

JOURNAL OF THE MYANMAR ACADEMY OF ARTS AND SCIENCE



Curriculum and Methodology, Educational Theory and Management

Vol. XXII, No.8, August, 2025

Myanmar Academy of Arts and Science

Journal of the Myanmar Academy of Arts and Science

Vol. XXII. No.8

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THE EFFECTS OF INTEGRATING INQUIRY-BASED LEARNING AND DIALOGIC TEACHING ON PRIMARY LEVEL SCIENCE LEARNING*

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Abstract

The main purpose of this study is to investigate the effects of integrating inquiry-based learning and dialogic teaching on science learning at primary school level. In order to promote student talk and inquiry skills in primary science classrooms, inquiry-based learning and dialogic teaching are integrated in this study. One of the mixed method research designs, the embedded research design was used in this study. It involved collecting and analyzing both quantitative and qualitative data and integrating the information within an experiment. For quantitative method, quasi-experimental design was used and the participant groups were selected by random sampling method. The pretest and posttest for science achievement were used for the experimental research. For qualitative method, an interview was taken in order to interpret the data. The target population is Grade Four students from Basic Education Schools. Four townships were randomly selected from four districts in Ayeyarwaddy Region. Four high schools were selected from these townships. Therefore, (215) Grade Four students and (4) primary science teachers participated in it. Quantitative research findings were calculated by using one-way analysis of covariance (ANCOVA). The results of this study showed that there was a significant difference in achievement between science learning of grade four students who received learning with integrating inquiry-based learning and dialogic teaching and those who received learning with the formal instruction. Moreover, students who participated in the interview had positive attitudes towards integrating inquiry-based learning and dialogic teaching before, during and after the experiment. Therefore, teaching with integrating inquiry-based learning and dialogic teaching has positive effects on primary level science learning.

Key words: inquiry-based learning, dialogic teaching, science, science learning, effects

Introduction

Science education not only helps children learn about science, but it contributes to the overall goals and objectives of the primary schools. One primary goal is the development of good citizens. Science education in Myanmar must meet the challenge of improving the scientific literacy of future citizens and of society as a whole. The main aim of teaching science in schools should be the development of scientific literacy first and foremost, with the acquisition of scientific knowledge second (Williams, 2011).

Inquiry played an important role in science education in the last two decades (Tsivitanidou, Gray, Rybska, Louca, & Constantinou, 2018). The process of scientific inquiry in science education involves the development of an understanding of scientific aspects of the world around through identifying questions; formulating hypotheses; planning and carrying out investigations; analyzing data; interpreting results; and developing explanations.

Learning to become a legitimate participant in a community involves learning how to talk (Wenger, 1998, as cited in Osborne & Dillon, 2010). As a shared form of knowledge, scientific understanding is inseparable from the written and spoken word. There are no boundaries, no walls between the doing of science and the communication of it; communicating is the doing of science.

* First Prize (2023)

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Primary science has a role in building a foundation for scientific literacy through the development of ideas, skills and attitudes (Harlen & Qualter, 2004). Schroeder et al., (2007, as cited in Tsivitanidou, Gray, Rybska, Louca, & Constantinou, 2018) has shown that inquiry strategies demonstrated a statistically significant positive influence on students' achievements and learning when compared with the traditional teaching methods used in instruction of the control groups. Jones pointed out that language is a tool used for the expression of information and ideas (Hassard, 2005). In the science classroom, bringing a variety of language modes is fundamental to helping students construct ideas: listening and talking; reading and writing; discussing and arguing; narrating and describing; using actions, images, and symbols.

Purpose of the Study

The main purpose of the study is to investigate the effects of science learning through integrating inquiry-based learning and dialogic teaching at primary school level in Myanmar.

The specific objectives of this study are as follows:

- To examine the attitudes of students towards the integrating inquiry-based learning and dialogic teaching
- To make suggestions and recommendations based on the data obtained from the study for the improvement of teaching and learning in primary science

Research Questions

The research questions for this study are as follows:

1. Is there a significant difference in science achievement between science learning of Grade Four students who received learning with integrating inquiry-based learning and dialogic teaching and those who received learning with the formal instruction?
2. What are the Grade Four students' attitudes towards integrating inquiry-based learning and dialogic teaching?

Scope of the Study

This study was geographically restricted to Ayeyarwaddy Region. Four sample schools were selected in this study. Participants in this study were (215) Grade Four students from the selected schools during the period within the Academic Year (2022-2023). The study is limited to the content area of four chapters from Grade Four science textbook prescribed by the Ministry of Education (MOE).

Definition of Key Terms

There are five definitions of key terms included for this study.

Inquiry-Based Learning: Inquiry-based learning is a learner-centered approach focusing on questioning, critical thinking and problem solving (Chu, Reynolds, Tavares, Notari, & Lee, 2017).

Dialogic Teaching: Dialogic teaching is an approach that capitalizes the power of talk to further students' thinking, understanding, and problem-solving (Reznitskaya & Wilkinson, 2015, as cited in Yaqubi & Rashidi, 2019).

Science: Science is the most ideal subject to help improve students' thinking ability, for it emphasizes inquiry, which in term permits students to construct their own knowledge through active investigation of objects and events (Collette & Chiappeta, 1989).

Science Learning: Science learning can mean two things: first, it can be the acquisition of subject knowledge and, second, it can mean learning the process of investigating and experimenting in science (Gillespie & Gillespie, 2007).

Effects: The effects of integrating inquiry-based learning and dialogic teaching are the science achievement and students' attitudes towards integrating inquiry-based learning and dialogic teaching.

Review of Related Literature

This section is concerned with the theoretical framework for inquiry-based learning and dialogic teaching, inquiry-based learning and dialogic teaching for primary science learning.

Theoretical Framework for Inquiry-Based Learning and Dialogic Teaching

In the theoretical framework of inquiry-based learning and dialogic teaching, constructivism, Piaget's developmental stage theory, social constructivism, Vygotsky's zone of proximal development (ZPD) and scaffolding are needed to consider for this study.

Constructivists view learning as the result of mental construction. Learning takes place when new information is built into and added onto an individual's current structure of knowledge, understanding and skills. Learning experiences based on constructivist theory often challenge students' ideas about the world. In constructivist learning theory, the key idea is that students actively construct their own knowledge: the mind of the student mediates input from the outside world to determine what the student will learn. Learning is active mental work, not passive reception of teaching (Woolfolk, 1993, as cited in Pritchard, 2009).

Jean Piaget is one of the best-known psychologists in the field of child development and learning. Piaget's developmental stage theory is a useful guide to intellectual growth. There are four stages in Piaget's developmental stage theory; (i) the sensori-motor stage, (ii) pre-operational stage, (iii) concrete operational stage, and (iv) formal operational stage. Grade Four students in this research are in concrete operational stage. In this stage, students become more able to take another's point of view and they begin to be able to take into account multiple perspectives. Although they can understand concrete problems, Piaget would argue that they cannot deal effectively with more abstract problems.

In social constructivist theory, emphasis is placed upon interaction between the learner and others. Social constructivism gives a high priority to language in the process of intellectual development. Dialogue becomes the vehicle by which ideas are considered, shared and developed. The dialogue is often with a more knowledgeable other. The role of the more knowledgeable other in formal learning situations is usually taken by a teacher. The teacher engages groups and individuals in dialogue and supports the development of understanding. The undertaking of this role is known as 'scaffolding'. To fully understand the concept of scaffolding, teacher needs to first look at the notion of a zone of proximal development (ZPD).

The zone of proximal development is a theoretical space of understanding which is just above the level of understanding of a given individual. In the zone of proximal development, a learner is able to work effectively, but only with support. The zone is necessarily different for each individual child. Sewell (1990, as cited in Pritchard, 2009) explained it that a child has partly mastered a skill but can act more effectively with the assistance of a more skilled adult or peer. Scaffolding is the process of giving support to learners at the appropriate time and at the

appropriate level of sophistication to meet the needs of the individual. Scaffolding can be presented through discussion and the provision of materials.

Inquiry-Based Learning

The University of Calgary's (2003, as cited in Blessinger & Carfora, 2014) institutional learning plan stated that inquiry-based learning is problem or question driven, typically has a small-group feature, includes critical discourse, is frequently multi-disciplinary, and incorporates research methods such as information gathering and synthesis of ideas. Inquiry-based learning offers opportunities to learners for achieving a better understanding of science concepts, principles and phenomena. Within an inquiry-based science teaching and learning context, learners are offered experiences in which they can develop an understanding of science concepts and generally connect concepts and ideas with phenomena experienced in everyday life.

The 5E instructional model is a series of instructional steps designed to result in students learning and science concepts with understanding. It is a useful tool for planning units and lessons that support inquiry-based learning in the classroom. The 5E model was developed by Dr. Rodger Bybee for the Biological Sciences Curriculum Study (BSCS) during the 1980s. The 5E instructional model is summarized as follows (By bee, 2006).

