope of the Study

This study is geographically restricted to Meiktila Township in Mandalay Region. The selected schools were No. (1) Basic Education High School, Meiktila, and No. (4) Basic Education High School, Meiktila, in Mandalay Region. Participants in this study are Grade Eleven students from selected schools in the 2023-2024 Academic Year. In this study, the content area is limited to Unit (4), Money and Banking, from the Grade Eleven Economics textbook by peer tutoring method was used in this study.

Definition of Key Terms

The definition of key terms are as follows:

Teaching

Teaching is an interactive process, primarily involving classroom talk which takes place between teacher and pupil and occurs during certain definable activities (Kumar, 2012).

Economics

Economics is the study of how human beings coordinate their wants and desires, given the decision-making mechanisms, social customs, and political realities of society (Backhouse & Medema, 2009).

Peer Tutoring Method

Peer tutoring is defined as an instructional arrangement in which the teacher pairs two students in a tutor-tutee relationship to promote the learning of academic skills or subject content (String, 2009).

Effectiveness

Effectiveness is a measure of the success in achieving a clearly stated objective (McCormick, 1981).

Achievement

Achievement is the outcome of education, the extent to which a student, teacher or institution has achieved the educational goals (Malik & Kumar, 2017).

Review of Related Literature**Theoretical Framework for Peer Tutoring Method**

Learning theories try to explain how students think and what factors determine their behavior and learning. They are conceptual frameworks that describe how information is absorbed, processed, and retained during learning. Therefore, it is important to understand the theoretical framework that peer tutoring method is built upon. Cognitive theories of Piaget and Vygotsky have significantly influenced on peer tutoring method.

Cognitive Developmental Theory

The explicit or implicit aim of much higher education is the development of students' cognitive abilities, and active, co-operative peer learning is no exception to this principle. Jean Piaget saw a progression of cognitive developmental stages as being inevitable, each building on the one which preceded it, and each being a prerequisite for the next. Piaget also believed that the rate of progression from one stage to another varied from person to person, and that progression through the stages involved multiple determinants: maturation, experience and social environmental factors. It was Piaget who stressed the value of cognitive conflict. Piaget argued that, when individuals encounter new information which does not fit into their current mental organization of knowledge and thought (their existing mental schema), a contradiction occurs which causes 'disequilibrium'. This enables learners to 'accommodate' the new information and modify their current understanding of aspects of the world, thus achieving a new 'equilibrium'. In this way, learners construct their own knowledge (Falchikov, 2001).

Vygotsky's Zone of Proximal Development

Vygotsky (1978, as cited in Slavin, 2018) believed that learning takes place most effectively when children are working within their zone of proximal development (ZPD). Tasks within the zone of proximal development are those that a child cannot yet accomplish alone but

could accomplish with the assistance of more competent peers or adults. That is, the zone of proximal development describes tasks that a child has not yet learned but is capable of learning at a given time. Some educators refer to a “teachable moment” when a child or group of children is exactly at the point of readiness for a given concept (Berger, 2012, as cited in Slavin, 2018). Vygotsky further believed that higher mental functioning usually exists in conversation and collaboration among individuals before it exists within the individual (Slavin, 2018). Peer tutoring method is based on Vygotsky’s socio-cultural theory. ZPD is the key concept of socio-cultural theory. Scaffolding and peer tutoring are extensions of Vygotsky’s notion of ZPD.

Peer Tutoring Method

Peer tutoring is a very old practice, traceable back at least as far as the ancient Greeks. Topping (1996) said that early manifestations of peer tutoring involved children acting as replacement teachers whose aim was the transmission of knowledge. In difference, more modern conceptions of peer tutoring involve ‘people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by teaching’. Peer tutoring is characterized by specific role-taking. In other words, someone fulfills the role of a tutor while another or others take the role of the tutee.

Peer tutoring is a system of instruction in which learners help each other and learn by teaching. It is commonly used to describe tutoring that is done between two people who are close in age and at a similar academic level. It consists of students teaching other students, of the same or a different age, on a one-to-one basis, or one tutor working with two or three students simultaneously. These two students can work together to help each other understand difficult concepts while deepening student own knowledge of the subject. Peer tutoring is a flexible, peer-mediated strategy that involves students serving as academic tutors and tutees. Typically, a higher-performing student is paired with a lower-performing student to review critical academic or behavioral concepts (Dash, Baral & Jena, 2015). Being closer in knowledge and status, the tutee in a peer relationship feels freer to express opinions, ask questions, and risk untested solutions. The interaction between instructor and pupil is more balanced and more active when the tutor is a peer (Damon & Phelps, 1989, as cited in Dash, et al., 2015).

The Objectives and Aims of Peer Tutoring Method

Peer tutoring has a variety of objectives. Accordingly, Falchikov (2001) enumerated the followings:

- Promoting critical thinking.
- Improving metacognitive skills.
- Encouraging students to think about their own experiences, analyze their tutoring positions, and assess their performance.
- Incorporating conflict and disagreement into peer tutoring programs to aid learning.
- Empowering learners and give them more autonomy.
- Enhancing learners’ communication abilities.
- Enhancing their writing and literary review abilities.

Therefore, peer tutoring appears to have a favorable influence on learning. Though peer tutoring appears to help all types of students, there is some evidence that low achieving students and those with specific educational needs benefit the most.

Spencer (2006, as cited in Racha, 2012) adds further aims to peer tutoring:

- It's a well-studied approach that works for all ages, grade levels, and topic areas.
- Students can receive one-on-one guidance through the intervention.
- In smaller groups, students have more opportunity to reply.
- It encourages both the tutor and the tutee to grow academically and socially.
- Increased student involvement and time on task.
- Peer tutoring boosts self-esteem and effectiveness.

Techniques of Same-Age Peer Tutoring Method

Simple techniques include the following varieties of simple techniques designed predominantly to aid interaction and development of skills:

- co-operative note-taking pairs;
- peer coaching;
- peer monitoring;
- three-step interview;
- think-pair-share
- flashcard tutoring.

There are various simple techniques aimed at enhancing interaction and skill development. Among these, the chosen techniques for the use of peer tutoring method are three-step-interview and think-pair-share. The lessons covering topics such as the origins of Banks, the functions of Commercial Banks, creation of Credit by the Bank, and techniques of monetary control were taught using the think-pair-share technique. In contrast, the lessons on the origins of Central Banks, types of Banks and the functions of Central Banks were delivered through the three-step interview technique.

Three-step interview

In the three-step interview (Nattiv, Winitzky & Drickey, 1991, as cited in Falchikov, 2001), students interview each other in pairs to learn the opinions and ideas of the other on topics introduced by the teacher. The student then reports their findings back to the group. This technique, which may be familiar to many readers under another name such as 'introduce your partner' (or, indeed, no name at all). This exercise may also be used as an 'ice-breaker'. In three-step interview technique, student pairs take turn interviewing each other and then report what they learn to one another pair. In implementing three-step interview, there some stages that conducted in the teaching. The procedures of three-step interview technique (Barkley, Cross, & Major, 2005, as cited in Candraloka, 2016) are following:

Step 1: Group Formation

- In this step, students are divided into groups, with each group consisting of four students. The teacher organizes these groups, ensuring that there are four students in each group.

Step 2: Topic Assignment and Pair Interviews

- In this step, the teacher assigns a specific topic to each group of students.
- Within each group, students are paired up. These pairs take turns interviewing each other about the assigned topic. This means that each student in a pair act as both the interviewer and interviewee during this stage.

Step 3: Round Robin Sharing

- In the final step, students come together in their original groups, which still consist of four students each.
- Within these groups, the pairs formed in step 2 share what they learned from their interviews. Each pair takes turns sharing their insights with the other pair in the same group. This round-robin sharing allows all students in the group to benefit from the different perspectives and information gathered during the interviews.

Think-pair-share

In this system, pairs of students discuss their individual responses to a question posed by the teacher (or, sometimes, to a question from another student). Sherman (1991, as cited in Falchikov, 2001) attributes the discovery of the think-pair-share technique, but teacher predict that this technique, too, will be very familiar to many readers. Teacher have been using it for a very long time, without the benefit of a name, or the realization that such a common-sense activity might have one. The teacher finds this technique useful in tutorials for building up student confidence, allowing pairs to rehearse an answer by discussing and agreeing it so that a greater proportion of students will participate in class discussion. It is equally useful in large lectures where it may provide time for reflection, and opportunity for pairs of students to compare notes, figuratively and practically.

Millis and Cattell (1998, as cited in Falchikov, 2001) described a variant to think-pair-share, the think-pair square technique. In this variant, pairs work together solving a problem, but share their responses in structured learning teams rather than in the larger class group.

Steps of Think-Pair-Share

The teacher explains the technique to the students before beginning the exercises-describe the purpose, set discussion guidelines and time limits, and model the strategy to ensure that students know what is expected of them.

Step 1: Think

The students begin with a specific question, and give students time to individually think about an answer, and document their responses on their own, either written or in pictures. The students can be given 1-3 minutes for this part of the exercise.

Step 2: Pair

Students now get into pairs. Decide before whether the teacher will assign pairs or let students choose their own partners. Remember when pairing to think of student strengths and their personalities. Ask the students to share what they came up with their partners and discuss. The teacher can provide questions for the students to ask one another. This part of the activity can take at least 5 minutes.

Step 3: Share

For this part, come back together as a class and have a whole class discussion. The teacher can either choose to have one person from each pair share with the class, or the discussion can be more open. Students can also share with the class what their partner said.

Teachers should choose these techniques according to their desired aims. Co-operative note taking might be used when student skills in these areas are deemed inadequate. Peer tutoring

has particular relevance for trainee teachers or for assisting any student improve an oral presentation or performance skills. Peer monitoring, on the other hand, may be used to help students motivate each other and study together. The three-step interview can act as a simple ice-breaker, while think-pair-share is useful in helping students participate in tutorial discussions. Several examples within this category may be familiar to readers. All are uncomplicated and easily applied.

Research Method

In this session, research design, population and sample size, instruments, analysis of the data, and procedure will be presented.

Research Design

In this study, quasi-experimental viz. nonequivalent control group design was used.

Population and Sample Size

In this study, two Basic Education High Schools were selected to carry out the research work. The schools for this study were (71) Grade Eleven students from No. (1) Basic Education High School, Meiktila Township, and (70) Grade Eleven students from No. (4) Basic Education High School, Meiktila Township in Mandalay Region. The population and sample size of each school can be seen in Table 1.

Table 1 Population and Sample Size

Name of Schools	No. of Population	No. of Sample
No. (1) Basic Education High School, Meiktila	71	71
No. (4) Basic Education High School, Meiktila	70	70
Total	141	141

Instruments

The instruments were constructed in accordance with the research design. To conduct this experimental research, (1) a pretest, (2) a posttest was used.

(a) Pretest

The pretest consisted ten True or False items, ten comprehension items, ten multiple-choice items, five definitions, and a short note item, focusing on topics from the Grade Eleven economics textbook. It was allocated a time of one hour and thirty minutes and worth 50 marks. Seven expert educators and two experienced teachers reviewed and validated the test items, leading to modifications based on their feedback. The pretest was then administered to 45 Grade Eleven students at Chiset Basic Education High School in Meiktila. Reliability was assessed using Cronbach's alpha, which yielded a value of 0.761, indicating acceptable reliability for the test.

(b) Posttest

The posttest consisted twenty-seven items related to money and banking, including seven True or False questions, seven comprehension questions, six multiple-choice questions, five definitions, and two short note items. It was developed with guidance from seven expert educators and two experienced teachers. The test was allocated a duration of one hour and thirty

minutes and had a total of 50 marks. The reliability of the posttest was assessed using Cronbach's alpha, which yielded a value of 0.764.

Analysis of the Data

To analyze the data, the computer program: Statistical Package for Social Sciences (SPSS): Version (25), was applied in this study. The pretest was used to see if the groups had the same basic economics knowledge before the treatment. To be able to determine whether there were differences between the experimental group and control group in economics achievement, the posttest scores of the groups were compared by using the independent samples *t* test.

Procedure

For the theoretical formation, relevant data were explored and studied through education journals, books, theses and the resources from internet. After that, the literature review was made. The pretest, posttest, and the lesson plans used for this study were developed. And then, the pilot study was administered with (45) Grade Eleven students from Chiset Basic Education High School, Meiktila township. In order to carry out an experimental study, a nonequivalent control group design was used. This study used quasi-experimental design, so the students to keep existing classrooms intact when it is just not possible to assign individual students, to groups randomly. For this study, the two high schools, No. (1) Basic Education High School, Meiktila and No. (4) Basic Education High School Meiktila were selected. The two intact classrooms in each selected school were selected and one of the classes was assigned as the experimental group to receive the treatment of peer tutoring method.

Research Findings

This part presents the findings obtained according to the purposes of the research. Table 2 show the result of pretest scores in two selected schools.

Table 2 The Results of *t* Test on the Pretest Scores in Two Selected Schools

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
S 1	Experimental	35	38.34	2.10	0.17	0.306	69	.760
	Control	36	38.17	2.69				(ns)
S 2	Experimental	36	38.42	1.08	0.21	0.906	68	.368
	Control	34	38.21	0.85				(ns)

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila; ns = not statistically significant.

In school 1, the mean of the experimental group was 38.34 and the control group was 38.17. According to the results of S 1, $t(69) = 0.306$ and $p = 0.760$, there was no significant difference between the experimental and control groups on basic economics knowledge before the treatment period. In school 2, the mean of the experimental group was 38.42 and the control group was 38.21. According to the results of S 2, $t(68) = 0.906$ and $p = 0.368$, there was no significant difference between the experimental and control groups on basic economics knowledge before the treatment period. According to the results, it can be interpreted that in the two groups from each school all the students were not different in the pretest scores. The comparison of the mean between the two groups on the pretest is shown in Figure 1.