Engagement. This phase of the instructional model initiates the learning task. The activity should (1) make connections between past and present learning experiences, and (2) anticipate activities and focus students' thinking on the learning outcomes of current activities. The student should become mentally engaged in the concept, process, or skill to be explored.

Exploration. This phase of the teaching model provides students with a common base of experiences within which they identify and develop current concepts, processes, and skills. During this phase, students actively explore their environment or manipulate materials.

Explanation. This phase of the instructional model focuses students' attention on a particular aspect of their engagement and exploration experiences and provides opportunities for them to verbalize their conceptual understanding, or demonstrate their skills or behaviors. This phase also provides opportunities for teachers to introduce a formal label or definition for a concept, process, skill, or behavior.

Elaboration. This phase of the teaching model challenges and extends students' conceptual understanding and allows further opportunity for students to practice desired skills and behaviors. Through new experiences, the students develop deeper and broader understanding, more information, and adequate skills.

Evaluation. This phase of the teaching model encourages students to assess their understanding and abilities and provides opportunities for teachers to evaluate student progress toward achieving the educational objectives.

Dialogic Teaching

Effective teaching involves persuading children of the value of the scientific idea teachers want them to learn. Children can work collaboratively to share ideas and make sense of the scientific view. Meaningful learning depends on the children appreciating the explanatory power of the scientific view and how it can provide them with useful ways of thinking and talking about the world. Dialogic teaching involves talk that is cumulative, supportive, reciprocal, collective, and purposeful (Alexander, 2006).

Dialogic teaching harnesses the power of talk to engage children, stimulate and extend their thinking, and advance learning and understanding (Alexander, 2006). Through dialogue, teachers find out what children think, engage with their developing ideas and help them to overcome misunderstandings. The chance to hear children talking is an invaluable assessment opportunity for their teachers. Some resources usefully promote talk in science. These may be concrete resources; a particular piece of software; Concept Cartoons; science poems or stories; non-fiction books, or a classroom visitor. A particular resource which can promote talk in primary science is 'talking points' (Dawes, 2008, as cited in Loxley, Dawes, Nicholls, & Dore, 2010).

Mortimer and Scott (2003) made a clearer distinction between different approaches constituting communication in the science classroom. Mortimer and Scott's framework for describing classroom discourse consists of four categories generated from the combination of two dimensions: interactive/non-interactive and authoritative/dialogic. According to Mortimer and Scott (2003), in the interactive/dialogic approach, the teacher listens to, and takes account of, the students' points of view, even though these might be quite different from the scientific view. In the context of more interactive teaching, dialogic interactions often occur when the teacher tries to elicit students' views. Dialogic interaction can also occur between students, especially when working on specific problems in small groups.

Science Teaching and Learning

Science is the system of knowing about the universe through data collected by observation and controlled experimentation. Science can be thought of as having three major components: (i) science is a body of knowledge, (ii) science is a process, a way of investigating, and (iii) science is a way of knowing or constructing understanding about the natural world. Learning and teaching science provides many practical suggestions for helping students acquire inquiry skills and science knowledge. In science teaching, scientists, science educators, and teachers contribute to the development of the individual. The learning outcomes of science courses should relate to the development of scientifically literate individuals who must acquire accurate and relevant scientific information. In the process, students must construct some of this knowledge through investigation.

Although science is a 'practical subject', science teaching occurs mainly through the medium of language, both spoken and written. It can be useful to divide the words of science into various types or categories. Through doing this, science teachers can become more aware of the language they use in classrooms (Wellington & Ireson, 2012). Each category of words acquires meaning in a different way, and it is this complexity that teachers of science need to be aware of naming words, scientific words, and concept words. Teachers need to tackle misconceptions about science through talk and practical teaching of accurate ideas (Gillespie & Gillespie, 2007). Moreover, effective teachers must understand how misconceptions develop. There are four main reasons why children develop misconceptions: language-based misconceptions; inaccurate information from adults; fact and fiction; and problems with the abstract.

An Instructional Design of Integrating Inquiry-Based Learning and Dialogic Teaching

An instructional design in this study is intended to improve science learning through integrating inquiry-based learning and dialogic teaching at primary school level in Myanmar.

According to this purpose, a new instructional design model was developed based on the Gagné-Briggs model, the Dick-Carey model of instructional design, the Gerlach-Ely instructional design model, Glynn's Teaching-with-Analogies Model, the practical inquiry model, Flanders' interaction analysis model, Talyzina's psychological cybernetic model and Khin Zaw's multi-modal model. In order to promote students' talks and inquiry skills in primary science classroom, inquiry-based learning and dialogic teaching are integrated in this instructional design. In this study, the instructional design of integrating inquiry-based learning and dialogic teaching contains seven steps of design. These are:

- (1) specification of content
- (2) identifying instructional goals and learning objectives
- (3) developing instructional strategy
- (4) developing and selecting instructional materials
- (5) instructional delivered steps
- (6) summative assessment, and
- (7) feedback

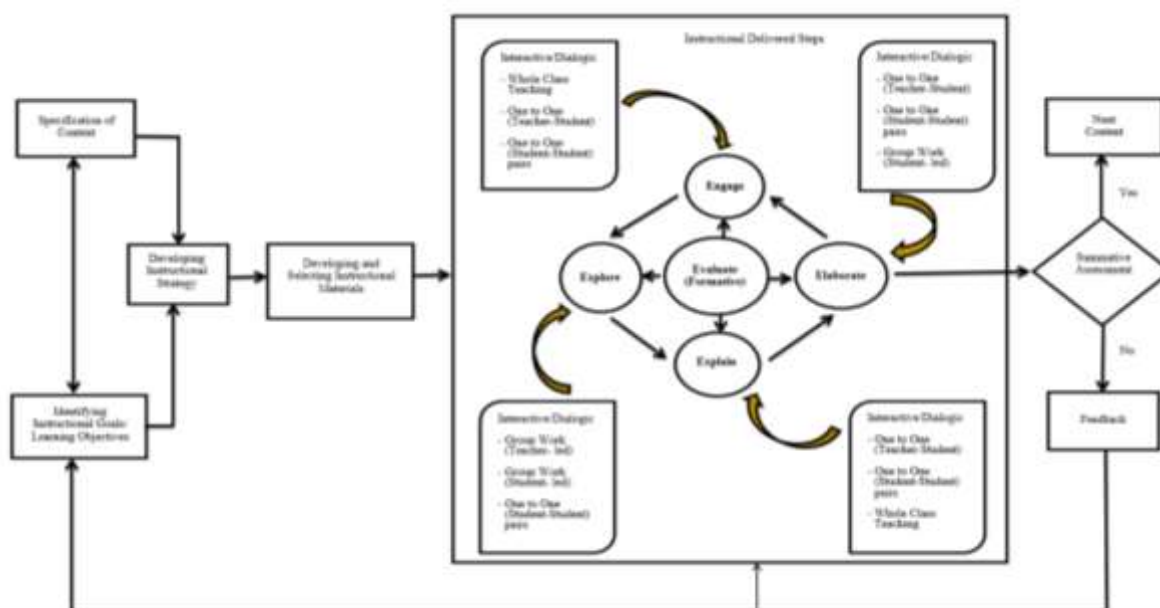


Figure: An Instructional Design of Integrating Inquiry-Based Learning and Dialogic Teaching

Method

This section presents the research design, sampling and procedure, and instrumentation.

Sampling and Procedure

The research design for this study was the embedded design (Creswell, 2012), Quan (qual). First, an instructional design of integrating inquiry-based learning and dialogic teaching was developed. Based on this design, sample lessons and learning materials were developed. The lesson concepts fit to the curriculum framework of Grade Four Science textbook. The target population is Grade Four students from Basic Education Schools. Among eight districts from Ayeyarwady Region, four districts were randomly selected. From these four districts, four townships were randomly selected. One basic education high school was selected from each

township; therefore, four basic education high schools were selected to collect the required data. The total of (215) Grade Four students were selected as samples for this study. Moreover, (4) primary teachers who are teaching science also participated in this study. The experimental research design was served as the quantitative method for this study. In the experimental design, one of the quasi-experimental designs: the nonequivalent control group design was chosen for receiving existing classrooms intact. From each selected school, two classrooms were chosen and these two classrooms were randomly assigned as the experimental group and the control group. The experimental group learned with integrating inquiry-based learning and dialogic teaching and the control group received the formal instruction. The intervention period was assigned for about four months. After the intervention, all the participants of the experimental and the control groups were assessed by posttest. Pretest and posttest formats were the same and so the time taken for them was forty minutes. For qualitative data collection, the interview was used before, during and after the intervention. In this research, semi-structured interviews were employed with students who were selected by purposive sampling method.