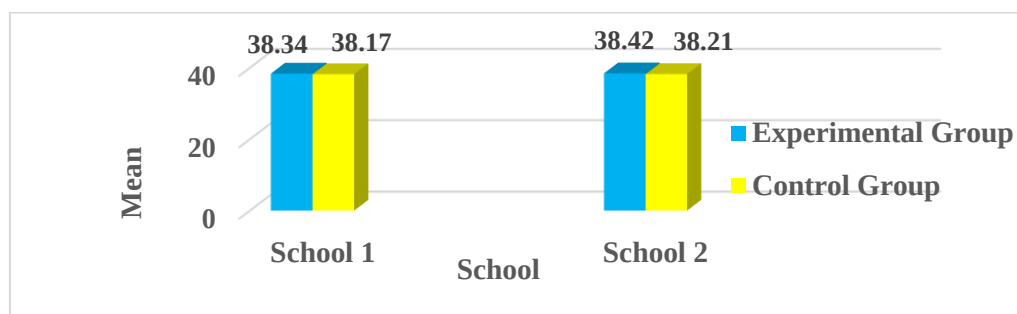


Figure 1. The comparison of mean for students' economics achievement on the pretest in the selected schools.

It can be interpreted that all students had the same level of basic economics knowledge in both groups. Table 3 shows that the result of posttest scores in two selected schools.

Table 3 *The Results of t Test on the Posttest Scores in Two Selected Schools*

School	Group	n	M	SD	MD	t	df	Sig (2-tailed)
S 1	Experimental	35	35.49	5.97	13.71	9.093	69	.000***
	Control	36	21.78	6.70				
S 2	Experimental	36	36.00	4.05	13.00	11.797	68	.000***
	Control	34	23.00	5.14				

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila.

*** $p < .001$.

In school 1, the mean of the experimental group was 35.49 and the control group was 21.78. According to the results of S 1, $t(69) = 9.093$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on posttest scores on economics achievement. In school 2, the mean of the experimental group was 36.00 and the control group was 23.00. According to the results of S 2, $t(68) = 11.797$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on posttest scores on economics achievement. The two groups from the selected schools showed different posttest scores, with experimental groups using peer tutoring having higher mean scores than control groups taught through formal instruction. This indicates a statistically significant difference in economics achievement, suggesting that peer tutoring method positively impacted economics teaching at the upper secondary level. The mean comparison of posttest scores is shown in Figure 2.

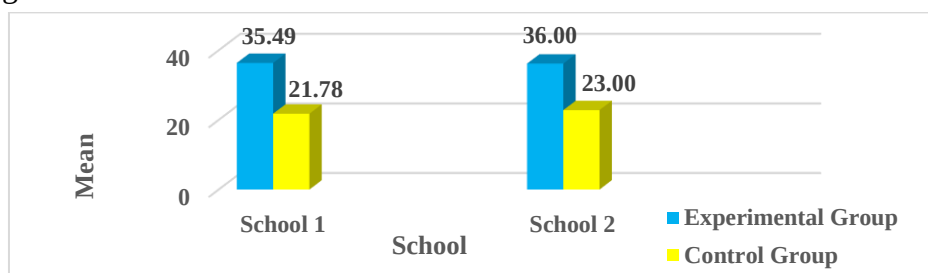


Figure 2. The comparison of mean on the posttest for students' economics achievement in the selected schools.

Table 4 shows that the result of remembering level questions in two selected schools.

Table 4 The Results of *t* Test on Remembering Level Questions in Two Selected Schools

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
S 1	Experimental	35	15.37	1.72	1.84	4.281	69	.000***
	Control	36	13.53	1.91				
S 2	Experimental	36	15.61	0.84	2.76	6.582	68	.000***
	Control	34	12.85	2.36				

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila.

*** $p < .001$.

In school 1, the mean of the experimental group was 15.37 and the control group was 13.53. According to the results of S 1, $t(69) = 4.281$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on posttest scores on economics achievement. In school 2, the mean of the experimental group was 15.61 and the control group was 12.85. According to the results of S 2, $t(68) = 6.582$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on remembering level questions in economics achievement. It can be interpreted that the students who were taught by using the peer tutoring method performed better on remembering level questions in economics achievement than the students who were taught by using formal instruction. The comparison of the mean for remembering level questions from each school is also presented in Figure 3.

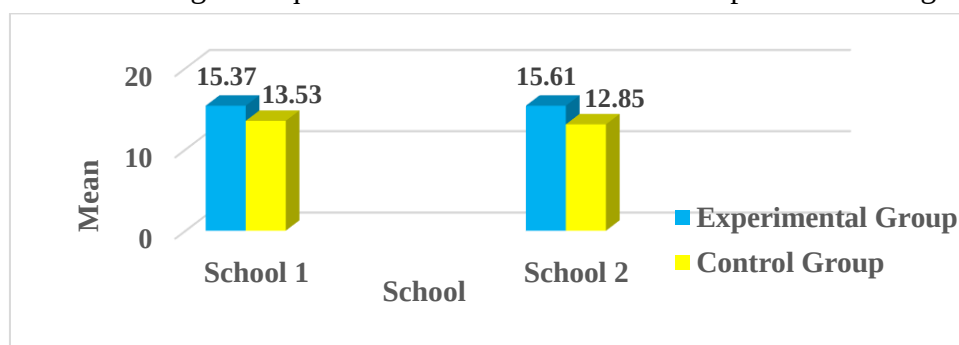


Figure 3. The comparison of mean on remembering level questions for students' economics achievement in selected schools.

Table 5 shows that the result of understanding level questions in two selected schools.

Table 5 The Results of *t* Test on Understanding Level Questions in Two Selected Schools

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
S 1	Experimental	35	8.51	1.40	1.82	2.520	69	.014*
	Control	36	6.69	4.04				
S 2	Experimental	36	8.36	1.46	2.83	6.191	68	.000***
	Control	34	5.53	2.30				

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila.

* $p < .05$, *** $p < .001$.

In school 1, the mean of the experimental group was 8.51 and the control group was 6.69. According to the results of S 1, $t(69) = 2.520$ and $p = .014$, there was a statistically significant

difference between the experimental and control groups on posttest scores on economics achievement. In school 2, the mean of the experimental group was 8.36 and the control group was 5.53. According to the results of S 2, $t(68) = 6.191$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on understanding level questions in economics achievement. It can be interpreted that the students who were taught by using the peer tutoring method performed better on understanding level questions in economics achievement than the students who were taught by using formal instruction. The comparison of the mean for understanding level questions from each school is also presented in Figure 4.

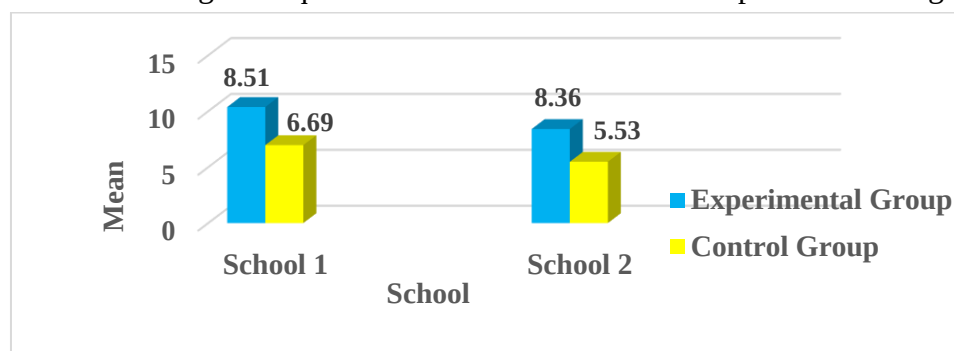


Figure 4. The comparison of mean on understanding level questions for students' economics achievement in selected schools.

Table 6 shows that the results of applying level questions in two selected schools.

Table 6 The Results of *t* Test on Applying Level Questions in Two Selected Schools

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig (2-tailed)</i>
S 1	Experimental	35	6.83	3.85	6.22	9.620	69	.000***
	Control	36	0.61	0.49				
S 2	Experimental	36	8.19	3.02	5.45	21.446	68	.000***
	Control	34	2.74	2.19				

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila.

*** $p < .001$.

In school 1, the mean of the experimental group was 6.83 and the control group was 0.61. According to the results of S 1, $t(69) = 9.620$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on posttest scores on economics achievement. In school 2, the mean of the experimental group was 8.19 and the control group was 2.74. According to the results of S 2, $t(68) = 21.446$ and $p = .000$, there was a statistically significant difference between the experimental and control groups on applying level questions in economics achievement. From the above results, it can be interpreted that the students who were taught by using the peer tutoring method performed better on applying level questions in economics achievement than the students who were taught by using formal instruction. The comparison of the mean for the applying level questions are also presented in Figure 5.

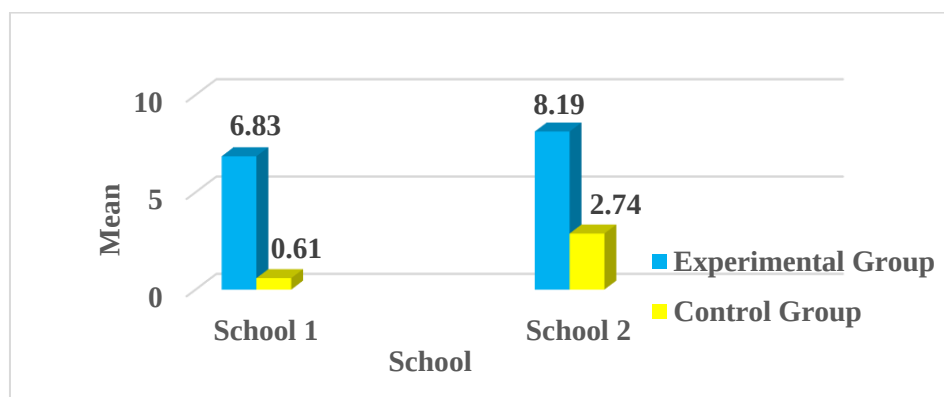


Figure 5. The comparison of mean on applying level questions for students' economics achievement in selected schools.

Table 7 shows that the result of analyzing questions in two selected schools.

Table 7 The Results of *t* Test on Analyzing Level Questions in Two Selected Schools

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
S 1	Experimental	35	3.94	2.77				
	Control	36	0.53	1.38	3.41	6.610	69	.000***
S 2	Experimental	36	4.06	2.93				
	Control	34	1.85	1.94	2.21	3.688	68	.000***

Note. S 1 = No. (1) Basic Education High School, Meiktila; S 2 = No. (4) Basic Education High School, Meiktila.

*** $p < .001$

In school 1 the mean of the experimental group was 3.94 and the control group was 0.53. According to the results of S 1, $t(69) = 6.610$, and $p = .000$, there was a statistically significant difference between the experimental and control groups on posttest scores on economics achievement. In school 2, the mean of the experimental group was 4.06 and the control group was 1.85. According to the results of S 2, $t(68) = 3.688$, and $p = .000$, there was a statistically significant difference between the experimental and control groups on analyzing level questions in economics achievement. It can be interpreted that the students who were taught by using the peer tutoring method performed better on analyzing level questions in economics achievement than the students who were taught by using formal instruction. The comparison of the mean for analyzing level questions are also presented in Figure 6.

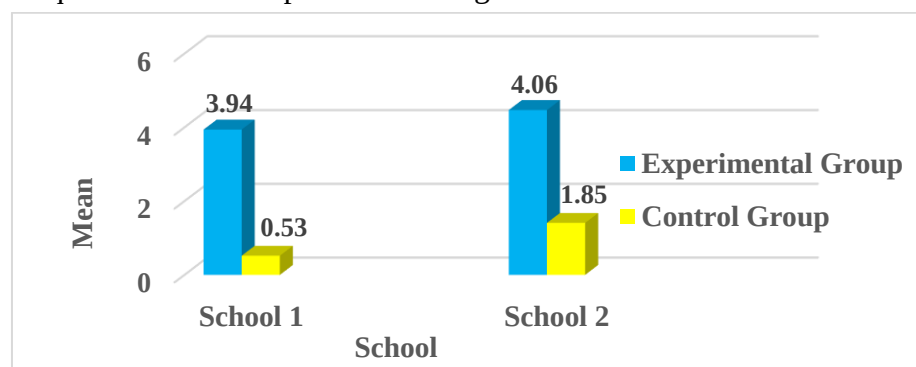


Figure 6. The comparison of mean on analyzing level questions for students' economics achievement in selected schools.

Discussion

Firstly, the mean scores of the experimental groups were significantly higher than those of the control groups in both schools. It indicated that there were statistically significant differences between the control and experimental groups on all posttest economics achievement scores. It can be interpreted that the use of peer tutoring method has a significant effect on the economics achievement of the students from each school.

Secondly, the results indicated that the mean scores on remembering level questions for the experimental group were statistically significantly higher than the scores for the control group in selected schools. The results showed that there were statistically significant differences between the control group and experimental group for scores on remembering level. It can be interpreted that the peer tutoring method could bring about the improvement of students' abilities to recall the concept of learning materials.

Thirdly, the results indicated that mean scores on the understanding level questions for the experimental group were statistically significantly higher than the scores for the control group in selected schools. The results showed that there were statistically significant differences between the control group and experimental group for scores on understanding level. Thus, the findings proved that peer tutoring method could bring about the improvement of students' ability to hold the meaning of learning materials by describing, discussing, comparing, and explaining.

Fourthly, the results indicated the mean scores on the applying level questions for the experimental group were statistically significantly higher than the scores for the control group in the selected school. The results showed that there were statistically significant differences between the control group and experimental group for scores on the applying level. As a result, students can utilize information in innovative ways by calculating, solving, and preparing.

Finally, the results indicated the mean scores on the analyzing level questions for the experimental group were statistically significantly higher than the scores for the control group in the selected school. The results showed that there were statistically significant differences between the control group and experimental group for scores on the analyzing level. Based on the results, students can distinguish parts, their relationships, and overall structure by comparing, separating, and organizing.

Based on the above outcomes and results, peer tutoring method can be used for effective teaching and learning. Peer tutoring method provides the opportunity to the students to interact directly with each other which is helpful in promoting learning activities among the students. According to the findings of this study, it can be concluded that using peer tutoring method was more effective than the formal instruction to helping students achieve better achievement in teaching economics. Thus, peer tutoring method can improve students' economics achievements at the upper secondary level.