Instrumentation

To conduct this experimental research, the instruments were constructed in accordance with the selected research design. Therefore, learning materials and sample lessons that were based on the instructional design of integrating inquiry-based learning and dialogic teaching, a pretest, a posttest and their marking scheme were used. Interview was conducted to obtain in-depth information of the attitudes of students towards the science learning through integrating inquiry-based learning and dialogic teaching before, during and after the experiments.

Findings

Table 1 shows the one-way ANCOVA results for the pretest score of Grade four students in all selected schools.

Table 1 One-way ANCOVA Results for the Pretest Score in All Selected Schools

School	Group	N	M	SD	MD	F	p
S1	Experimental	28	13.96	3.80	- 0.37	0.14	.709 (ns)
	Control	27	14.33	3.49			
S2	Experimental	22	15.55	3.33	2.64	6.01	.018*
	Control	23	12.91	3.84			
S3	Experimental	28	12.18	3.77	0.37	0.13	.720 (ns)
	Control	27	11.81	3.71			
S4	Experimental	30	15.83	2.56	- 0.14	0.05	.829 (ns)
	Control	30	15.97	2.17			

Note. ns = not significant, * $p < .05$

The results in Table 1 indicate that there was a significant difference between the experimental group and the control group on the overall pretest score in S2. Based on the fact that the experimental group is higher in overall pretest score than the control group in S2, it means that the two groups were not equated in initial science knowledge before the experiment.

There were no significant differences between the experimental group and the control group in the overall pretest score in S1, S3 and S4. Based on these results, there were no

significant differences in initial science knowledge between the two groups in S1, S3 and S4. Although S1, S3 and S4 were not significant differences in entry behavior between the two groups before the experiment, it does not guarantee that the two groups were equated on all variables.

Table 2 shows the one-way ANCOVA and descriptive results for the posttest score of Grade four students in all selected schools.

Table 2 One-way ANCOVA and Descriptive Statistics Results for the Posttest Score in All Selected Schools

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	p	η^2	EG	CG	EG	CG
S1	Pretest	1	22.54	.000***	.302	17.04	13.19	17.15	13.07
	Group	1	18.09	.000***	.258				
	Error	52							
S2	Pretest	1	31.89	.000***	.432	15.32	11.70	14.60	12.38
	Group	1	11.72	.001**	.218				
	Error	42							
S3	Pretest	1	71.33	.000***	.578	12.00	9.85	11.82	10.03
	Group	1	4.29	.043*	.076				
	Error	52							
S4	Pretest	1	21.57	.000***	.275	19.87	17.07	19.88	17.05
	Group	1	30.98	.000***	.352				
	Error	57							

Note. EG = Experimental Group; CG = Control Group

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

In S1, after adjusting the pretest scores (covariate), there was a significant difference in overall posttest scores between the experimental and control groups according to the adjusted mean scores ($M = 17.15$, $M = 13.07$) and $F(1, 52) = 18.09$, $p = .000$, with a large effect size (partial eta squared = .258). There was a significant relationship between the pretest scores (covariate) and the overall scores on posttest, $F(1, 52) = 22.54$, $p = .000$.

In S2, after controlling the pretest scores (covariate), there was a significant difference in overall posttest scores between the experimental and control groups according to the adjusted mean scores ($M = 14.60$, $M = 12.38$) and $F(1, 42) = 11.72$, $p = .001$, with a large effect size (partial eta squared = .218). There was a significant relationship between the pretest scores (covariate) and the overall scores on posttest, $F(1, 42) = 31.89$, $p = .000$.

In S3, after controlling the pretest scores (covariate), there was a significant difference in overall posttest scores between the experimental and control groups according to the adjusted mean scores ($M = 11.82$, $M = 10.03$) and $F(1, 52) = 4.29$, $p = .043$, with a medium effect size (partial eta squared = .076). There was a significant relationship between the pretest scores (covariate) and the overall scores on posttest, $F(1, 52) = 71.33$, $p = .000$.

In S4, after adjusting the pretest scores (covariate), there was a significant difference in overall posttest scores between the experimental and control groups according to the adjusted

mean scores ($M = 19.88$, $M = 17.05$) and $F(1, 57) = 30.98$, $p = .000$, with a large effect size (partial eta squared = .352). There was a significant relationship between the pretest scores (covariate) and the overall scores on posttest, $F(1, 57) = 21.57$, $p = .000$.

The results in Table 2 show that there were significant differences in science achievement in the overall posttest scores between the experimental and control groups in all selected schools.

To answer the research question (2), students' interviews were conducted to obtain in-depth information of the students' attitudes towards integrating inquiry-based learning and dialogic teaching. Students' interviews were conducted before, during and after the experiment. A total of 12 students from the experimental group from each school who were assigned in group A, B, and C participated in the interview.

Students' responses to interview questions are presented as follow.

Before the experiment

33% of students from group A, B and C responded that they did not encounter the inquiry activities in their learning science lessons.

All students (100%) from group A, B and C described that they were happy in doing inquiry while learning science lessons.

75% of students who participated in the interview said that they enjoyed arguing scientific ideas in science lesson because they interacted with each other and they learned new ideas and understand the concept from listening their classmates' discussion.

During the experiment

75% of students from group A, B and C responded that they felt happy to discuss and listen to scientific ideas with classmates.

All students (100%) who participated in the group A, B and C claimed that they got new learning experiences in science by integrating inquiry-based learning and dialogic teaching.

67% of students from group A, B and C stated that they felt happy and excited during their science class section in this study.

33% of students from Group A, B and C said that they preferred to conduct one-to-one interaction; 59% of students were fond of participating in group discussion, and 8% of students liked to talk with the teacher while learning science in this study.

After the experiment

93% of students who participated in the interview expressed their views on science that it is a practical subject by doing investigations and exploring the things in their environment.

All students (100%) from group A, B, and C responded that they were happy in learning science in this study.

75% of students from group A, B and C commented that they wanted to continue to do inquiry activities and investigate the experiment in learning science.

According to these interview's results, it can be interpreted that students who participated in the interview had positive attitudes towards integrating inquiry-based learning and dialogic teaching before, during and after the experiment.

Discussion

This study mainly attempted to improve science learning through integrating inquiry-based learning and dialogic teaching at primary school level in Myanmar, and to examine the

attitudes of students towards that instructional design for giving suggestions and recommendations, and for the improvement of teaching and learning in primary science.

Research question (1) addresses the results of Grade Four students' science achievement on posttest. According to one-way ANCOVA and descriptive results on posttest scores, there were significant differences in science achievement on the overall posttest scores between the experimental and control groups in all selected schools. Moreover, the adjusted mean scores of the experimental groups were higher than the control groups in overall posttest scores. This means that the experimental groups have better science achievement than the control groups in all selected schools. Therefore, the results of the research question (1) state that there is a significant difference in science achievement between science learning of Grade Four students who received learning with integrating inquiry-based learning and dialogic teaching and that of students who received learning with the formal instruction.

This finding was consistent with Abdi (2014) who investigated the effects of inquiry-based learning method on students' academic achievement in fifth grade science lesson and showed that students who were instructed through inquiry-based learning were achieved higher score than the ones which were instructed through the traditional method. Moreover, the findings were consistent with results reported by Aydeniz, Cihak, Graham, and Retinger (2012), as well as Maxwell, Lambeth, and Cox (2015) who found that students taught with inquiry-based learning methods scored higher on content knowledge assessments as compared to students taught in a traditional manner.

According to the students' responses to interview questions, it was found that they got new learning experiences in science learning by using the instructional design based on inquiry-based learning and dialogic teaching. They were happy during their science class because they learned new knowledge and concepts by doing practical work and talking about science with their friends. According to Cross and Bowden (2014), speaking and listening are major vehicles for learning in science, different from writing and drawing. Students' learning will benefit when given very regular opportunities to talk and discuss as well as to write about their science. The development of literacy in science presents a wealth of opportunities for pupils to strengthen language and language skills in a very meaningful context.

While science education is acknowledged to play a fundamental role in building a culture of continuous innovation and in developing scientifically literate citizens, teaching science at an early age is crucial to begin early to build scientific literacy. Science is a practical subject that can be applied in real life. Science learning will be effective when it is taught in hands-on and minds-on activities.

According to Piaget's theory of cognitive development, students at the primary school level are still in the concrete operational stage. Abstract concepts in primary science would make the students difficult to understand the material being studied. Although students in the concrete operational stage begin to show some abstract thinking, newly concepts in Grade Four science such as spine, gravity, state of matter and electrical circuit made students difficult to identify and understand the concepts about them.