Suggestions

Based on the findings of the research, the following recommendations are suggested for further studies.

- As peer tutoring method is an effective method to teach economics, it is suggested that further studies should focus on the teaching of other subjects.

- Since the size of the sample is small, this result may not be generalized to a larger population. Thus, similar research should be carried out in many schools from other Townships and other Regions.
- Due to time limitation, the treatment time is short. Therefore, period for the intervention and the content to be learned should be extended for further studies.
- Further research should be conducted to study the teacher's attitudes concern with using peer tutoring method.
- In this study, think-pair-share and three-step-interview techniques were used. The remaining techniques (such as co-operative note-taking pairs, peer coaching, peer monitoring and flashcard tutoring) should be used in further research.
- Further researches should investigate the action research using the various types of assessments (peer assessment and peer feedback) to promote the 21st century skills of the students who are taught by peer tutoring method.

Conclusion

To sum up, peer tutoring method is an effective method for students to learn from one another. It benefits the students not only academically, but also helps them to develop their communication and interpersonal skills. Peer tutoring method enhances the confidence of the students and motivates them to become self-sufficient. This two-way process is equally advantageous for both the tutors and the learners. Organized peer tutoring method is more effective and beneficial than unorganized peer tutoring activities. Therefore, it can be concluded that using peer tutoring method has positive effects on teaching economics at the upper secondary level.

Acknowledgements

First of all, our profound thanks go to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) who allowed us to do this study. We would like to express our deep and sincere gratitude to Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Sagaing University of Education), and to external examiner, Dr. Su Mon Aung (Lecturer, Department of Curriculum and Methodology, Yangon University of Education), for their excellent supports, enthusiastic guidance, insightful assessment, invaluable suggestions, expertise and extensive discussions to accomplish our research successfully.

References

- Akpan, J. P., & Beard, L. A. (2016). Using constructivist teaching strategies to enhance academic outcomes of students with special needs. *Universal Journal of Educational Research*, 14(2), 54-56.
- Backhouse, R. E. & Medema, S. G. (2009). Retrospectives on the definition of economics. *Journal of Economic Perspectives*, 23(1), 221-233.
- Bombardellia, O. (2016). *Effective teaching practice: Peer tutoring in education for active citizenship*. Trento: Trento University Press.
- Candraloka, O. R. (2016). Implementing three-step interview in teaching speaking. *Journal Eduligua*, 3(1), 1-8.
- Dash, B., Baral, S., & Jena, S. (2015). Peer tutoring: Theoretical foundation and benefits. *Online International Interdisciplinary Research Journal*, 5(1), 165-185.
- Dehghan, S. (2013). The effect of the using the brainstorming method on the academic achievement of students in grade five in Tehran elementary schools. *Journal of Social and Behavioral Science*, 83(13), 230-223.
- Falchikov, N. (2001). *Learning together: Peer tutoring in higher education*. New York: Routledge Falmer.
- Kumar, T. P. (2012). *Advanced methods of teaching*. Bengaluru: Himalaya Publishing House.

- Malik, U., & Kumar, R. (2017). A study on academic achievement of sr. sec. school students in relation to internet addiction. *International Journal of Research in Humanities*, 5(12), 203-208.
- Mccormick, J. S. (1981). Effectiveness and efficiency. *Journal of the Royal College of General Practitioners*, 31(1), 299-302.
- Prasad, C., & Gupta, P. (2020). Educational impact on the society. *International Journal of Novel research in Education and Learning*, 7(6), 1-7.
- Racha, B. (2012). Peer tutoring as a teaching strategy to increase peer interaction in EFL mixed ability classes. (Unpublished master's thesis). Mohammed KHEIDEP University of Biskra. Retrieved from <http://archives.univ.biskra.dz/bitstream/>
- Slavin, R. E. (2018). *Educational psychology: Theory and practice* (12th ed.). New York: Pearson Education, Inc.
- String, L. (2009). *The effect of peer tutoring model on student achievement for general education students and students receiving special education services*. Retrieved from https://mdsoar.org/bitstream/handle/11603/2846/actionres_String_paper
- Topping, K. J. (1996). *The effectiveness of peer tutoring in further and higher education: A typology and review of the literature*. Heidelberg: Springer.

THE EFFECTIVENESS OF ACTIVITY-BASED LEARNING ON STUDENTS' MATHEMATICS ACHIEVEMENT AT THE LOWER SECONDARY LEVEL

Shwe Eain Si¹ and Khaing Khaing Lwin²

Abstract

This study is undertaken to determine the effectiveness of activity-based learning on students' mathematics achievement at the lower secondary level. A quantitative research method was used to compare the students' mathematics achievement between the experimental and control groups. The design of the study was one of the true experimental designs, posttest only control group. The students from the experimental group were taught by using activity-based learning. The students from the control group were taught by using formal instruction. Two sample schools, BEHS (2) and BEHS (3) were selected by simple random sampling method. The findings of the study showed that students who were taught by using activity-based learning achieved significantly higher in the posttest than those who were not. The study proved the significant effect of activity-based learning.

Keywords: Effectiveness, Activity-Based Learning, Mathematics, Achievement, Mathematics Achievement

Introduction

Education plays a vital role in determining the quality of its human resources. The education sector provides a skilled workforce for people in the country. The advancement of a nation depends upon its quality of education. Education is the complete development of the individual of the child so that it can make an original contribution to human life according to the best of his capacity. It is the development of an individual according to his needs and demands of society, of which he is an integral part.

Mathematics is an essential subject. Therefore, to impart and transmit knowledge, it is necessary to understand what mathematics is and what its nature is. Mathematics can be defined in many different ways. It is an exact science that is related to measuring, calculating, discovering relationships, and dealing with the problems of space (Zubair, 2012).

Mathematics is a systematic, organized, and exact branch of science. It has its language and characteristics. It is called ritual and calculation as part of human life and knowledge. It is the science of logical reasoning and numerical problems. Therefore, the process of mathematics teaching and learning is an integral part of people's lives (Sidhu, 1995).

Purpose of the Study

The main purpose of this study is to examine the effectiveness of activity-based learning on students' mathematics achievement at the lower secondary level.

The specific objectives of this study are -

1. to investigate the mathematics achievement between the students who are taught with activity-based learning and those who are not.
2. to make suggestions and recommendations based on the result of the study about activity-based learning.

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Research Questions

The research questions of this study are as follows.

1. What are the differences in the overall posttest mathematics achievement between students who are taught by activity-based learning and those who are not?
2. What are the differences in mathematics achievement between students who are taught by activity-based learning and those who are not taught to answer knowledge level questions and application level questions?
3. How does mathematics achievement differ between students who are taught by activity-based learning and those who are not taught to answer comprehension level questions and analysis level questions?

Scope of the Study

The following points are the scope of the research study.

1. Participants in this research are Grade Seven Students from the selected schools: No (2) Basic Education High School and No (3) Basic Education High School in Pinyinmana District, Nay pyi Taw Union Territory.

Definitions of Key Terms

The definitions of key terms are as follows.

Effectiveness

Effectiveness is the capability of producing an effect and is most frequently applied in connection with the degree to which something is capable of producing a specific, desired effect (Eslami, 2011).

Activity-Based Learning

Activity-based learning is a process whereby learners are actively engaged in the learning process, rather than “passively” absorbing lectures, it is based on the core premise that learning should be based on doing some hands-on experiments and activities. It involves reading, writing, discussion, practical activities, engagement in solving problems, analysis, synthesis, and evaluation (Festus, 2013).

Mathematics

Mathematics is a way to settle into the mind of children’s habit of reasoning (Locke, 1975, as cited in Zubair, 2012).

Achievement

Achievement means an accomplishment or proficiency of performance in a given skill body or knowledge (Sasikala, 2012).

Mathematics Achievement

Mathematics Achievement is the competency shown by the student in the subject of mathematics its measure is the score on an achievement test in mathematics (Mangal, 2008).

Review of Related Literature

Theoretical Foundation of Activity-Based Learning

Learning theories attempt to explain how students think and what factors determine their behavior and learning. Learning theories are the basic raw materials, which are applied in the

teaching-learning process. So, it is important to understand the theoretical framework that active learning techniques are built upon.

In the constructivist theory, learning occurs when students become engaged in an activity that utilizes the content and skill they are learning. Any new information introduced during the activity that is consistent with current knowledge and understanding is either rejected as being wrong or is built into new knowledge. New knowledge is constructed when students combine new information with existing knowledge through the process of reflection (Adams & Burns, 1999).

Activity-based learning theory is a cognitive learning theory that is considered a “constructivist” learning theory. Students are active learners who should be given opportunities to “construct” their frames of thought. In learning activities, students are free to infer and discover their answers to important questions. Also, the student actively seeks new information and is actively engaged in the process in the way student gains, assimilates and utilizes knowledge.

Activity-Based Learning

Activity-based learning methods are based on the active engagement of learners in the learning process to acquire skills, knowledge, and attitudes. Activity-based learning practices aim to facilitate learning for the students. Activity-based learning can be a very efficient strategy to help students acquire a better grasp of the knowledge that is important to the class. Activity-based learning approach refers to the learning process where students mentally and physically explore the subject’s content by forming identical situation of the work environment and handling the tools and materials that are similar to the world of work. This learning technique includes activities that enhance knowledge, skill, and attitude. Also, it will help to develop students’ notions about the real world (Ravi & Xaviera, 2007).

Activity-based learning is also defined as any strategy “that involves students in doing things and thinking about the things they are doing”. Active learning is defined as a method where the teacher is only a facilitator and the learner is at the center of the learning process by their high involvement in practical activities and discussion.

Different Types of Activity-Based Learning

Activity-based learning is achieved broadly in three ways, namely, exploration, experimentation, and expression. There’s a wide range of activities that can be employed with activity-based learning (David Horsburgh, 1994, as cited in Festus, 2013).

Dramatization: An event, a story, or a novel is reconstructed into a dramatic presentation.

Quizzes: A competitive activity in which participants should give the answers to the questions in a prescribed period following some pre-determined rules.

Group discussions: Groups are formed and students discuss a given topic and reach a decision or arrive at some conclusions.

Role play: Students enact some situations or play the roles of characters

Educational games: Games are designed to help students learn a skill, enhance their understanding of concepts, and learns about certain subjects.

Brainstorming: Students produce a heap of ideas on a particular theme or a problem with no commenting on anyone’s points of view.

Problem-solving: a process of finding the solution to the problem by using one or more concepts or principles or formulae or required information.

Debates: Discussion involving arguments between two groups in which one group argues to defend the controversial issue or theme and the other group puts up the arguments against the theme.

Fieldwork: Students experience real-life situations, collect relevant data, process and analyze the data, and arrive at conclusions.

Discovery learning: Students learn by exploring or discovering many aspects of the environment in their way.

Projects: Projects are aimed at achieving one or more definite goals of understanding. They involve investigating and finding solutions, planning, and carrying out to completion by students.

Concept mapping: It is a process of representation of the concepts or different things in a hierarchical fashion with the most inclusive, general concepts at the top and less general concepts at the bottom in a pictorial form.

Among the different types of activity-based learning, group discussion, brainstorming and problem-solving will be used.

Group Discussion

Group discussion may be defined as a form of a systematic and purposeful oral process characterized by the formal and structured exchange of views on a particular topic, issue, problem, or situation for developing information and understanding essential for decision-making or problem-solving (Hamann, Pollock & Wilson, 2012).

Steps in Using Discussion

To do this, several steps must be taken when conducting group discussions (Brewer, 1997).

Step 1. Introduction; The introduction should have four parts.

- i. Instructional Objective.
- ii. Purpose.
- iii. Relationship and
- iv. Advanced Organizer.

Step 2. Directing the Discussion and

Step 3. Summarizing the Discussion

Brainstorming

A structured approach to thinking helps a group of people utilize their collective brain power to generate new ideas (HarirForoush & Sadeghi, 2010, as cited in Rizi, Najafipour, Haghani & Dehghan, 2013).

Alrubai (2014) suggested that the brainstorming procedures for learning and teaching consist several of steps;

1. Dividing the class into the brainstorming groups,
2. Identifying the problem and time limit,
3. Generating of ideas,
4. Evaluating the ideas,

5. Selectiong of an idea, and
6. Implementating.

Problem-Solving Method

Problem-Solving is a set of events in which human being was rule to achieve some goals (Gagne, 1985, as cited in Zubair, 2012).

Problem-Solving is a planned attack upon a difficulty or perplexity for the purpose to find a satisfactory solution (Rick T M, 1985, as cited in Zubair, 2012).

Problem-Solving involves concept formation and discovery learning (Ausubel, 1918, as cited in Zubair, 2012).

Steps in Problem-Solving

The steps of problem-solving are given below.

1. Identifying and Defining the Problem
2. Analyzing the Problem
3. Formulating Tentative Hypothesis
4. Testing the Hypothesis and
5. Verification of the Result (Zubair, 2012).

Research Method

Research Design

In this study, one of the true experimental designs; posttest-only control group design was used.

Population and Sample Size

The required sample schools were selected by using a simple random sampling method. The sample schools were No (2) Basic Education High School (BEHS) and No (3) Basic Education High School BEHS. At No (2) Basic Education High School, only (29) students were selected by random sampling method from the population of (58) Grade Seven students in the academic year 2023-2024. In the same way, only (30) students were selected from the population of (60) Grade Seven students at BEHS, No (3), Pyinmana District.

Instruments

The instruments used for this study were a prerequisite test and a posttest. This test was constructed based on Grade Seven Mathematics Textbook Chapter (1) to (5) from Mathematics Textbook Volume (I) and Chapter (1) to (4) from Mathematics Textbook Volume (II). There were (25) multiple- choice items in the test and the total score of the test was 25 marks. The posttest was constructed to measure the mathematics achievement of the students. The posttest consisted of three sections. There were (10) multiple-choice items in section (A), three short questions in section (B) and two long questions in section (C). The allocated time for this test was 1:00 hour and the given marks are 50.

Learning Materials Used in the Study

Learning materials included lesson plans, Variety of teaching learning aids, and textbook and teacher's guide.

Analysis of the Data

To determine if the groups were essentially the same before the treatment, the prerequisite test was used. Be able to determine if there was a significant difference between the experimental and control groups, the posttest scores of the two groups were compared using an independent samples *t* test. For the analysis of data obtained in the study, (Statistical Package for the Social Sciences) SPSS version 20 was used.

Procedure

In this study, a true experimental design will be used. Experimental group was provided treatment by using activity-based learning for two weeks. At the same time, the control group was provided treatment by using formal instruction to the same content for the same periods. The allocated time for this posttest is 1:00 hour and the given marks are 50 marks.

Research Findings

The main purpose of this study is to investigate the mathematics achievement between the students who are taught by activity-based learning and those who are taught by formal instruction. The findings of the study in each selected school are presented as follows.

Findings on Prerequisite Test

The prerequisite test was administered to both groups before the treatment was given. The data from the prerequisite test were carefully recorded and analyzed to compare the difference between the experimental groups and the control groups. The results of *t* test, the mean, standard deviations, and mean differences of both groups were presented as follows.

Table 1 Results of *t* values for Prerequisite Test Scores

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS (2)	Experimental	29	20.55	3.32	1.93	1.54	56	.12(ns)
	Control	29	18.62	5.87				
BEHS (3)	Experimental	30	19.27	6.18	1.14	0.68	58	.49(ns)
	Control	30	18.13	6.64				

Note. BEHS (2) = No (2) Basic Education High School, Pyinmana; BEHS (3) = No (3) Basic Education High School, Pyinmana.

ns = not statistically significant.

According to the *t* value for prerequisite test of BEHS (2) and BEHS (3) $t(56) = 1.54$, $p = .12$ (ns) and $t(58) = 0.68$, $p = .49$ (ns), it showed that there was no significant difference between the experimental groups and the control groups for the scores on the prerequisite test in each school.

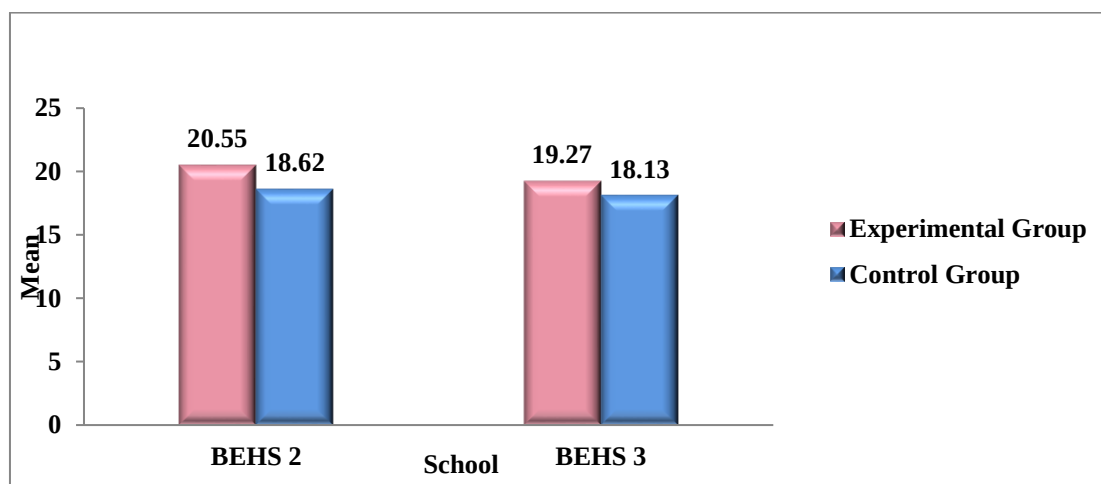


Figure 1 Comparison of prerequisite means for pretest.

As shown in Figure 1, the prior knowledge of the experimental groups and the control groups were equivalent.

Findings of Posttest on Mathematics Achievement

After administering the prerequisite test, the students from the experimental group were taught by using activity-based learning and the students from the control group were taught by using formal instruction. At the end of the treatment period, posttest was administered to measure the mathematics achievement of students. The posttest score data was recorded systematically. The results for posttest mathematics achievement are presented in Table 2.

Table 2 Results of *t* values for Overall Posttest Mathematics Achievement

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS (2)	Experimental	29	29.03	7.20	10.96	5.49	56	.000***
	Control	29	18.07	7.97				
BEHS (3)	Experimental	30	27.13	7.54	7.03	4.52	58	.000***
	Control	30	20.10	3.96				

Note. BEHS (2) = No (2) Basic Education High School, Pyinmana; BEHS (3) = No (3) Basic Education High School, Pyinmana.

*** $p < .001$.

Results showed that the mean of the experimental groups was significantly higher than that of the control groups in each selected school (see Table 2). According to the *t* values for overall posttest mathematics achievement of BEHS (2) and BEHS (3) $t(56) = 5.49$, $p < .001$ and $t(58) = 4.52$, $p < .001$, it showed that there was a significant difference between the experimental group and the control group for the scores on the mathematics achievement in each selected school. Comparison of overall means for posttest is described in Figure 2.

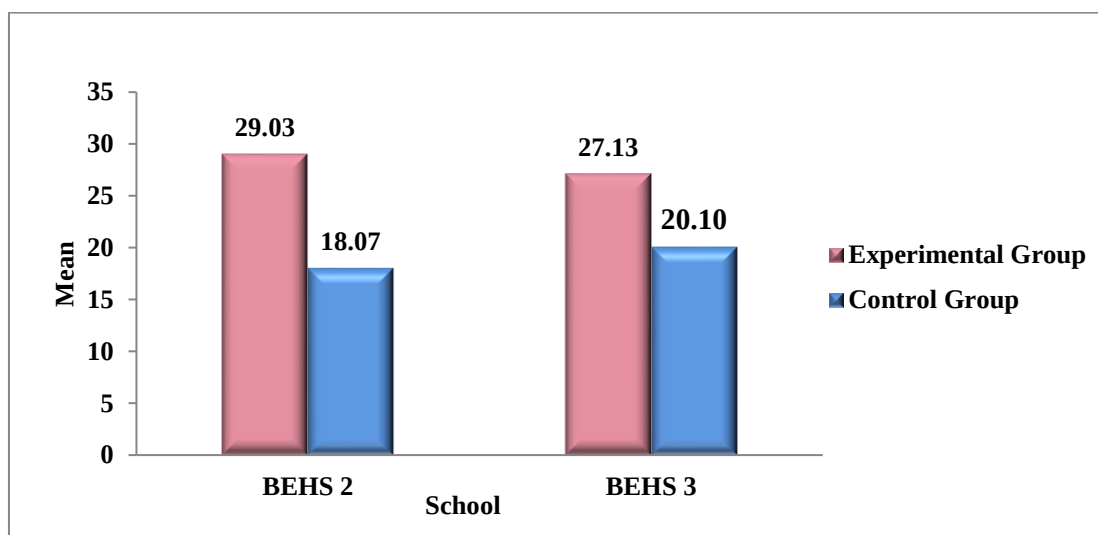


Figure 2 Comparison of overall means for posttest.

It can be interpreted that teaching by Activity-Based Learning, has significant effects on the mathematics achievement of the students. Therefore, teaching by ABL positively contributed to mathematics teaching at the lower secondary level to develop students' problem-solving skills, logical and critical thinking skills, creativity and reflection, self-directed learning, and higher-order thinking. Besides, the mathematics achievement for each cognitive level was analyzed. The questions were analyzed such as knowledge level questions, comprehension level questions, application level questions, and analysis level questions. To measure significant differences in mathematics achievement between the experimental group and the control group in performing knowledge level questions, an independent samples *t* test was used.

Discussion

No (2) BEHS and No (3) BEHS, the overall mathematics achievement of the experimental group was higher than that of the control group. It can be interpreted that teaching by ABL has significant effects on the mathematics achievement of the students. Thus, teaching by Activity-Based Learning positively contributed to mathematics teaching at the lower secondary level. This result was collaborated by Suydan, Marilyn, and Higgins (1997, as cited in Khan, et al., 2012), stated that ABL in teaching mathematics is more effective than formal instruction of teaching. According to the results, it is obvious that the use of ABL methods can improve students' engagement in teaching learning process, the recall and retention of knowledge, and critical thinking. The teacher has to closely relate the content of his subject to the basic needs and lives of his students. Therefore, mathematics teachers should use ABL in teaching mathematics to develop students' problem-solving skills, logical and critical thinking skills, students' creativity and reflection, advance self-directed learning, and higher-order thinking skills.

Suggestions

According to the results of the study, time was an issue. Activity-based learning took up more time than formal instruction. To get a wide range of mathematical concepts and processes, mathematics teachers should successfully implement activity-based learning in the classroom. The teacher should provide opportunities for their students to participate actively in teaching

teaching-learning process. The principals and administrators must support the mathematics teachers to implement activity-based learning in the classroom. Mathematics teachers should assess student understanding in more meaningful ways and try to increase and update activity-based learning. Students should be critical thinkers, presenters, accommodations, and active learners.

Conclusion

In Myanmar's formal school system, the teaching-learning process in the classroom should undergo a major reform. The teaching-learning conditions should be student-centered in the classroom. The teacher is not only a transmitter of knowledge but also an organizer of knowledge. The teacher should facilitate, guide, and provide for students to learn themselves. For this situation, activity-based learning is a suitable and effective approach. ABL encourages problem-solving skills, critical thinking skills, and creativity students' creativity and reflection, and advances self-directed learning, and higher-order thinking skills. Activity-Based Learning should be frequently used in the mathematics classroom to improve students' mathematics achievement. It can be concluded that ABL had positively contributed to the improvement of mathematics achievement at the lower secondary level.

Acknowledgments

We would like to express our deepest gratitude to Dr. Myat Myat Thaw, Rector, Sagaing University of Education, Dr. Khin Hnin Yee, Pro-rector, Sagaing University of Education, and Dr. Cho Kyi Than, Pro-rector, Sagaing University of Education for their permission to conduct the study. Special gratitude goes to the respectable teacher, Dr. Wai Wai Oo, Professor and Head of Department of Curriculum and Methodology, Sagaing University of Education for her valuable guidance and advice for this paper.

References

- Brewer, E. W. (1997). *Proven ways to get your message across: The essential reference for teachers, trainers, presenters, and speakers*. California: Corwin Press, Inc.
- Festus, A. B. (2013). Activity-based learning strategies in the mathematics classrooms. *Journal of Education and Practice*, 13(4), 8-14.
- Gay, L. R., & Airasian, P. (2003). *Education research, competencies for analysis and application* (7th ed.). New Jersey: Pearson Education.
- Khan, M., Muhammad, N., Ahmed, M., Saeed, F., & Khan, S. A. (2012). Impact of activity-based teaching on students' academic achievements in physics at secondary level. *Academic Research International Journal*, 3(1), 146-156.
- Mishra, L. (2009). *Teaching of mathematics*. New Delhi: A. P. H Publishing Corporation .
- Ravi, R., & Xaviera, P. (2007). Activity-based learning as self-accessing strategy to promote learners' autonomy. *I – manager's Journal on Educational Psychology*, 1(2), 7-9.
- Eslami, N. (2011). Promoting innovation in enterprises through human resources management practices. *Australian Journal of basic and applied sciences*, 2(1), 18-25.
- Sasikala, V. (2012). *Influence of study skill and academic achievement of BED teacher trainees*. Retrieved from <https://www.ijssrp.org/research/paper-112/ijssrp-p11101.pdf>
- Sidhu, K. S. (1995). *Teaching of mathematics*. New Delhi: Sterling Publishers Pvt.ltd.
- Zubair, P. P. (2012). *Teaching of mathematics*. New Delhi: APH Publishing Corporation.

THE EFFECTIVENESS OF HEURISTIC METHOD ON STUDENTS' MATHEMATICS ACHIEVEMENT AT THE LOWER SECONDARY LEVEL

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Abstract

The major purpose of this study is to investigate the effectiveness of heuristic method on students' mathematics achievement at the lower secondary level. Quantitatively, an experimental study was used to compare the mathematics achievements of the students between the control and experimental groups. The students from the experimental group were taught by heuristic method. The students from the control group were taught by formal teaching method. One of the true-experimental designs, namely, the posttest only control group design was used. In this experimental study, the participants were (120) Grade Seven students from two schools: Basic Education High School, Sintgaing and Basic Education High School, Hingu. Learning materials were selected from Grade Seven Mathematics Textbook. It contained Chapter (5) Algebraic Equations from Mathematics Textbook Volume I and Chapter (4) Symmetry from Mathematics Textbook Volume II. Independent samples *t* test was used to compare the differences between the two groups. Research findings revealed that teaching by heuristic method had a positive contribution to the improvement of mathematics teaching. It was interpreted that teaching by heuristic method was effective in raising students' mathematics achievement at the lower secondary level.

Keywords: heuristic method, mathematics, achievement, mathematic achievement lower secondary level

Introduction

Education is a tool that helps the formation and development of beliefs, knowledge, wisdom and thought. It can be certainly said that education is the only remedy to unindustrialization and the only solution to eradicate underdevelopment in today's industrialized world. The main aim of education is to help children to earn their livings and to make them self-dependent (Mishra, 2009). Every nation emphasizes the role of education and interests the effectiveness of education to face the challenges of life. There are many aspects of learning for the improvement of education. Among them, mathematics is one of the most important subjects in today's world schools.

Despite the Myanmar government's efforts to improve the teaching and learning of mathematics in secondary schools, teachers have traditionally used other teaching methods to increase students' interest in mathematics and bind them to mathematics. However, students' interest in mathematics remains low.

Heuristic approaches are alien to some mathematics teachers. Therefore, students were unable to develop the necessary skills to solve mathematics problems with or without the teacher's supervision. This has led to the problem of students' low performance in mathematics. Therefore, this study is intended to investigate the effectiveness of heuristic method on students' mathematics achievement at the lower secondary level.

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Aims of the Study

The major objectives of this study are described as follows:

1. To study the heuristic method in mathematics teaching at the lower secondary level.
2. To investigate the effectiveness of the heuristic method on students' mathematics achievement at the lower secondary level.
3. To make suggestions and recommendations based on the results of the study.