Piaget suggested that children make sense of their environments and construct reality based on their capabilities at the present time. Children impose their concepts on the world to

make sense of it. Teachers should apply it when they understand at what levels their students are functioning. They should keep in mind that all students in their classroom are not expected to operate at the same level. Teachers should try to ascertain levels and gear their science teaching accordingly. The teachers should evaluate the development levels of their students prior to planning lessons. The teachers also need to know how their students are thinking.

According to Khin Zaw (1993), man's communication system is not perfect and the human brain is not a noise-free channel nor a perfect communication system. Because of this fact, the science teachers should prepare the various resources before delivering the lesson and assured to encourage the students' talk and inquiry and to elicit their interest. To think critically and creatively, the teachers have to encourage their children to act autonomously and to teach the process skills with the help of real and concrete objects in their environment. Teachers should also provide a safe and challenging environment to facilitate a greater number of teachable moments.

Teachers also need to gain a clear understanding of the 5E inquiry-based learning model and the purpose of each phase of inquiry, and how the model is used to guide the implementation of science investigations. The science teachers should have the capacity to use effective questioning techniques and discourse to elicit, explore and probe their students' ideas in class discussions. Additionally, they need to develop the capacity to adjust their questioning to fit the instructional focus of a lesson or phase of inquiry. The teachers also need to extend the repertoire of discourse to support their questioning and to differentiate their management of class discussions during different phases of inquiry. Gillespie and Gillespie (2007) suggested that the science teachers need to tackle science misconceptions about science through talk and practical teaching of accurate ideas.

However, this study is not perfect in an effort because of the limited time and content area. In this study, only four content areas were studied. Therefore, the results could not represent the whole content area of the Grade Four Science textbook. On the basis of this study, some recommendations can be provided for future research.

1. In this study, sample schools were randomly selected from Ayeyarwaddy Region. Further research should be carried out in other regions and states to support the findings of the present study.
2. This study was focused on only three areas among five strands from Grade Four Science textbook. Further research should be carried out for the whole syllabus.
3. In the present study, randomly assigned individual student to the experimental and the control groups was difficult in real context and quasi-experimental design was adopted. Thus, a true experimental study should be conducted to generalize the present findings.
4. This study can be replicated in different schools with a larger sample size to increase generalizability and for different age groups.
5. One of the communicative approaches, interactive/dialogic, was used in the present study. Other studies should be carried out by other communicative approach.

Conclusion

Primary education is the foundation for the children since the new science curriculum is to be grounded in child- centered approach in Myanmar. The main reason to start teaching

science in primary school is to build scientific literacy early. Scientific literacy is the main goal of science teaching. Learning to think scientifically and to understand the scientific view of the physical and natural world takes time. Science experiences from the earliest grades are essential for helping students to learn to think and understand.

The main purpose of the study is to investigate the effects of science learning through integrating inquiry-based learning and dialogic teaching at primary school level in Myanmar. Inquiry-based learning is a pedagogical approach that engages learners actively in a knowledge-building process through the generation of answerable questions (Harada & Yoshina, 2004, as cited in Chu, Reynolds, Tavares, Notari, & Lee, 2017). Harnessing the power of talk to stimulate and promote students' thinking and learning requires a special type of teaching commonly referred to as dialogic teaching (Gillies, 2020). In the dialogic classroom, questions are open and more divergent and designed to promote meaningful inquiries; teachers provide students with constructive feedback; and students take on key responsibilities for the flow of the discussion. One form of interaction used in this study, the interactive and dialogic approach where the teacher actively listens to students' ideas and seeks to explore and elicit their ideas further by asking questions that demonstrate a genuine interest in the issue under discussion. According to Mortimer and Scott (2003), in dialogic classrooms, teachers need to be very adept at using language that not only builds on students' ideas but also enables the teacher to present and model the canonical ways of reasoning in science relevant to the topic under discussion.

Based on the quantitative and qualitative findings in this study, it is observed that there is a significant difference in science achievement between science learning of Grade Four students who received learning with integrating inquiry-based learning and dialogic teaching and that of students who received learning with the formal instruction. It is also investigated that the effects of integrating inquiry-based learning and dialogic teaching on students' science learning are better achievement in scientific knowledge, and positive attitudes towards integrating inquiry-based learning and dialogic teaching. In conclusion, the present study could contribute to some extent for improving the science learning through integrating inquiry-based learning and dialogic teaching at the primary school level in Myanmar.

Acknowledgements

We would like to express our gratitude 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 permitting us to conduct this research successfully. 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.

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AN ANALYTICAL STUDY OF PRE-SERVICE TEACHERS' PEDAGOGIC SKILLS IN CLASSROOM TEACHING*

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Abstract

The main purpose of this study is to investigate pre-service teachers' pedagogic skills in classroom teaching. Pedagogic skills are teaching skills or activities carried out by the teachers to foster meaningful learning for the learners. This study was conducted with convergent parallel design (QUAN+QUAL), which is one of the basic mixed methods designs. The one-group pretest-posttest design was used in the quantitative study whereas case study research design was used in the qualitative study. The participants were Second Year pre-service teachers at Sagaing University of Education in 2019-2020 Academic Year. The research instruments are pretest, posttest, a set of questionnaire, analytic rubrics for observation, and interview questions. In this study, the quantitative and qualitative data were simultaneously collected, merged them, and used the results to understand the research questions. For the quantitative data analysis, descriptive statistics and inferential statistics were used. In order to determine the progress of the participants in each of their pedagogic skills, pretest and posttest scores obtained from the quantitative study were compared with paired samples *t* test. The pre-service teachers' attitudes towards pedagogic skills were analyzed using descriptive statistics (mean and percentage). For the qualitative study, the observation data were converted into numbers and analyzed quantitatively. In addition, thematic analysis was used for reporting themes within the interview data. Quantitative and qualitative data were merged through methodological and data triangulation. According to the research findings, the instructional behaviour of pre-service teachers in their pedagogic skills has been improved after using the pedagogic skills model.

Key words: pedagogy, skills, pedagogic skills, signature pedagogy, pre-service teachers

Introduction

Pre-service teachers who choose the teaching profession need to have the professional traits. Since the improvement of basic education in the future depends on the quality of pre-service teachers, they should be trained to access the necessary skills in their teaching. The pedagogic skills required for the pre-service teachers can be provided according to signature pedagogies of Shulman (2005). Signature pedagogies are the types of teaching that organize the fundamental ways in which future practitioners are educated for their professions. A signature pedagogy has three dimensions: surface structure, deep structure and implicit structure. If pre-service teachers are trained to have pedagogic skills using signature pedagogies, it will improve the pedagogic skills of pre-service teachers and lead to the improvement of student learning in their classroom.

In Myanmar, there is a challenge to produce qualified teachers in pre-service teacher education. Major changes are needed to improve the quality of teaching and learning in teacher education institutions. Pre-service teacher education suffers from an overloaded and outdated curriculum and there are limited opportunities for trainees to apply their learning through practicum. Improving the quality of classroom teaching is essential to improve student learning achievement in schools (Ministry of Education [MOE], 2016). There is a need to improve the pedagogic skills of pre-service teachers during their classroom teaching. Therefore, this study will contribute the improvement of pre-service teachers' classroom teaching through the pedagogic skills model.

*Second Prize(2023)

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Purpose of the Study

The main purpose of this study is to investigate pre-service teachers' pedagogic skills in classroom teaching. The specific objectives of the study are as follows.

1. To investigate the effectiveness of the pedagogic skills model for pre-service teachers.
2. To explore the attitudes of pre-service teachers towards pedagogic skills.
3. To examine the knowledge and skills of pre-service teachers who have learned about pedagogic skills by using the pedagogic skills model.
4. To make suggestions and recommendations for improving pre-service teachers' pedagogic skills in teacher education.

Research Questions

1. Is there any difference in pre-service teachers' pedagogic skills between the pretest and posttest using the pedagogic skills model?
2. What are the differences between the performance of pre-service teachers in their pedagogic skills before and after using the pedagogic skills model?
3. What are the attitudes of pre-service teachers towards pedagogic skills?
4. What are the knowledge and skills of pre-service teachers who have learned about pedagogic skills by using the pedagogic skills model?
5. To what extent does the pedagogic skills model impact on instructional behaviour of pre-service teachers regarding their pedagogic skills?

Scope of the Study

This study was conducted to improve the pedagogic skills of pre-service teachers in planning and preparation, lesson presentation, and assessing students' progress. The participants are Second Year pre-service teachers in the 2019-2020 Academic Year at Sagaing University of Education. This study was conducted in May 2022 due to the Covid-19 pandemic.

Definition of Key Terms

Pedagogy

Pedagogy is the act of teaching together with its attendant discourse. It is what one needs to know, and the skills one needs to command in order to make and justify the many different kinds of decisions by which teaching is constituted (Alexander, 2003, as cited in Cogill, 2008).

Skills

In the educational context, skills are referred to as achievements and/or behaviours to be acquired through practice or training to facilitate the student learning and classroom management (Irvine, 1997, as cited in Chong & Cheah, 2009).