Research Hypotheses

The research hypotheses are described as follows:

1. There is a significant difference in mathematics achievement between the students who receive heuristic method and those who do not.
2. There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving knowledge level questions.
3. There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving comprehension level questions.
4. There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving application level questions.
5. There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving analysis level questions.

Scope of the Study

The following points indicate the scope of the research study:

1. This study is geographically restricted to two selected Basic Education High Schools, Sintgaing and Hingu in Sintgaing Township, Mandalay Region.
2. Participants in this study are Grade Seven students from the selected schools in the 2023-2024 academic year.
3. This study is limited to the content area of algebraic equations and symmetry from Grade Seven Mathematics Textbook Volume I and II prescribed by Ministry of Education (MOE).

Definition of Key Terms

In this study, the definitions of key terms are described as follows.

Heuristic Method

Heuristic method refers to “a particular method of teaching that allows the students to learn by discovering things by themselves and learning from their own experience rather than telling them things” (Wang, Han, Zhang, Fan & Zhang, 2011).

Mathematics

Mathematics is the branch of human inquiry involving the study of numbers, quantities, data, shape, and space and their relationships, especially their generalizations and abstractions and their application to situations in the real world (Clapham & Nicholson, 2009).

Achievement

Achievement is the competence of a person in relation to a domain of knowledge (Algarabel & Dasi, 2001).

Mathematic Achievement

Mathematics achievement is the competency shown by the student in the subject of mathematics (Pandey, 2017).

Lower Secondary Education

Lower secondary education refers to the educational level that typically includes grades 6 to 8, following primary education and preceding upper secondary education (Shaikh, Pal & Shah, 2021).

Review of Related Literature

This section is concerned with the theoretical foundation of the heuristic method.

Theoretical Foundation of the Heuristic Method

Holubová (2010) stated that the heuristic method is based on learning by discovering, on constructivism, and on the active interaction of teachers and pupils. In this section, the foundation and theory of constructivism, Piaget's cognitive developmental stage theory, social constructivism and Vygotsky's zone of proximal development (ZPD) are described as follows:

McLeod (2023) expressed that constructivism is a learning theory that emphasizes the active role of learners in building their own understanding. Rather than passively receiving information, learners reflect on their experiences, create mental representations, and incorporate new knowledge into their schemas. This promotes deeper learning and understanding. The earliest votary of the constructivism was the Italian philosopher Giambattista Vico (1668 - 1744), who proposed a constructivist theory of knowledge.

Theory of cognitive development by Jean Piaget recommended that children pass through four different mental development stages: the sensorimotor stage (birth to 2 years), the preoperational stage (ages 2 to 7), the concrete operational stage (ages 7 to 11), and the formal operational stage (ages 12 and up). According to Berk (1997), Piaget considered that children develop steadily and progressively across life at different stages, and the experiences gained from one stage form the basis for shifting to the next. In this study, the participants' level is under the formal operational stage (Mady, 2019).

The sociocultural theory was developed by Russian psychologist Lev Vygotsky (1896-1934). Vygotsky proposed the concept of the Zone of Proximal Development, which is built on the concept that there is a difference between what an individual can achieve on his own and what he can do with help. According to Vygotsky (1978), learning happens in this zone. Finally, Vygotsky believed that teachers should assist the students to learn and gain knowledge within their zone of proximal development (ZPD) (Mady, 2019).

Heuristic Method

A heuristic is a simple but useful method for problem-solving, decision-making, and discovery. The origin of the term goes back to the Ancient Greek verb 'heuriskein', which means 'to find out' or 'to discover'. According to Huiqin, Kejun, and Qingrui (2013), a heuristic method is particularly used to rapidly come to a solution that is hoped to be close to the best possible answer, or 'optimal solution'. Heuristics are "rules of thumb," educated guesses, intuitive judgments, or simply common sense. It is a general way of solving problem. This method was originally introduced by Armstrong for the learning of science. In this method, a good deal of importance has been given to experiments.

The main aim of teaching by the heuristic method is not so much to teach facts of science, mathematics, grammar, or history as to teach how knowledge of those may be obtained, systematized, and used. In short, the process is considered more important than the product. On closer study, the method appears to be a second form of the “inductive method.” Dumvilla defines this method as “Heurison is nothing other than Herbert Spencer’s inductive method of teaching.”

Objectives of the Heuristic Method

Pathak (2023) stated the objective of the heuristic method of teaching that

- Objective: Encourage students to become independent learners and critical thinkers in life.
- Focus: Emphasize the learning process rather than just gaining knowledge.
- Applicability: Suitable for various subject areas.
- Effectiveness: Particularly effective in fields requiring problem-solving, critical thinking, and creativity.

Steps of the Heuristic Method

According to Polya (1945), there are four steps in the heuristic method. They are -

- (a) Understanding the problem,
- (b) Making a plan,
- (c) Implementing the plan, and
- (d) Evaluation and adaptation.

Method

Research Design

In this study, one of the true experimental designs; the posttest only control group design was used.

Participants

The participants were Grade Seven students from the two selected schools in Sintgaing Township, Mandalay Region. The population and sample size of the selected schools are presented in Table 1.

Table 1 Population and Sample Size

Name of Schools	No. of Population	Sample Size
BEHS, Hingu	60	60
BEHS, Sintgaing	60	60
Total	120	120

Note. BEHS = Basic Education High School

Instrument

Instruments used for this study were a prerequisite test and a posttest. These were used after examining the reliability coefficient.

The prerequisite test was developed to measure the basic mathematical knowledge of the selected samples. Test items were constructed based on the Chapter (1) to (4) from Grade Seven Mathematics Textbook Volume I and the Chapter (1) to (3) from Grade Seven Mathematics

Textbook Volume II. There were (25) multiple-choice items in this test, and the given marks were (25) marks. The allocated time for this test was 45 minutes.

The posttest question consisted of three sections. Section (A) consisted of 10 multiple-choice items. Section (B) consisted of five short answer questions and section (C) consisted of five long answer questions. Test items were constructed based on the content areas of Chapter (5) Algebraic Equations and Chapter (4) Symmetry from the Grade Seven Mathematics Textbook Volume I and II. This test was constructed based on Bloom's Taxonomy: knowledge, comprehension, application, and analysis levels. The allocated time for this test was 1:30 hours, and the given marks were (50).

Procedure

For this study, two basic education high schools: Basic Education High School, Hingu and Basic Education High School, Sintgaing were randomly selected from Sintgaing Township, Mandalay Region. In this study, a true experimental design was used. There are (30) students in the experimental group and (30) students in the control group in each selected school. All the selected sample students have to take the prerequisite test. The prerequisite test was used to measure students' basic mathematical knowledge and to examine the equivalence of the two groups.

In each selected school, the experimental group was given treatment using the heuristic method and the control group was taught using formal instruction. At the end of the treatment period, all the students were tested in the posttest.

Analysis of the Data

In order to find out whether there is a significant difference between the experimental and control groups, the prerequisite test scores of the two groups were compared using an independent samples *t* test. After finding that the two groups were essentially the same on the prerequisite test, posttest scores were compared directly using independent samples *t* test.

Findings

The findings of the study in each selected school are presented as follows.

Table 2 shows the results of *t* Values for prerequisite test of Grade Seven students in the two selected schools.

Table 2 Results of *t* Values for Prerequisite Test

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
S1	Experimental	30	11.87	4.84	0.07	0.05	58	.958
	Control	30	11.80	4.90				(ns)
S2	Experimental	30	13.43	4.96	0.30	0.24	58	.813
	Control	30	13.13	4.83				(ns)

Note. S1 = Basic Education High School, Hingu;
S2 = Basic Education High School, Sintgaing;
ns = not significant.

According to the *t* value of S1, $t(58) = .958$, and the *t* value of S2, $t(58) = .813$, it showed that there was no significant difference between the experimental and control groups for

the scores on the prerequisite test in each school. Thus, it can be interpreted that the prior knowledge of the experimental groups and the control groups was equivalent.

Table 3 shows the results of t Values for overall posttest mathematics achievement of Grade Seven students in the two selected schools.

Table 3 Results of t Values for Overall Posttest Mathematics Achievement

School	Group	n	M	SD	MD	t	df	Sig. (2-tailed)
S1	Experimental	30	34.03	5.29	13.30	6.31	58	.000***
	Control	30	20.73	10.26				
S2	Experimental	30	31.10	7.24	6.90	4.42	58	.000***
	Control	30	24.20	5.54				

Note. S1 = Basic Education High School, Hingu;

S2 = Basic Education High School, Sintgaing;

*** $p < .001$.

The results showed that the mean of the experimental group was significantly higher than that of the control group in each school (see Table 3). According to the t value of S1, $t(58) = 6.31$, $p < .001$ and the t value of S2, $t(58) = 4.42$, $p < .001$, it showed that there was a significant difference between the experimental group and control group for the scores on the mathematics achievement in each school. According to the results, it can be interpreted that the students who received the heuristic method performed better than those who received formal instruction. It means that using a heuristic method in mathematics teaching at the lower secondary level resulted in positive effects.

Table 4 Results of t Values for Scores on Knowledge Level Questions

School	Group	n	M	SD	MD	t	df	Sig. (2-tailed)
S1	Experimental	30	2.50	0.69	0.63	2.99	58	.004**
	Control	30	1.87	0.94				
S2	Experimental	30	2.23	0.97	0.90	3.91	58	.000***
	Control	30	1.33	0.80				

Note. S1 = Basic Education High School, Hingu;

S2 = Basic Education High School, Sintgaing;

** $p < .01$, *** $p < .001$.

Table 4 presents the results of knowledge level questions. It showed that the mean of the experimental group was significantly higher than that of control group in each school (see Table 4). According to the t value of S1, $t(58) = 2.99$, $p < .01$ and the t value of S2, $t(58) = 3.91$, $p < .001$, it showed that there was a significant difference between the control group and experimental group for the scores on knowledge level questions in each selected school. The findings indicated that there is a significant difference in learning, knowledge skills and information absorption. It can be interpreted that the heuristic method could positively improve students' ability to remember basic mathematical knowledge.

Table 5 Results of *t* Values for Scores on Comprehension Level Questions

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
S1	Experimental	30	4.57	0.77	0.74	2.34	58	.023*
	Control	30	3.83	1.55				
S2	Experimental	30	5.80	0.71	0.30	1.10	58	.274 (ns)
	Control	30	5.50	1.31				

Note. S1 = Basic Education High School, Hingu;

S2 = Basic Education High School, Sintgaing;

* $p < .05$, ns = not significant.

According to the scores on the comprehension level questions, the mean of the experimental group was higher than that of the control group in S1. According to the *t* value of S1, $t(58) = 2.34$, $p < .05$, it can be inferred that there was a significant difference for scores on comprehension level questions in S1. But the mean was not significantly different between the two groups in S2. According to the *t* value of S2, $t(58) = 1.10$, it can be concluded that there was no significant difference for the scores on comprehension level questions in S2. Therefore, it can be interpreted that the heuristic method could have a positive effect on students' understanding of mathematics at the lower secondary level.

Table 6 Results of *t* Values for Scores on Application Level Questions

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
S1	Experimental	30	9.23	4.44	4.10	3.18	58	.002**
	Control	30	5.13	5.49				
S2	Experimental	30	12.27	2.33	1.60	2.68	58	.010*
	Control	30	10.67	2.29				

Note. S1 = Basic Education High School, Hingu;

S2 = Basic Education High School, Sintgaing;

** $p < .01$, * $p < .05$.

In terms of application level questions, the experimental groups achieved a significantly higher mean than the control groups in both schools. According to the *t* value of S1, $t(58) = 3.18$, $p < .01$ and the *t* value of S2, $t(58) = 2.68$, $p < .05$, it can be concluded that there was a significant difference for scores on application level questions in each selected school. So, it can be interpreted that teaching through the heuristic method positively contributed to the application level of mathematics teaching at the lower secondary level. Therefore, teaching by heuristic method could help students to improve higher-order thinking skills and problem-solving skills in learning mathematics at the lower secondary level.

Table 7 Results of *t* Values for Scores on Analysis Level Questions

School	Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
S1	Experimental	30	17.73	4.40	7.83	6.24	58	.000***
	Control	30	9.90	5.29				
S2	Experimental	30	11.40	7.27	6.00	4.03	58	.000***
	Control	30	5.40	3.68				

Note. S1 = Basic Education High School, Hingu;

S2 = Basic Education High School, Sintgaing;

*** $p < .001$.

Table 7 presents the results of the analysis level questions. It showed that the mean of experimental group was significantly higher than that of the control group in each selected school (see Table 7). According to the *t* value of S1, $t(58) = 6.24$, $p < .001$ and the *t* value of S2, $t(58) = 4.03$, $p < .001$, it can be concluded that there was a significant difference for scores on analysis level questions in each school. Thus, it can be interpreted that the use of the heuristic method could also bring about an improvement in students' ability to remember facts, rules, and previously learned materials.

Discussion

Discussion on Hypothesis (1): There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not.

According to the findings of this study, students from experimental groups got higher achievement than students from control groups in the two selected schools. It showed that there was a significant difference in mathematics achievement between the students who are taught by the heuristic method and those who are taught by formal instruction. This result is consistent with the findings of Abonyi and Umeh (2014) who found that the mean of the students who were taught by the heuristic method was higher than the mean of the students who were taught by formal instruction. Their result described that the heuristic method fostered better achievement in linear algebra than formal instruction. They recommend the application of the heuristic method in teaching mathematics both in primary and secondary schools. Heuristic method could motivate, stimulate, and sustain students' interest in mathematics.

Discussion on Hypothesis (2): There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving knowledge level questions.

According to the findings of this study, students from experimental groups got higher achievement than students from control groups in the two selected schools. It showed that there was a significant difference in mathematics achievement between the students who are taught with the heuristic method and those who are taught with formal instruction in both schools at the knowledge level. Therefore, it can be concluded that students can remember and recall the relevant knowledge from long-term memory at the beginning of the lesson.

There may be a variety of reasons that caused significant achievement for students in the two selected schools. It can be said that the teacher could provide students with accurate instructions to think collaboratively and to understand independently. The other thing is that

students from control groups were less likely to learn ahead of new lessons, and so experimental groups achieved higher results than control groups.

Discussion on Hypothesis (3): There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving comprehension level questions.

According to the findings of this study, the achievement of the experimental group was significantly higher than that of the control group in S1. It showed that there was a significant difference in mathematics achievement between the students who are taught with the heuristic method and those who are taught with formal instruction in S1 at the comprehension level. It can be concluded that students in the experimental group could classify, discuss with each other, and use collaborative behavior in solving problems to improve their performances.

This study also revealed that the achievement of the experimental group was not significantly higher than that of the control group in S2. It showed that there was no significant difference in mathematics achievement between the students who are taught with the heuristic method and those who are taught with formal instruction in S2 at the comprehension level. It may be due to the fact that students in the experimental group were more likely to be familiar with the teacher's instructions and explanations than studying on their own.

Discussion on Hypothesis (4): There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving application level questions.

According to the findings of this study, the achievement of the experimental group was significantly higher than that of the control group in each selected school. It showed that there was a significant difference in mathematics achievement between the students who are taught with the heuristic method and those who are taught with formal instruction in both schools at the application level. It can be interpreted that the heuristic method in teaching mathematics helped students as a foundation to get higher-order thinking skills from the lesson. Moreover, teaching by the heuristic method could encourage students to construct their own understanding, meaning, and thinking critically. And students can solve the problems by using the concepts and rules through the heuristic method.

Discussion on Hypothesis (5): There is a significant difference in mathematics achievement between the students who receive the heuristic method and those who do not in solving analysis level questions.

According to the comparison of mean on analysis level questions, the findings showed that the mean of experimental groups was significantly higher than that of the control groups in the two selected schools. It showed that there were significant differences between the experimental and control groups in both schools. According to this result, students in experimental group are interested in learning geometry, shapes, sizes, and mass, and they can perform well in drawing, measuring, summarizing, and concluding. It can be interpreted that the heuristic method could improve the students' ability to remember facts, rules, and previously learned materials.

Suggestions

Suggestions for the Mathematics Teachers

- Before implementing the heuristic method, the teachers should know the procedures and prepare the lessons with the appropriate teaching learning materials that can effectively meet the needs of the students.
- Teachers should create a classroom atmosphere that encourages open communication and active engagement, where students feel comfortable asking questions, sharing their ideas, and exploring new concepts on their own.
- Teachers should offer guidance and feedback throughout the learning process, helping students reflect on their experiences.
- Teachers should provide students with opportunities to participate actively in the teaching-learning process.
- Teachers should design activities that encourage students to explore and experiment with new concepts.
- Teachers should carefully manage classroom conditions to reduce time constraints (Maheshwari, 2016 & Pathak, 2023).

Suggestions for the School Administrators

Administrators should support and encourage in-service trainings, workshops, and seminars so as to inculcate the rudiments of the heuristic method in teaching mathematics at the lower secondary level. In addition, the government, in conjunction with curriculum developers and mathematics teachers, should establish mathematics resource centers in each local government area of the state for the procurement and storage of relevant heuristic instructional materials.

Recommendations

Based on the findings of the study, there are some recommendations for further study.

- In this study, the sample schools were randomly selected from Sintgaing Township, Mandalay Region. It may not be able to generalize to the whole country. So, further research should be conducted in other states and regions.
- This study dealt with lower secondary level in the 2022-2023 academic year. Thus, further study should be carried out at the primary or upper secondary level or in higher education to obtain exact and specific results.
- In this study, the content areas were limited to Grade Seven Mathematics Textbook. Therefore, further study should be tried out for the other content areas at the lower secondary level to improve the teaching of mathematics.
- To study the effectiveness of heuristic method in teaching mathematics, more time should be spent in implementing this method.

Conclusion

Heuristic approaches are alien to some mathematics teachers in Myanmar Education. Therefore, students were unable to develop the necessary skills to solve mathematics problems with or without the teacher's supervision. This has led to the problem of students' low performance in mathematics. In terms of statistical results, students' performance between the

experimental and control groups showed a significant difference in overall mathematics achievement. It can be concluded that using the heuristic method has positively contributed to the improvement of mathematics teaching at the lower secondary level. This study will assist teachers and students in having a pleasurable learning experience and a successful outcome. Furthermore, further research into alternative teaching approaches are needed in order to continuously enhance Myanmar Education.

Acknowledgements

First of all, our profound thanks goes to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-Rector, Sagaing University of Education), and Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education) who allowed us to do this study.

We would like to express our deep and sincere gratitude to Dr. Wai Wai Oo (Professor and Head, Department of Curriculum and Methodology, Sagaing University of Education) for her excellent supports, enthusiastic guidance, insightful assessment, invaluable suggestions, expertise and extensive discussions to accomplish my research successfully.

References

- Abonyi, O. S., & Umeh, V. O. (2014). Effects of heuristic method of teaching on students' achievement in algebra. *International Journal of Scientific & Engineering Research*, 5(2), 1735-1740.
- Algarabel, S., & Dasi, C. (2001). The definition of achievement and the construction of tests for its measurement: A review of the main trends. *Psicologica*, 22(1), 43-66.
- Clapham, C., & Nicholson, J. (2009). *The concise oxford dictionary of mathematics* (4th ed.). Oxford University Press.
- Holubová, R. (2010). Improving the quality of teaching by modern teaching methods. *Problems of Education in the 21st Century*, 25, 58-66.
- Huiqin, S., Kejun, S., & Qingrui, L. (2013). Heuristic teaching method on innovative talents cultivation of electrical engineering. In P. Li (Ed). *International Conference on Education Technology and Management Science (ICETMS 2013)* (pp. 862-864). Atlantis Press.
- Mady, M. A. (2019). Impact of cognitive developmental theories on the teaching and learning process at a private US curriculum school in Dubai, UAE (Unpublished master thesis). The British University in Dubai.**
- Mcleod, S. (2023). *Constructivism learning theory and philosophy of education*. Retrieved from <https://www.simplypsychology.org/constructivism.html>
- Mishra, L. (2009). *Teaching of mathematics*. New Delhi: APH Publishing Corporation.
- Pandey, B. D. (2017). A study of mathematical achievement of secondary school students. *International Journal of Advanced Research (IJAR)*, 5(12), 1951-1954.
- Pathak, S. (2023). *Heuristic method of teaching: How is it helpful for teachers?* Retrieved from <https://classplusapp.com/growth/heuristic-method-of-teaching/>
- Polya, G. (1945). *How to solve it; a new aspect of mathematical method*. Princeton University Press.
- Wang, S., Han, R., Zhang, M., Fan, X., & Zhang, S. (2011). Improving teaching efficiency with heuristic teaching method in information technology. In Tan, H., & Zhou, M. (Eds.), *Advances in Information Technology and Education* (pp. 454-458). Berlin: Springer.

THE RELATIONSHIP BETWEEN PROBLEM SOLVING ABILITY AND LOGICAL MATHEMATICAL INTELLIGENCE OF MIDDLE SCHOOL STUDENTS

Nyein Nyein Thet¹ and Aye Su Myat²

Abstract

The main purpose of this study is to investigate the relationship between problem solving ability and logical mathematical intelligence of middle school students. The research design for this study was descriptive (survey) research design and it was conducted in Nattalin District, Bago Region (West). The participants of this study were (450) Grade Eight students and the questionnaire for problem solving ability including (25) items, the questionnaire for logical mathematical intelligence including (25) items and eight open-ended questions were used as an instrument. In order to address the research questions, the descriptive statistics (mean, standard deviation, frequency, percentage) and the inferential statistics (Pearson product-moment correlation) were used. The comparison of mean values of problem solving abilities indicated that the mean score of confident problem solving ability was the highest and that of avoidant problem solving ability was the lowest among six dimensions of problem solving ability. The result of the finding of logical mathematical intelligence indicated that most students possess the moderate level of logical mathematical intelligence. Moreover, the result also showed that problem solving ability was moderately correlated with logical mathematical intelligence of middle school students ($r = .464$). The results of eight open-ended questions indicated that some students skip the steps and get wrong answers while they are solving problems, they have to use previously learned concepts and they can manage challenging problems by calming down their mind and by using self-monitoring activities but sometimes they face difficulties according to misunderstanding and nearly all students use their logical mathematical intelligence for making various activities.

Keywords: Problem, Problem Solving, Ability, Problem Solving Ability, Mathematical Problem Solving, Intelligence, Logical Mathematical Intelligence

Introduction

The main purpose of education is to make children to become autonomous and independent person. To implement such purpose, there is no subject in the world as important as mathematics. Mathematics is the gateway to numerous career path and profession and can develop critical thinking skill and problem solving ability. It teaches students to analyze problem, to break them down into smaller components and to apply logical reasoning to find solutions. These skills are essential in various fields, including science, technology, engineering and even everyday life situations (Algani, 2022).

All the exercises in mathematics are rooted on problem solving ability. Unless the students have this ability, they cannot be able to perform well in mathematics. Furthermore, students have to use problem solving ability acquired from mathematics throughout their lives. As a consequence of this, problem solving ability has played a fundamental role in human history.

In problem solving process, students have to use their efforts to find solutions by using analytical thinking, critical thinking, reasoning and past experiences. All forms of thinking and cognitive processes are rooted in human intelligence. Logical mathematical intelligence provides

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a strong foundation for mathematics. Based on the above facts, problem solving ability and logical mathematical intelligence of middle school students are needed to study for the development of mathematics education.

Purposes of the Study

The main purpose of this study is to investigate the relationship between problem solving ability and logical mathematical intelligence of middle school students. The specific objectives of the study are as follows.

1. To find out the impulsive, reflective, confident, avoidant, monitoring and planful problem solving abilities of middle school students
2. To investigate logical mathematical intelligence of middle school students
3. To examine the relationship between problem solving ability and logical mathematical intelligence of the middle school students
4. To investigate middle school students' ideas and opinions about problem solving ability and logical mathematical intelligence
5. To make suggestions for improving mathematics teaching and learning at middle school level

Research Questions

Research questions for this study are as follows.

1. What is the impulsive, reflective, confident, avoidant, monitoring and planful problem solving abilities of middle school students?
2. What is the logical mathematical intelligence of middle school students?
3. Is there a relationship between problem solving ability and logical mathematical intelligence of middle school students?
4. What are the middle school students' ideas and perspectives about problem solving ability and logical mathematical intelligence?

Scope of the Study

This study was geographically restricted to Nattalin District, Bago Region (West). The participants of this study are (450) Grade Eight students of 2023-2024 Academic Year from the selected schools. This study was intended to investigate problem solving ability in mathematics and logical mathematical intelligence of middle school students. This study was limited to investigate six types of problem solving abilities namely impulsive problem solving ability, reflective problem solving ability, confident problem solving ability, avoidant problem solving ability, monitoring problem solving ability and planful problem solving ability.

Definition of Key Terms

Seven key terms are defined as follows.

Problem

Problem is mathematical object representing a collection of questions that might be able to solve (Alubady, 2013).

Problem Solving

Problem solving is a process of developing, testing and evaluating a method for overcoming an obstacle by identifying a problem and finding the best alternative to solve it (Miller & Stoeckel, 2011).

Ability

Ability is the quality of being able to do something; physical, mental, financial or legal power to perform (Carroll, 1987).

Problem Solving Ability

Problem solving ability is a person's ability to obtain a solution or way out of a goal that is not easy to achieve (Polya, 1957).

Mathematical Problem Solving

Mathematical problem solving is the process of applying previously acquired mathematical knowledge to new, unknown situations (Rahmat, 2020).

Intelligence

Intelligence may be defined as the ability to do something with facility, speed and adequacy (Colendrino-Bucu, Guerrero, Pascual & Mateo, 1997).

Logical Mathematical Intelligence

Logical mathematical intelligence is the ability to effectively use numbers and solve problems (Breaux & Magee, 2010).

Significance of the Research

In Myanmar, the new curriculum for basic education is well designed with greater focus on learning concepts, problem solving process and understanding of basic principles and reasons behind the knowledge (Ministry of Education [MoE], 2016). This means that it is important for the students to develop problem solving ability in order to face the challenges of a changing world. This study can contribute for the curriculum developers, mathematics teachers, students and teaching and learning process. Firstly, curriculum developers take into account the aspect of problem solving ability and logical mathematical intelligence of students and design to include various types of mathematics problems that can be solved by the students having different types of problem solving abilities and different levels of logical mathematical intelligence. Secondly, this study can provide mathematics teachers for their effective teaching. Therefore, the teachers need to advocate students with different types of problem solving abilities and different levels of logical mathematical intelligence to become genius and the teachers need to prepare a wide variety of learning activities for the students. Consequently, the students have to learn by using five senses to accommodate to the teachers' teaching. As a result, there will be productive teaching learning process and the students can acquire soft skills needed for 21st century. Hence, this study is very significant and can give profound effects for education.

Review of Related Literature**Philosophical Foundations of Problem Solving Ability and Logical Mathematical Intelligence of Middle School Students**

This study was based on philosophical foundations of constructivism and cognitivism.

Constructivism. Ozmon and Craver (2003) say that constructivist learning is based on students' active participation in problem solving and critical thinking regarding a learning activity. Students construct their own knowledge by testing ideas and approaches based on their knowledge and experiences, applying them to new situation and integrating new knowledge gained with preexisting intellectual constructs. Piaget's cognitive constructivism also implies that

the teachers must look at the students' ability to solve problems in order to understand how children think. Vygotsky sees teachers and peers as living representations. Teachers are considered as means of transition of knowledge of a particular culture. During this process, students are encouraged to develop meta cognitive skills such as reflective thinking and problem solving techniques in constructive approach unlike the traditional method of learning (Brooks & Brooks, 1993).