Pedagogic Skills

Teachers' knowledge about classrooms, personal knowledge about specific students and their families, assessments, students' motivation, and social interaction skills are considered as pedagogic skills (Clark & Walsh, 2002, as cited in Rafique & Aziz, 2019).

Signature Pedagogies

Signature pedagogies are defined as the types of teaching that organize the fundamental ways in which future practitioners are educated for their new professions. It has three dimensions: surface structure, deep structure, and implicit structure (Shulman, 2005).

Pre-service Teachers

Pre-service teachers are those who are getting training to become teachers and they are known by different names like would-be teachers, pupil-teachers, student-teachers and future-teachers (Parvez & Shakir, 2013).

Review of Related Literature

Educational philosophy is actually the resultant merger of the study of philosophy with the knowledge of children and learning psychology. Without a sound educational philosophy, there can hardly be sound policy and sound pedagogic practice. Expert pedagogues and learned educators contend such practice will lower both the quality and prestige of teacher education (Khin Zaw, 2013).

Research into teacher education development indicates that improvement in pedagogical practices requires professional development program that develops and upgrades pedagogic knowledge and skills over a sustained period of time, starting with the provision of higher education of pre-service teacher education and training and continuing throughout a teacher career through the provision of in-service education and training (Khin Zaw, 2013). Therefore, this study was conducted to develop a pedagogic skills model for the improvement of pre-service teachers' pedagogic skills. The pedagogic skills model was designed on the basis of philosophical foundations concerning pragmatism, progressivism, reconstructionism, constructivism, and behaviourism to bridge the gap between theory and practice, and to cultivate well-qualified teachers in pre-service teacher preparation programs.

The pedagogic skills model is based on pedagogy in relation to learning theories in the field of education such as behaviourist pedagogy, progressivist/constructivist pedagogy, social psychological pedagogy, and critical pedagogy. Then, the pedagogic skills model is constructed on the basis of reflective decision making model, pedagogical competence model, Flanders' interaction analysis model, Gilbert's praxeonomic training model, and Kirkpatrick's model for evaluation of a training program.

The training for pre-service teachers' pedagogic skills typically focuses on providing specific skills for their teaching profession. The pedagogic skills model for pre-service teachers is designed with three phases. The first phase is identified as an initial assessment. In this phase, a pretest about the pedagogic skills and an observation form to observe the pedagogic skills of pre-service teachers are used. The second phase refers to training pedagogic skills through signature pedagogy. The third phase of the model is outcomes analysis.

Method

Research Design

In this study, one of the basic mixed methods designs, the convergent parallel design (QUAN+QUAL) was used. According to Mills and Gay (2016), quantitative and qualitative data are given equal attention and emphasis, and are collected concurrently throughout the same study in this design.

Population and Sample Size

The participants were Second Year pre-service teachers at Sagaing University of Education. The population was 94 Second Year pre-service teachers. Among them, the sample size was assigned to 30 participants of the population. The participants were selected with stratified random sampling method for the involvement of the study.

Instruments

In this study, pretest, posttest and a set of questionnaire based on the pedagogic skills were used for the quantitative study. For the qualitative study, the analytic rubrics for observation, and interview questions were used to investigate the pedagogic skills of pre-service teachers.

Procedure

The pedagogic skills model for pre-service teachers was designed based on the literature review. The instruments required for the study were constructed. After that, the validation for the instruments was taken from the expert educators. Next, a pilot study was conducted at the University for the Development of the National Races of the Union. Then, the main study was conducted at Sagaing University of Education.

Data Analysis

For the quantitative study, pretest and posttest scores from the quantitative study were compared with paired samples *t* test. The attitudes of pre-service teachers towards pedagogic skills were analyzed using descriptive statistics (mean and percentage). For the qualitative study, the observation data were converted into numbers and analyzed quantitatively. In addition, thematic analysis was used for identifying, analyzing and reporting themes within the interview data to organize and describe them in detail. Quantitative and qualitative data were merged through triangulation.

Findings

Quantitative Research Findings

In the quantitative research findings, the levels of outcomes analysis: results and reaction of pre-service teachers on their pedagogic skills are described. At the results level, pre-service teachers' pedagogic skills are explained with the posttest whether they have progress in comparison with the pretest according to test scores of each pedagogic skill. At the reaction level, the pre-service teachers' attitudes towards the pedagogic skills are described.

Research Findings of Pretest and Posttest on Pedagogic Skills

In order to compare a single group's performance at two different times, they were analyzed by using nonindependent samples *t* test. The results of pre-service teachers' pedagogic skills on pretest and posttest are described in Table 1.

Table 1. *t* Values for Test Scores of Pre-service Teachers' Pedagogic Skills

No.	Paired Samples		<i>n</i>	<i>M</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>	Eta squared
1.	Planning and Preparation	Before	30	8.83	-0.67	-3.16	29	.004**	.26
		After	30	9.50					
2.	Lesson Presentation	Before	30	8.57	-0.46	-2.38	29	.024*	.16
		After	30	9.03					
3.	Assessing Students' Progress	Before	30	6.33	-1.87	-6.26	29	.000***	.58
		After	30	8.20					

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

According to Table 1, the posttest scores were higher than the pretest scores on planning and preparation, lesson presentation and assessing students' progress because the mean

difference was 0.67, 0.46, and 1.87. Therefore, there was a significant difference between the scores on each pedagogic skill before and after using the pedagogic skills model. According to Cohen (1988, as cited in Pallant, 2013), the guidelines for interpreting eta squared value are .01 = small effect, .06 = moderate effect, and .14 = large effect. In this study, the eta squared value of .26, .16, and .58 showed that there has a large effect of the pedagogic skills model on planning and preparation, lesson presentation and assessing students' progress of pre-service teachers. It can be interpreted that the use of the pedagogic skills model has a significant effect on each pedagogic skill of pre-service teachers.

Findings of Pre-service Teachers' Attitudes towards Planning and Preparation

The pre-service teachers' attitudes towards planning and preparation were analyzed by using descriptive statistics. The responses of pre-service teachers are described in Table 2.

Table 2. Pre-service Teachers' Attitudes towards Planning and Preparation

Item	Statement	n	M	Percentage (%)			
				SD	D	A	SA
1	Making teaching smooth and effective in the classroom	30	3.93	-	-	6.7	93.3
2	Planning a detailed lesson plan for effective teaching	30	3.70	-	-	30.0	70.0
3	Identifying the instructional objectives for the lesson	30	3.73	-	-	26.7	73.3
4	Facilitating the teaching and learning process by planning and preparation	30	3.67	-	-	33.3	66.7
5	Evaluating students' learning prior to teaching and learning process	30	3.27	3.3	3.3	56.7	36.7

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree.

According to Table 2, most of the pre-service teachers accepted that lesson preparation with a detailed plan makes their teaching smooth and effective in the classroom. Therefore, it can be interpreted that identifying clear objectives, and preparing a detailed instructional procedure and assessment facilitate the teaching learning process.

Findings of Pre-service Teachers' Attitudes towards Lesson Presentation

The pre-service teachers' attitudes towards lesson presentation were analyzed by using descriptive statistics. The responses of pre-service teachers for each item of lesson presentation are described in Table 3.

Table 3. Pre-service Teachers' Attitudes towards Lesson Presentation

Item	Statement	n	M	Percentage (%)			
				SD	D	A	SA
1	Making the lesson content clear and appropriate to the learning outcomes	30	3.47	-	3.3	46.7	50.0
2	Using a variety of question types during the lesson to get students' attention	30	3.13	-	6.7	73.3	20.0
3	Making students noticeable importance of the lesson by providing clear instruction	30	3.63	-	-	36.7	63.3
4	Manifesting important ideas and concepts of the lesson by using appropriate instructional materials	30	3.70	-	-	30.0	70.0
5	Asking questions to make verbal interaction in the classroom	30	3.27	-	-	73.3	26.7

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree.

According to Table 3, most of the pre-service teachers accepted that providing clear instruction with the established objectives and with the related examples makes the lesson content clear for the students and facilitate their learning. They also accepted that asking different types of questions maintains their students' attention and affects the interactions between the teacher and the students. Therefore, it is sure that the learning experiences the teacher set up help students achieve the intended learning outcomes by themselves.

Findings of Pre-service Teachers' Attitudes towards Assessing Students' Progress

The pre-service teachers' attitudes towards assessing students' progress were analyzed by using descriptive statistics. The responses of pre-service teachers for each item of assessing students' progress are described in Table 4.