Cognitivism. Cognitivism is a theory of learning that began in cognitive psychology. It argues that learning requires the use of memory, reflection, thinking, abstraction, metacognition and motivation. Montague, Warger and Morgan (2000) believe that cognitive processes incorporate the activities of reading, paraphrasing, visualizing, hypothesizing, estimating, computing and checking out of the process. Moreover, they also offer another cognitive process. It incorporates some stages: comprehending linguistic and numerical information problems, translating that information into mathematical notations, algorithm and equation, observing relationship among the elements of the problems, formulating a plan to solve the problems, predicting outcome, regulating the solution path as it is executed and detecting and correcting errors during the problem solution. Cognitivism is important for problem solving ability and logical mathematical intelligence because it emphasizes information processing, problem representation, cognitive strategies, metacognition and the transfer of learning. By understanding and applying cognitive process effectively, learners can enhance their problem solving ability, logical mathematical intelligence and become adept at solving complex problems in a wide range of domains.

Theoretical Foundations of Problem Solving Ability of Middle School Students

This study was based on Polya's problem solving theory, Schoenfeld's mathematical problem solving theory and Gardner's theory of multiple intelligence.

Polya's problem solving theory. Problem solving ability is a very important ability. Students must be able to understand the problem and might be able to face real life. Problem solving requires understanding the problems situation and need to make decision which direct individual understanding (Daulay & Ruhaimah, 2019). One way to improve problem solving ability is to teach learning theory that can be used to solve problem, namely Polya's theory. The four principles introduced by Polya (1957) are: understanding the problem, devising the plan, carrying out the plan and looking back. Polya's prescription for solving problems consist of four steps that use the 3R's (Request, Response, Result) of problem solving and the verification of the result.

Schoenfeld's mathematical problem solving theory. In most classes of secondary education, mathematics teachers teach students to solve mathematics problems by having them copy standard solutions methods provided by the textbooks. Schoenfeld (1992) states that students need to learn to define goals and to self-regulated their problem solving behavior in order to improve solving of non-standard mathematics problems. Schoenfeld (1985) observes that during problem solving, students display distinct categories of behaviors. These are called episodes. Crucial episodes are analyzing the problem, selecting appropriate mathematical knowledge, making plan, carrying it out, checking the answer against the question asked. According to Schoenfeld (1985), four categories of knowledge or skills are needed to be

successful in mathematics namely (1) resources: proposition and procedural knowledge of mathematics, (2) heuristics: strategies and techniques for problem solving such as working backwards or drawing figures, (3) control: decision about when and what resources and strategies to use and (4) beliefs: a mathematical “world view” that determines how someone approaches a problem.

Gardners’ theory of multiple intelligence. The theory of multiple intelligence (MI), developed by psychologist Howard Gardner in the late 1970s and early 1980s, posits that individuals possess eight or more relatively autonomous intelligences. These intelligences include linguistic intelligence, logical mathematical intelligence, spatial intelligence, musical intelligence, bodily kinesthetic intelligence, naturalist intelligence, interpersonal intelligence and intrapersonal intelligence (Gardner, 2006). Logical mathematical intelligence is the capacity to use number effectively and to reason well (Armstrong, 2009). This intelligence includes sensitivity to logical patterns and relationships, statements and propositions, functions and other related abstractions. It is important for problem solving and mathematics education. By recognizing and nurturing this intelligence, educators and individuals can promote inclusive education, enhance problem solving skill and encourage a broader understanding of intelligence beyond traditional measure.

Problem Solving Ability

Polya (1957) states that problem solving ability is a person’s ability to obtain a solution or way out of a goal that is not easy to achieve. According to National Council of Teachers of Mathematics (NCTM, 2000), problem solving is the basic foundation of school mathematics. Unless the students possess the ability to solve problems, the usefulness and power of mathematical ideas, knowledge and skills are severely limited.

Impulsive problem solving ability. According to D’Zurilla and Nezu (2010), impulsive or careless problem solving ability is a dysfunctional problem solving ability characterized by active attempts to apply problem solving procedures and techniques, but these attempts are narrow, impulsive, careless hurried and incomplete. A person with this problem solving ability generally consider only a few alternatives.

Reflective problem solving ability. Students with reflective problem solving ability anticipate the consequences of each alternatives and compare each other when making a decision for solving problems. In the problem solving process, students with reflective problem solving ability try to consider the problem situation, collect the necessary information to solve, make decision and reflect on the whole process (Richards, 2015).

Confident problem solving ability. Confidence is necessary for the process of problem solving. It is a firm belief in personal abilities. Critical thinkers and good problem solvers are confident in their abilities and believe that they can do the best in whatever situation. When they encounter problem situation, confident people often expect that they can handle the problem well (Wandberg, 2010).

Avoidant problem solving ability. Avoidant problem solving ability is a dysfunctional one. People with this type of problem solving ability do nothing when they confront the problem situations. They act as if a problem does not exist or they are not concerned with the problems. Such people act passive, inactive, dependent and procrastinating behaviors.

Monitoring problem solving ability. Monitoring serves a foundation for problem solving ability and it is important for successful problem solving. This is why complex problem solving includes a high level of uncertainty, temporally unfolding events and evaluating the effectiveness of the strategies (Phang, 2009).

Planful problem solving ability. Planful problem solving ability is the conductive approach involving the systematic and planful application of the following set of skills (Nezu, Nezu, Ricelli & Stern, 2015).

Logical Mathematical Intelligence

Logical mathematical intelligence is the capacity to use numbers effectively and to reason well. This intelligence involves the sensitivity to logical patterns and relationships, statements and propositions, functions and other related abstractions. People with this intelligence can perform the process like categorization, classification, inference, generalization, calculation and hypothesis testing (Armstrong, 2009).

Research Method

Research Design

The research design adopted in this study was the descriptive (survey) design.

Procedure

Firstly, the problem was formulated. Then, related literature for this study was collected from various resources. Secondly, instrument for this study was constructed, conducted expert review and validated through pilot test. The internal consistency (Cronbach's Alpha) was 0.779. Then, modified instrument was distributed to all participants on 1st October, 2023. After collecting the data, the data were analyzed by using the Statistical Package for Social Science (SPSS 22).

Instrument

The instrument for problem solving ability was constructed in accordance with six dimensions such as impulsive, reflective, confident, avoidant, monitoring and planful problem solving ability. Confident problem solving ability consists of five items while each of the remaining five dimensions has four items. Therefore, 25 items were included in the six dimensions of instrument for problem solving ability. The questionnaire for logical mathematical intelligence includes 25 items. The items were constructed on five-point Likert scales ranging from strongly disagreed to strongly agreed. Finally, eight open-ended questions were used to investigate the ideas and opinions about problem solving ability and logical mathematical intelligence of middle school students.

Population and Sample Size

This study was conducted in Nattalin District, Bago Region (West). All participants in this study were Grade Eight students of 2023-2024 Academic Year. There were 4136 Grade Eight students in Nattalin District and 450 students were selected by using simple random sampling method. Therefore, the population and sample size are presented in Table 1.

Table 1 Population and Sample Size

No.	District	No. of Population	No. of Participant
1	Nattalin	4136	450

The number of participants from the four townships are presented in Table 2.

Table 2 Number of Participants from the Four Townships

No.	District	Township	No. of Participant
1	Nattalin	Thae Gone	153
		Paungde	72
		Nattalin	133
		Ze Gone	92
Total			450

Data Analysis

The data was analyzed by using descriptive statistics (mean, standard deviation, frequency and percentage,) and inferential statistics (Pearson product-moment correlation).

Findings

Findings of Problem Solving Ability of Middle School Students

According to the participants' responses, the mean scores of impulsive, reflective, confident, avoidant, monitoring and planful problem solving ability of middle school students are presented in Table 3.

Table 3 Mean Scores of Problem Solving Ability of Middle School Students

Dimension of Problem Solving Ability	Mean Score	Standard Deviation	Minimum	Maximum	Percentage (%)
Impulsive	10.60	3.12	5	18	35.4
Reflective	15.33	2.27	7	20	62.9
Confident	18.83	2.79	10	24	77.4
Avoidant	8.44	3.53	4	19	17.9
Monitoring	15.77	2.49	5	20	64.8
Planful	15.04	2.54	7	20	61.8

According to the data presented in Table 3, it can be interpreted that the mean score of avoidant problem solving ability (8.44) is the lowest and that of confident problem solving ability (18.83) is the highest among the problem solving abilities. And the remaining problem solving abilities also have their respective proper mean scores.

Findings of Logical Mathematical Intelligence of Middle School Students

To investigate the logical mathematical intelligence of the middle school students, descriptive statistics (mean, standard deviation and percentage) was used to analyze the responses in this questionnaire. Table 4 presents the mean score of logical mathematical intelligence of the middle school students.

Table 4 Mean Score of Logical Mathematical Intelligence of Middle School Students

Dimension	Mean Score	Standard Deviation	Minimum	Maximum
Logical Mathematical Intelligence	91.44	11.43	52	120

According to the data presented in Table 4, the mean score and standard deviation were (91.44) and (11.43) respectively. And then (+1) standard deviation to the mean and (-1) standard deviation from the mean were carried out. Therefore, the scores less than (80.01) are grouped as low level, the scores between (80.01) and (102.87) are grouped as moderate level and the scores higher than (102.87) are grouped as high level of logical mathematical intelligence. Therefore, the level of logical mathematical intelligence of middle school students are described in Table 5.

Table 5 Levels of Logical Mathematical Intelligence of Middle School Students

Level	Score	No. of Students	Percentage (%)
Low	$x < 80.01$	76	16.8
Moderate	$80.01 \leq x \leq 102.87$	295	65.6
High	$x > 102.87$	79	17.6
Total		450	100

According to the results from Table 5, (16.8%) of the students possess low level of logical mathematical intelligence, (65.6%) of the students possess moderate level of logical mathematical intelligence and (17.6%) of the students possess high level of logical mathematical intelligence. Therefore, it can be interpreted that more than half of the students possess moderate level of logical mathematical intelligence and the number of students who possess high level of logical mathematical intelligence is a little bit more than the number of students who possess low level of logical mathematical intelligence.

Relationship between Problem Solving Ability and Logical Mathematical Intelligence of Middle School Students

Pearson's product-moment correlation coefficient was used to determine the relationship between problem solving ability and logical mathematical intelligence of middle school students. The result is presented in Table 6.

Table 6 Correlation between Problem Solving Ability and Logical Mathematical Intelligence of Middle School Students

Variable		Problem Solving Ability	Logical Mathematical Intelligence
Problem Solving Ability	Pearson Correlation	1	.464**
	Sig (2-tailed)		.000
	N	450	450
Logical Mathematical Intelligence	Pearson Correlation	.464**	1
	Sig (2-tailed)	.000	
	N	450	450

Note. **Correlation is significant at the 0.01level (2-tailed).

Table 6 indicated that there was a correlation ($r = .464$). Therefore, it can be interpreted that there was a moderate positive correlation between problem solving ability and logical mathematical intelligence of middle school students.

Findings of Students' Ideas and Opinions of Problem Solving Ability and Logical Mathematical Intelligence

The questions for getting the ideas and opinions of problem solving ability and logical mathematical intelligence were composed of eight open-ended questions. The first six open-ended were intended for receiving extra information about impulsive, reflective, confident, avoidant, monitoring and planful problem solving ability of the middle school students. The last two questions were intended for receiving extra information about their logical mathematical intelligence. The most answered responses of the eight questions are presented in Table 7.

Table 7 Percentage of Students' Ideas and Opinions of Problem Solving Ability and Logical Mathematical Intelligence

Category	N	Frequency	Percentage (%)
Never do impulsive activity	450	213	47.33
Using theorems, corollaries and properties	450	200	44.44
Calming down and computing quickly	450	118	26.22
Understanding the problems thoroughly	450	187	41.56
Brainstorming	450	314	69.78
No difficulties	450	244	54.22
Solving problem quickly and easily	450	275	61.11
Studying	450	128	28.44

Table 7 showed that 47.33% of the students do not perform impulsive manner in solving mathematical problems, 44.44% of the students have to use previously learned theorems, corollaries, properties and concepts in solving new problems and 26.22% of the students make themselves to calm down and solve quickly by skipping unnecessary steps. Moreover, 41.56% of the students want to solve the problem by themselves because they understand the problems thoroughly. Surprisingly, 69.78% of the students can solve the problems by brainstorming their ideas. Besides, 54.22% of the students never encounter difficulties and challenges in solving the problem. Furthermore, 61.11% of the students like computers or calculators because they can solve the problems quickly and easily. Finally, 28.44% of the students apply their logical mathematical intelligence for planning different activities. According to the data presented in Table 7, the percentage of ideas and opinions of problem solving ability and logical mathematical intelligence is illustrated in Figure 1.

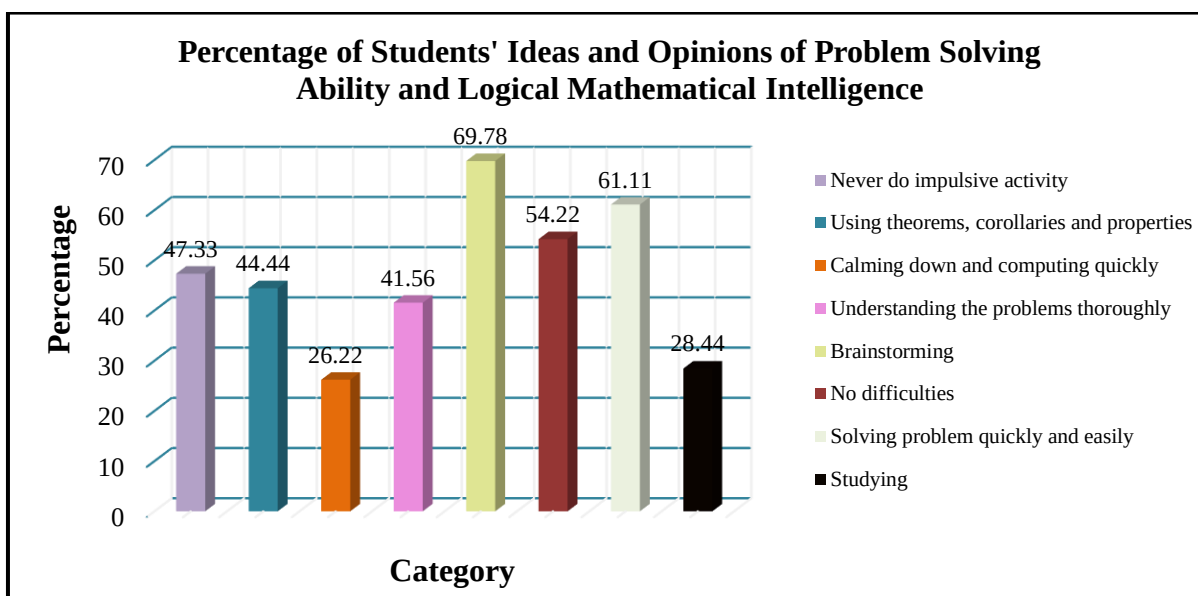


Figure 1 Percentage of Students' Ideas and Opinions of Problem Solving Ability and Logical Mathematical Intelligence

Summary of Research Findings

The findings of this study are summarized as follows.