Table 4. Pre-service Teachers' Attitudes towards Assessing Students' Progress

Item	Statement	n	M	Percentage (%)			
				SD	D	A	SA
1	Using appropriate assessment activities to determine knowledge and understanding of students	30	3.40	-	3.3	53.4	43.3
2	Using assessment techniques that are tailored to the purpose for which it is intended	30	3.63	-	-	36.7	63.3
3	Identifying students' readiness for future learning by assessing their progress	30	3.40	-	3.3	53.4	43.3
4	Providing educative feedback about students' progress	30	3.30	3.3	-	60.0	36.7
5	Determining how well the content is being learned through classroom assessment	30	3.57	-	-	43.3	56.7

Note. SD = Strongly Disagree; D = Disagree; A = Agree; SA = Strongly Agree.

According to Table 4, most of the pre-service teachers accepted that students can be provided with educative feedback for future learning through the assessment of their progress. Therefore, it can be interpreted that the regular assessment of students' progress makes the teaching-learning process effective in the classroom.

Qualitative Research Findings

For the purpose of exploring pre-service teachers' performance in classroom teaching as well as their knowledge and skills, the behaviour and learning of pre-service teachers on their pedagogic skills were examined in the qualitative study. At the behaviour level, the performance of pre-service teachers on their pedagogic skills is explained in terms of the observation data during their classroom teaching. At the learning level, the knowledge and skills of pre-service teachers who have learned about pedagogic skills are described based on the responses of participants to interview questions.

Research Findings of Pre-service Teachers' Performance from Observation

The pre-service teachers' pedagogic skills were observed with analytic rubrics before and after using the pedagogic skills model. The pre-service teachers' performance levels on pedagogic skills were assigned as advanced, proficient, basic and unsatisfactory respectively. The observation data were converted into numbers as 1 = unsatisfactory, 2 = basic, 3 = proficient, and 4 = advanced. They were analyzed quantitatively by using descriptive statistics (mean). Then, the results were turned into narrative accounts and descriptions based on the criteria which are described in the analytic rubrics.

Findings of Pre-service Teachers' Performance on Planning and Preparation

The performance levels of pre-service teachers before and after using the pedagogic skills model are described in Table 5.

Table 5. Pre-service Teachers' Performance Levels on Planning and Preparation

No.	Performance on Planning and Preparation	Level	
		Before	After
1.	Identifying instructional objectives	2	3
2.	Describing the rationale	1	3
3.	Including instructional materials	2	3
4.	Preparing instructional procedure	2	4
5.	Evaluating student learning	2	3
	Overall	2	3

Note. 1 = Unsatisfactory; 2 = Basic; 3 = Proficient; 4 = Advanced.

According to Table 5, after using the pedagogic skills model, the pre-service teachers were able to identify most of the instructional objectives correctly. They explained the reason for teaching the lesson. They prepared the materials related to the lesson. They provided instructional procedure in detail. They prepared evaluation component to be consistent with most of the predetermined objectives in the lesson plan.

Therefore, it was observed that the performance of pre-service teachers increased from basic level to proficient level on planning and preparation after using the pedagogic skills model.

Findings of Pre-service Teachers' Performance on Lesson Presentation

The performance levels of pre-service teachers before and after using the pedagogic skills model are described in Table 6.

Table 6. Pre-service Teachers' Performance Levels on Lesson Presentation

No.	Performance on Lesson Presentation	Level	
		Before	After
1.	Presenting instructional clarity	3	3
2.	Providing examples	2	3
3.	Changing instructional alternatives	2	2
4.	Applying questioning strategies	1	2
5.	Using sequence of questioning	2	3
	Overall	2	3

Note. 1 = Unsatisfactory; 2 = Basic; 3 = Proficient; 4 = Advanced.

According to Table 6, after using the pedagogic skills model, the pre-service teachers provided instruction that helps students come to a clear and accurate understanding of important concepts of the lesson. They provided examples related to the lesson. They varied the instructional alternatives which are suitable to the students for their engagement in the lesson. They used the divergent questioning strategy to evoke a wide range of student responses in accordance with the sequences of questioning.

Therefore, it was observed that the performance of pre-service teachers increased from the basic level to the proficient level in providing examples related to the lesson as well as in asking questions according to the sequence of questioning. Moreover, their pedagogic skills increased from unsatisfactory level to basic level in using questioning strategies.

Findings of Pre-service Teachers' Performance on Assessing Students' Progress

The performance levels of pre-service teachers before and after using the pedagogic skills model are described in Table 7.

Table 7. Pre-service Teachers' Performance Levels on Assessing Students' Progress

No.	Performance on Assessing Students' Progress	Level	
		Before	After
1.	Assessing the prior knowledge and understanding	2	3
2.	Assessing the recall of new information	3	3
3.	Assessing the organization of the new content	2	3
4.	Assessing the deeper level of learning	1	2
5.	Using assessment techniques	1	2
	Overall	2	3

Note. 1 = Unsatisfactory; 2 = Basic; 3 = Proficient; 4 = Advanced.

According to Table 7, after using the pedagogic skills model, the pre-service teachers assessed the prior knowledge and understanding of some students. They assessed the recall of new information of some students. They assessed the organization of new content by some students. They assessed the deeper level of one student. They sometimes used the classroom assessment techniques to tailor the intended purpose of the assessment.

Therefore, it was observed that the performance of pre-service teachers increased from the basic level to the proficient level in assessing the prior knowledge and the organization of new content. In the same way, their pedagogic skills increased from the unsatisfactory level to the basic level in assessing the deeper level of learning and using assessment techniques after using the pedagogic skills model.

Research Findings from Interview Questions

The interview questions were analyzed with thematic analysis. The results are described based on planning and preparation, lesson presentation, and assessing students' progress.

Findings of Interview Questions on Planning and Preparation

The results of interview questions on planning and preparation are described in Table 8 based on the responses of the pre-service teachers.

Table 8. Results of Interview Questions on Planning and Preparation

Main Theme	Sub Theme
Factors on planning and preparation	▪ lesson content, objectives ▪ instructional materials, alternatives, procedure ▪ assessment
Implementation of planning and preparation	▪ preparation of instructional procedure ▪ including instructional materials ▪ listing what the teacher intends to teach
Challenges faced in planning and preparation	▪ using instructional materials ▪ varying instructional alternatives ▪ responding to students' questions
Contributions to future practices	▪ reducing how much thinking they will have to do during the lesson ▪ making teaching-learning process sequential and effective

Main Theme	Sub Theme
	▪ being aware of the facts that need preparing for teaching ▪ be able to construct a lesson plan systematically

Findings of Interview Questions on Lesson Presentation

The results of interview questions on lesson presentation are described in Table 9 based on the responses of the pre-service teachers.

Table 9. Results of Interview Questions on Lesson Presentation

Main Theme	Sub Theme
Factors on lesson presentation	▪ using instructional materials ▪ using questioning strategies ▪ varying instructional alternatives
Implementation of lesson presentation	▪ using instructional materials including blackboard ▪ using examples ▪ using different types of questions ▪ varying instructional alternatives
Challenges faced in lesson presentation	▪ exciting in teaching because of peers ▪ having anxiety while peer teaching at the beginning
Contributions to future practices	▪ becoming aware of the challenges faced in teaching ▪ getting experiences in peer teaching ▪ having self-confidence in teaching

Findings of Interview Questions on Assessing Students' Progress

The results of interview questions on assessing students' progress are described in Table 10 based on the responses of the pre-service teachers.

Table 10. Results of Interview Questions on Assessing Students' Progress

Main Theme	Sub Theme
Factors on assessing students' progress	▪ recalling new information ▪ organization of new content ▪ deeper level of learning
Implementation of assessing students' progress	▪ recalling new information ▪ organization of new content
Challenges faced in assessing students' progress	▪ asking questions to catch the important points of the lesson
Contributions to future practices	▪ attainment of the objectives of the lesson through assessing students' progress ▪ identifying the progress of the students ▪ determining the students' understanding through assessment ▪ examining the needs and student learning through assessment

Integration of Research Findings on Pedagogic Skills (QUAN+QUAL)

This study was conducted by utilizing a convergent parallel design which is one of the basic mixed methods designs. According to Creswell and Clark (2018), the qualitative and quantitative data were collected simultaneously instead of one after another in this design. Quantitative and qualitative data were merged through methodological and data triangulation. Methodological triangulation involved the use of both quantitative and qualitative research methods. Data triangulation involved the utilization of both quantitative and qualitative data collection methods (Denzin, 2012). The integration of quantitative and qualitative research findings is described in Table 11.

Table 11 Integration of Research Findings on Pedagogic Skills

Pedagogic Skill	Quantitative		Qualitative		Interpretation
	Results (eta squared)	Reaction	Behaviour	Learning	
PP	.26	Be effective teaching in the classroom	Proficient level	Reduce how much thinking they will have to do during the lesson	Pre-service teachers' pedagogic skills have been improved after using the pedagogic skills model.
LP	.16	Achieve intended learning outcomes	Proficient level	Have experiences in peer teaching	
ASP	.58	Facilitate the students' progress in teaching-learning process	Proficient level	Attainment of the objectives of the lesson	

Note. PP = Planning and Preparation; LP = Lesson Presentation; ASP = Assessing Students' Progress.

According to Table 11, it can be interpreted that the pedagogic skills model has a strong effect on instructional behaviour of pre-service teachers regarding their pedagogic skills.

Discussion

The purpose of this study was to investigate the pre-service teachers' pedagogic skills in classroom teaching. The first research question is about whether there are differences in pre-service teachers' pedagogic skills between the pretest and posttest after using the pedagogic skills model. According to the results, the use of the pedagogic skills model has a significant effect on the pedagogic skills of pre-service teachers. The results were in line with the study of Choy, Wong, Chong, and Lim (2013) who investigated the beginning teachers' pedagogical knowledge and skills.

The second research question is about investigating the performance of pre-service teachers on their pedagogic skills after using the pedagogic skills model. According to the results, the performance of pre-service teachers on planning and preparation, lesson presentation, and assessing students' progress was higher than before the use of that model. The results of the study were consistent with the findings of Choy, Wong, Chong, and Lim (2014) who showed that beginning teachers' self-perceived pedagogical knowledge and skills significantly increased at the end of their courses.

The third research question is set up for exploring the pre-service teachers' attitudes towards pedagogic skills. According to the results, identifying clear objectives, and preparing a detailed instructional procedure and assessment facilitate the teaching-learning process. Then, the

learning experiences the teacher sets up help students achieve the intended learning outcomes by themselves. Moreover, the regular assessment of students' progress makes the teaching-learning process effective in the classroom. The results of the study were in line with the study of Gultom, Hutaaruk, and Ginting (2020) who investigated about teaching skills of teachers in increasing student learning interest.

The fourth research question is about examining the knowledge and skills of pre-service teachers who have learned by using the pedagogic skills model. According to the results of the pre-service teachers' interviews, they accepted that it is necessary to identify the instructional objectives related to learning activities, organize the instructional procedure, and assess their students' progress. They agreed that they arranged a set of instructions on how to present the lesson that they intends to teach, and organized their students' thoughts by using the basic questioning strategies.

They stated that they had difficulties in their teaching-learning process due to the weakness of lesson preparation, and lesson presentation to catch the concept of the lesson. Moreover, they claimed that they can make teaching-learning process sequential and effective with careful planning and reduce how much thinking they will have to do during the lesson. The results of the study were consistent with the research findings of Tok (2010) who studied the problems of teacher candidates about teaching skills during teaching practice.

The last research question is about the impact of pedagogic skills model on pre-service teachers' instructional behaviour regarding their pedagogic skills. According to the results, pre-service teachers' pedagogic skills have been improved after using the pedagogic skills model. The findings were in conformity with the findings of Negassa and Engdasew (2017) who indicated that pedagogical skills training had an effect on their teaching skills.

Suggestions

Teachers' performance to promote student learning inside the classroom can enhance quality teaching. It includes selecting appropriate instructional objectives and assessments, employing varied instructional alternatives, creating a positive learning environment, and evaluating the impact of teaching on student learning. Thus, pre-service teachers should be able to construct a lesson plan systematically and become aware of the importance of the assessment component in planning and preparation for classroom teaching. They should take into account that explanations need to be clear and matched to the needs of the students. In addition, they should take in establishing and maintaining a highly interactive classroom using different types of questions. They should engage in the use of the pedagogic skills model for the improvement of instructional behaviour that helps their students learn in classroom teaching.

As teacher educators, the pedagogic skills model should be used to acquire active participation of pre-service teachers in teacher preparation programs by applying the theories that they have studied. Although the contents involved in the pedagogic skills model overlap with the regular courses for the Second Year pre-service teachers, they are provided with the opportunities to practice their pedagogic skills based on the theory that has been studied. The results of the study indicated the large effect of the pedagogic skills model on pre-service teachers' pedagogic skills. Therefore, the administrators from teacher education programs should take into consideration designing pedagogic skills improvement activities in the Second Year BEd courses for the improvement of their pedagogic skills to prepare them for practice teaching.

Recommendations

Research plays a vital role in addressing educational issues and searching for potential solutions (Creswell, 2012). This study was conducted to investigate the pedagogic skills of Second Year pre-service teachers at Sagaing University of Education. Therefore, the further research studies should be made based on the current study.

1. Replication of this study should be conducted with pre-service teachers at the other Universities of Education and Education Degree Colleges.
2. Further studies should be conducted as qualitative studies for each pedagogic skill to cover the research process and to avoid the constraints of time.

Conclusion

In the teacher education sector, the result of pre-service teachers training program is fundamental in developing the quality of teaching. Since the pedagogic skills of teachers are powerful forces for them, the teacher education program is required to cultivate pre-service teachers with effective pedagogic skills for their teaching. This study aimed at investigating the pre-service teachers' pedagogic skills in classroom teaching.

The research design applied in this study was the convergent parallel design (QUAN+QUAL) which is one of the basic mixed methods designs. In this design, quantitative and qualitative data were collected concurrently throughout the study. According to the research findings, the pedagogic skills of pre-service teachers have been improved after the use of pedagogic skills model.

In conclusion, pedagogic skills are a key requirement for the pre-service teachers who come into the teaching profession. Pedagogic skills help them lay the foundation for meaningful classroom learning for their students and the interaction between the students and the teachers in order to improve the quality of teaching in the classroom. For the pre-service teacher education program, it should make sure that the pre-service teachers have the required pedagogic skills before they embark on their teaching journey.

Acknowledgements

We would like to give a special 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 organizational support and permission to carry out this study. Especially, we would like to express our deepest appreciation to Dr. Khin Mar Khine (Professor and Head of Department of Curriculum and Methodology, Yangon University of Education) for her invaluable guidance and encouragement in this study.

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AN INVESTIGATION INTO READINESS AND ENGAGEMENT OF STUDENT TEACHERS TOWARDS BLENDED LEARNING IN SAGAING UNIVERSITY OF EDUCATION

Wai Wai Myint¹ and Wai Wai Oo²

Abstract

The purpose of this study is to explore readiness and engagement of student teachers towards blended learning in Sagaing University of Education. The design of this study was descriptive research design. A sample of (258) student teachers from Sagaing University of Education were selected by using cluster sampling. The instrument that measures the readiness for blended learning questionnaires with (33) items and the instrument for student teachers' engagement questionnaires with (25) items were applied. In pilot testing, the reliability value for the readiness towards blended learning was (.734) and that for the engagement towards blended learning was (.746) using Cronbach's alpha. The quantitative data were analyzed by using Statistical Package for Social Science (SPSS). In order to examine the readiness and engagement of student teachers towards blended learning, descriptive statistics (mean and standard deviation) were used. Independent samples *t* test were used to compare the readiness and engagement of student teachers towards blended learning in terms of gender and year of study. Pearson product-moment correlation was used for the relationship of the readiness and engagement of student teachers towards blended learning. The results showed that there was positively moderate correlation between the readiness and engagement of student teachers towards blended learning.

Keywords: blended learning, readiness, engagement, online learning, face-to-face learning

Introduction

Rapidly changing internet technologies have forced higher education worldwide. Additionally there has been a demand for quality learning and teaching at higher education institutions. Educational reform has been performed with respect to the integration of technology in daily classroom practices at higher educational level in Myanmar. Nowadays, digital technologies and digital classrooms become the most significant and dynamic issues in education sector. Since Myanmar is a lower level income country at the very early stage of ICT development, many challenges and barriers would be inevitably experienced both by teachers and students.

With the changing educational conceptions, teacher educators should be up-to-date with the latest technological development and give suggestions to the student teacher concerning technology advancement and up gradation. According to Livingstone (2015), higher education institutions must make every attempt to replace teacher-centered strategies with more student-centered approaches. One strategy many higher education institutions are using to facilitate a more student-centered approach is blended learning. Graham (2016) defined blended learning as the combination of traditional face-to-face learning and online learning.

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Therefore, for student teachers to prepare blended learning effectively is important in this technology age. The present study focuses on readiness and engagement of student teachers towards blended learning.

Purpose of the Study

The main purpose of this study is to investigate the readiness and engagement of student teachers towards blended learning. The specific objectives are as follows:

- To explore the readiness of student teachers towards blended learning in terms of gender and year of study.
- To investigate the engagement of student teachers towards blended learning in terms of gender and year of study.
- To find out the relationship between the readiness and the engagement of student teachers on blended learning.
- To make suggestions and recommendations based on the result of the study.

Research Questions

The research questions of this study are as follows:

1. What factors of readiness towards blended learning are perceived as the most important?
2. How do student teachers differ the readiness towards blended learning in terms of gender and year of study?
3. How do student teachers vary the engagement towards blended learning in terms of gender and year of study?
4. What is the relationship between the different factors of readiness and engagement towards blended learning?