1. The study found that the mean score of confident problem solving was the highest and that of avoidant problem solving ability was the lowest among impulsive, reflective, confident, avoidant, monitoring and planful problem solving ability.
2. Finding of the extent of logical mathematical intelligence showed that most of the students possess moderate level of logical mathematical intelligence and the number of students who possess high level of logical mathematical intelligence was a little bit more than those who possess low level of logical mathematical intelligence.
3. Problem solving ability was moderately correlated with logical mathematical intelligence of middle school students ($r = .464$).
4. The results of eight open-ended questions indicated that some students skip the steps and get wrong answers while solving problems, they have to use previously learned concepts, they can manage challenging problems by calming down their mind and by using self-monitoring activities but sometimes face difficulties according to misunderstanding and nearly all students use their logical mathematical intelligence for making various activities.

Discussion

According to the research finding of problem solving ability of middle school students, the mean score of impulsive problem solving was (10.60), that of reflective problem solving ability was (15.33), that of confident problem solving ability was (18.83), that of avoidant problem solving ability was (8.44), that of monitoring problem solving ability was (15.77) and that of planful problem solving ability was (15.04). The result showed that the mean score of confident problem solving ability is the highest and that of avoidant problem solving ability is the lowest among impulsive, reflective, confident, avoidant, monitoring and planful problem solving ability of middle school students.

The second research question is to investigate logical mathematical intelligence of middle school students. According to the result, most of the students possess moderate level of logical mathematical intelligence and the number of students who possess high level of logical mathematical intelligence was a little bit more than those of students who possess low level of logical mathematical intelligence. Therefore, it can be interpreted that more than half of the students possess moderate level of logical mathematical intelligence and they can think abstractly, logically and conceptually. Moreover, they can discern logic and reason while carrying out mathematical operations or solving complex problems. Likewise, they understand mathematical concepts, identify patterns create logical pathways and apply systematic approaches for solving problems. Besides, they can break down complex problems into manageable steps, facilitating a more structured and efficient problem solving process. In addition, students who possess moderate and high level of logical mathematical intelligence perform well in the subjects like mathematics and science. Moreover, they can solve complex problems by using their abilities and systematic approaches to various challenges.

The third research question is to investigate the relationship between problem solving ability and logical mathematical intelligence of middle school students. The result showed that there was a significant correlation ($r = .464$) between problem solving ability and logical mathematical intelligence, and the direction of correlation was positive. Therefore, it can be interpreted that problem solving ability has moderately correlated with logical mathematical intelligence of middle school students.

The fourth research question is to investigate students' ideas and perspective about problem solving ability and logical mathematical intelligence. The result showed that 47.33% of the students did not perform impulsive manner in solving mathematical problems, 44.44% of the students answered that they had to use previously learned theorems, corollaries, properties and concepts in solving new problems and 26.22% of the students answered that they made themselves to calm down and solve quickly by skipping unnecessary steps and they were confident their ability when they encountered to solve problems in a small amount of time. Furthermore, 41.56% of the students can solve the problems by themselves as a consequence of understanding the problems thoroughly. Moreover, 69.78% of the students can solve the problems by brainstorming. Besides, 54.22% of the students encountered difficulties and challenges in solving the problem but they can reflect previously learned concepts and solved till the correct solution was received. Furthermore, 61.11% of the students like to use computers and calculators in order to solve the problems quickly and 28.44% of the students applied their logical mathematical intelligence for planning different activities.

Suggestions

From the findings of problem solving ability of middle school students, 35.4% of the students possess impulsive problem solving ability. Therefore, curriculum developers should design the curriculum that includes interactive workshops and encourage students to think critically. Moreover, the school administrators should invest in professional development for teachers. In addition, mathematics teachers should use real-life scenarios and problems that students can relate their mathematics problems to their real-life situations.

Moreover, 62.9% of the students possess reflective problem solving ability. Therefore, the curriculum developers should design the curriculum that can help the students to visually map out problems, relationships and solutions by reflecting on information. Likewise, the school administrators should support differentiated learning. Furthermore, mathematics teachers provide constructive feedback on students' problem solving approaches. In addition, parents should encourage their children to think critically and ask questions about the world around them.

In addition, 77.4% of the students possess confident problem solving ability. Therefore, the curriculum developers should plan the mathematics curriculum starting with a solid understanding of fundamental concepts ensuring a strong foundation for problem solving. Additionally, mathematics teachers should ask open-ended questions that require students to think critically and explore different solutions.

According to the result of problem solving ability of middle school students, 17.9% of the students possess avoidant problem solving ability. In order to help students with avoidant problem solving ability, the curriculum developers should integrate real-life problem solving scenario relevant to students' experience by making the content more engaging and applicable.

According to the results from the finding of problem solving ability of the middle school students, 64.8% of the students possess monitoring problem solving ability. Therefore, curriculum developers should integrate formative assessments throughout the curriculum to continuously monitor students' progress. In addition, the school administrators should celebrate achievements of students.

In addition, 61.8% of the students possess planful problem solving ability. Therefore, curriculum developers should develop curriculum content including real-world problems. This help students apply planful problem solving skill to situations they may encounter in their future careers. Moreover, mathematics teachers should use variety of resources including textbooks, online tools, diagrams and charts to cater to different learning styles. Additionally, parents should introduce age-appropriate mathematics books and resources that make mathematics to be more interesting. Furthermore, parents should consider to enroll in mathematics competitions or clubs like mathematics Olympic if their children show an interest in mathematics.

According to the research findings of the extent of logical mathematical intelligence of middle school students, most students (65.6%) possess moderate level of logical mathematical intelligence and the number of students who possess high level of logical mathematical intelligence (17.6%) is a little bit more than the number of students who possess low level of logical mathematical intelligence (16.8%). Therefore, the mathematics teachers should assign projects that require students to apply their mathematics and problem solving skill to research and create something meaningful. And then, the teachers should ensure consistent practice with a mix of easy, moderate and challenging problems to strengthen problem solving ability over time.

The result of the findings of students' ideas and opinions of problem solving ability and logical mathematical intelligence of middle school students also revealed that students solved mathematical problems on their own in order to improve their abilities and to memorize the previously earned materials. Therefore, mathematics teachers should provide constructive feedback on students' problem solving approaches and the teachers should highlight both correct and incorrect methods. In order to make the students to be interested in mathematics, the teachers

should show how mathematics is used in real world professions and encourage students to explore mathematics related careers. Additionally, mathematics teachers should ask open-ended questions that require students to think critically and explore different solutions. This fosters logical thinking. Besides, mathematics teachers should encourage group work that can encourage students to collaborate, discuss ideas and learn from each other's problem solving strategies. Furthermore, mathematics teachers should use variety of resources including textbooks, online tools, diagrams and charts to cater to different learning styles and enhance their understanding and employ questioning techniques to guide students in thinking step by step and solving problems on their own.

Recommendations

This study was carried out in basic education high schools, high schools (branch) and middle schools in Nattalin District, Bago Region (West). This cannot completely cover the overall areas of Bago Region and of Myanmar. Similar studies should be carried out in other districts, states and regions of Myanmar within rural and urban settings. The sample size in this study was limited to (450) students. Similar study with different sample size should be conducted. The selected students in this study were middle school students. The replication of study should be conducted with other school level. Problem solving ability and logical mathematical intelligence of middle school students were studied by using questionnaires. Further study should be conducted by using problem solving ability tests, logical mathematical intelligence tests, interviews and observations. More than six dimensions should be used for studying problem solving ability and more than one dimension should be used for studying logical mathematical intelligence of middle school students.

Therefore, it can be hoped that this study will support not only for the further researchers but also for the curriculum developers, mathematics teachers, students and teaching learning process.

Conclusion

To sum up, this study will help curriculum developers to design various types of mathematics problems that can be solved by the students who possess different types of problem solving ability and varying levels of logical mathematical intelligence. Furthermore, this study can provide mathematics teachers for their effective teaching. Thus, the teachers need to advocate those students to become genius and the teachers need to prepare a wide variety of learning activities. Consequently, the students have to learn by using five senses to accommodate to the teachers' teaching. Then, there will be productive teaching learning process and the students can acquire soft skills needed for 21st century. Moreover, a new curriculum for basic education in Myanmar is well designed with greater focus on learning concepts, problem solving process and understanding basic principles and reasons behind the knowledge (Ministry of Education [MoE], 2016). According to this statement, problem solving ability, logical reasoning and reflective thinking are essential for the teaching and learning process and education system in Myanmar is looking for the best practices for the students to cope well with the problems in their everyday lives. Therefore, this study will contribute to some extent for effective mathematics teaching and learning process at the basic education level.

Acknowledgements

First of all, we would like to express our respectful gratitude to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education), Dr. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector, Yangon University of Education), Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education), and Dr. Tin Myo Myo Swe (Pro-Rector, Yangon University of Education) for their permission to carry out this study successfully. Secondly, we would like to express our thanks to Dr. Khin Mar Khine (Professor and Head of Department of Curriculum and Methodology, Yangon University of Education) and Dr. Swe Swe Nyunt (Professor, Department of Curriculum and Methodology, Yangon University of Education) for her valuable suggestion, administration, management and great support during this study.

References

- Algani, Y. M. A. (2022). Role, need and benefits of mathematics in the development of society. *Journal for the Mathematics Education and Teaching Practices*, 3(1), 23-29. Retrieved June 29, 2023, from <https://dergipark.org.tr/en/download/article-file/2482784>
- Alubady, R. (2013). *Programming fundamental*. Babylon: University of Babylon College of Information Technology Press.
- Armstrong, T. (2009). *Multiple intelligence in the classroom* (3rd ed.). United States of America: ASCD Publication.
- Breaux, E., & Magee, M. B. (2010). *How the best teachers differentiate instruction*. New York: Eye on Education, Inc.
- Brooks, J. G., & Brooks, M. G. (1993). *The case for constructivist classrooms*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Carroll, J. B. (1987). New perspective in the analysis of ability. In R. R. Ronning, J. A. Glover, J. C. Conoley, & J. C. Witt (Eds.), *The influence of cognitive psychology on testing* (pp. 267-284). United States of America: University of Nebraska Press.
- Colendrino-Bucu, L., Guerrero, M. R., Pascual, B. M., & Mateo, R. A. S. (1997). *Introduction to psychology: A textbook in general psychology* (2nd ed.). Philippines: Rex Printing Company.
- D’Zurilla, T. J., & Nezu, A. M. (2010). Problem solving therapy. In K. S. Dobson (Ed.), *Handbook of cognitive-behavioral therapies* (3rd ed., pp. 197-225). United States of America: The Guildford Press.
- Daulay, K. R., & Ruhaimah, I. (2019). Polya’s theory to improve problem solving skills. *Journal of Physics*, 2(1), 1-6. Retrieved July 18, 2023, from <https://www.researchgate.net/publication/332681968-Polya-theory-to-improve-problem-solving-skill>
- Gardner, H. (2006). *Multiple intelligence: New horizons in theory and practice*. New York: Basic Books.
- Miller, M. A., & Stoeckel, P. R. (2011). *Client education: Theory and practice*. London: Josey and Bartlett Publishers.
- Ministry of Education (MoE). (2016). *National Education Strategic Plan 2016-2021: Summary*. The Government of the Republic of the Union of Myanmar.
- Montague, M., Warger, C., & Morgan, T. H. (2000). Solve it: Strategy instruction to improve mathematical problem solving. *Learning Disabilities Research and Practice*, 15(2), 110-116. Retrieved July 27, 2023, from <https://www.researchgate.net/publication/247641746-Solve-It-to-Improve-Math-Problem-Solving>
- National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.
- Nezu, A. M., Nezu, C. M., Ricelli, S., & Stern, J. (2015). Case formulation for the cognitive and behavioral therapies: A problem solving perspective. In C. M. Nezu & A. M. Nezu (Eds.), *The oxford handbook of cognitive and behavioral therapies* (pp. 129-152). United States of America: Oxford University Press.
- Ozmon, H. A., & Craver, S. M. (2003). *Philosophical foundations of education* (7th ed.). New Jersey: Pearson Education Inc.
- Phang, F. A. (2009). The pattern of physics problem solving from the perspective of metacognition. *European Journal of Education Studies*, 1(3), 1-10.

- Polya, G. (1957). *How to solve it: A new perspective of mathematical method* (2nd ed.). Princeton: Princeton University Press.
- Rahmat, T. (2020). The level of mathematical intelligence towards the solving of mathematical problem solving. *Journal of Physics*, 1(7), 20-54. Retrieved June 29, 2023, from <https://iopscience.iop.org/article/10.1088/1742-6596/147/1/012054>
- Richards, T. (2015). *Problem solving: Best strategies to decision making, critical thinking and positive thinking*. United States of America: Amazon Publisher.
- Schoenfeld, A. H. (1985). *Mathematical problem solving*. Orlando, FL: Academic Press.
- Schoenfeld, A. H. (1992). Learning to think mathematically: Problem solving, metacognition and sense making in mathematics. In D. A. Grouws (Ed.), *Handbook of research on mathematics teaching and learning: A project of National Council of Teachers of Mathematics* (pp. 334-370). United Kingdom: MacMillan Publishing Co, Inc.
- Wandberg, R. (2010). *Creative problem solving: What's a better way?* Minesota: Capstone Press.

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