Definition of Key Terms

Blended Learning : Blended learning is a combination of face-to-face instruction in classroom and technology-mediated learning, or a support of traditional teaching by using internet-based technology such as chat rooms, discussion groups, podcasts, and self-assessment tools (Sharma & Barrett, 2007).

Engagement : Engagement can refer to the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes (Kuh & Hu, 2001).

Online Learning : Online learning can be defined as acquiring knowledge and skills through synchronous and asynchronous learning applications (Thorne, 2003).

Operational Definition

Readiness : Readiness means the preparedness of students to perform learning activities in a learning environment.

Face-to-Face Learning : Face-to-face learning is an instructional method where course content and learning material are taught in person to a group of students.

Scope of the Study

This study is restricted to Sagaing University of Education. Student teachers who are studying BEd second year (first semester) and BEd fourth year (first semester) are selected as participants within 2022-2023 Academic Year.

Review of Related Literature

Blended Learning

Blended learning is a combination of face-to-face instruction in classroom and technology-mediated learning, or a support of traditional teaching by using internet-based technology such as chat rooms, discussion groups, podcasts, and self-assessment tools (Allan, 2007). During the technology-mediated learning mode of this learning environment, students are not required to physically gather in the same classroom, but they can connect digitally through online network. In blended learning course, students could involve in a class taught or directed by a teacher in a face-to-face classroom setting and complete online learning component of the course independently, outside of the classroom through online platform. Online learning experiences may replace classroom instruction and can include interaction with others or learning alone using an independent study. The different learning experiences are complementing each other, and managed to process in parallel (Cleveland-Innes & Wilton, 2018). In short, there are two main delivery modes of learning in the blended learning approach: face-to-face classroom learning and online-based learning experience. Hence, blended learning can refer to an incorporation of online learning tools and activities into face-to-face classroom instruction.

Blended Learning in Higher Education

Educational reform has been performed with respect to the integration of technology in daily classroom practices at higher educational level in Myanmar. Unfortunately, COVID 19 was announced by the World Health Organization (WHO) in January 2020 as a coronavirus disease outbreak and Myanmar confirmed its first two official cases of COVID-19 on 23 March 2020. Then, the Ministry of Education (MOE) called for the closing of all schools and higher education institutions. Face-to-face education has ended by numerous schools, colleges and universities. This was negative impact on educational activities, so social distance was crucial at this stage. This shutdown stimulated the growth of online learning activities so that there would be no interruption to education. Many faculties have been involved in how best to offer online course material, involve students, and perform evaluation. Nowadays, digital technologies and digital classrooms become the most significant and dynamic issues in the education sector. Since Myanmar is a lower level income country at the very early stage of ICT development, many challenges and barriers would be inevitably experienced both by teachers and students.

With the changing educational conceptions, Myanmar higher education institutions are now required to integrate learning management systems (LMS) in their courses and face-to-face instruction, creating a blended learning environment for their students. The LMS software is a popular approach for planning, delivering and managing blended learning models of instruction in higher education institutions. LMS, such as Moodle and Zoom provide tools to enable communications between lecturers and students online, track student activities, such as assignment submissions, discussion management, group work and other administrative tools

(Pellas & Kazandis, 2015). The most widely used LMS components in all higher education institutions are communications, followed by course delivery, productivity, content development and administration.

The use of social media was recommended by educators and students alike to facilitate interactions. Social media platforms such as Facebook Live, YouTube, Messenger, etc. have increasingly been integrated into the higher education learning experience and have been shown to stimulate student's engagement and collaborative work (Rigby et al., 2012). Studies show that frequent interaction and communication increase students' motivation. As technological devices and tools become more cost-effective and the internet network coverage is expanded, the implementation of blended learning in higher education can be seen to be more wide-ranging.

Higher education institutions are faced with the challenge to modify educational experiences in tandem with the rapid progress in information technologies, as well as the expectations of prospective students for higher quality blended learning experiences. In comparison with traditional face-to-face teaching, incorporation of blended learning has the potential to provide learning opportunities that allow students to engage more deeply with their subject matter and analyze and reflect at their own pace, and should not be limited to finding a new medium to deliver old content (Garrison & Kanuka, 2004). This move requires rethinking the teaching-learning relationship and will have profound yet uncertain implications on teaching practices and the way students engage with the university program.

Research Method

Research Design

The design used in this study was survey research design which is one of descriptive research designs. In this study, data were mainly collected through a quantitative method.

Subjects

The sample of this study were (258) student teachers from Sagaing University of Education. The participants in this study were second year (first semester) and fourth year (first semester) from this university. The participants were selected by using cluster sampling method. The selected population and sample size are presented in Table 1.

Table 1 Population and Sample Size

Year of Study	No. of Participants		Total
	Male	Female	
Second Year	51	57	108
Fourth Year	61	89	150
Total	112	146	258

Instruments

The instruments used in this study were questionnaires for readiness and engagement of student teachers towards blended learning. The survey instrument measuring student teachers' readiness was adapted from Tang and Chaw (2013) study on student readiness for blended learning. This instrument consisted of (33) items on six different dimensions of blended learning: Learning Flexibility (5 items), Online Learning (7 items), Study Management (4 items), Technology (5 items), Classroom Learning (5 items) and Online Interaction (7 items). The

instrument for the engagement of student teachers was constructed based on Student Engagement Questionnaires (SEQ) online scales (Coates, 2006). These instrument contained (25) items of five dimensions: Online Engagement (4 items), Online Social Interaction (4 items), Online Teaching (6 items), Online Collaboration (7 items), Online Academic Relevance (4 items). In order to support the questionnaires, open-ended questions were also used.

Procedure

First of all, in order of the required data, the instruments were constructed under the guidance of the supervisor. After preparing the questionnaires, an expert review was conducted by two expert teachers who have special knowledge from the Department of Curriculum and Methodology, Sagaing University of Education. After that, the questionnaires were modified again according to their advice and guidance. A pilot testing was conducted with (50) student teachers at University for Development of National Races (UDNR). Based on the result of pilot testing, some items were revised for clear understanding. The internal consistency of the questionnaire for attitudes towards blended learning was determined to be (.734) and that of the questionnaire for the engagement towards blended learning was (.746) using Cronbach's Alpha. According to Morgan, Leech, Gloeckner and Barrett (2013), the reliability values for both have acceptable reliability. And then, the permission of Rector from Sagaing University of Education was requested to distribute the instruments to all participants from this university. After a few weeks, all the instruments were returned, and then the data were analyzed by using the Statistical Package for the Social Science (SPSS 25).

Data Analysis

The responses of student teachers to the questionnaires were analyzed and calculated by using descriptive statistics and inferential statistics from the Statistical Package for the Social Science (SPSS 25). To examine the readiness of student teachers towards blended learning, descriptive statistics (mean and standard deviation) were used. Inferential statistics such as independent samples *t* test were used to compare the readiness and engagement of student teachers towards blended learning in terms of gender and year of study. Pearson product-moment correlation was used for the relationship of readiness and engagement of student teachers towards blended learning.

Research Findings

Findings of Research Question (1)

The answers of research questions No.1 “What factors of readiness towards blended learning are perceived as the most important?” were presented in this part.

This research question used descriptive statistics to ascertain that factors of readiness towards blended learning are the most important. The means and standard deviations were employed to examine the six readiness blended learning factors of student teachers. The criteria used to interpret mean values were as shown in Table 2.

Table 2 Interpretation of Score and Level

Score	Level
1.00 – 2.33	Low
2.34 – 3.66	Moderate
3.67 – 5.00	High

Table 3 shows the number of participants, minimum, maximum, means and standard deviations of the six blended learning readiness factors of student teachers.

Table 3 Means and Standard Deviations of Student Teachers' Readiness towards Blended Learning

Readiness towards BL	N	Minimum	Maximum	M	SD
Learning Flexibility	258	2	5	3.93	0.53
Online Learning	258	1	5	2.85	0.72
Study Management	258	1	5	3.03	0.69
Technology	258	1	5	3.26	0.55
Online Interaction	258	2	4	3.17	0.44
Classroom Learning	258	2	5	3.97	0.47

Note. BL= blended learning.

According to Table 3, the six readiness dimensions of blended learning for student teachers rated classroom learning ($M = 3.97$) followed by learning flexibility ($M = 3.93$) and technology ($M = 3.26$) as the more important readiness dimension of blended learning. Online learning was viewed as the least important ($M = 2.85$). Based on the levels identified in this study, the findings revealed student teachers' readiness are high level for classroom learning and learning flexibility. Moreover, student teachers in this study are at a moderate level of technology, online interaction, study management and online learning in readiness towards blended learning. In order to see clearly, Figure 1 is illustrated.

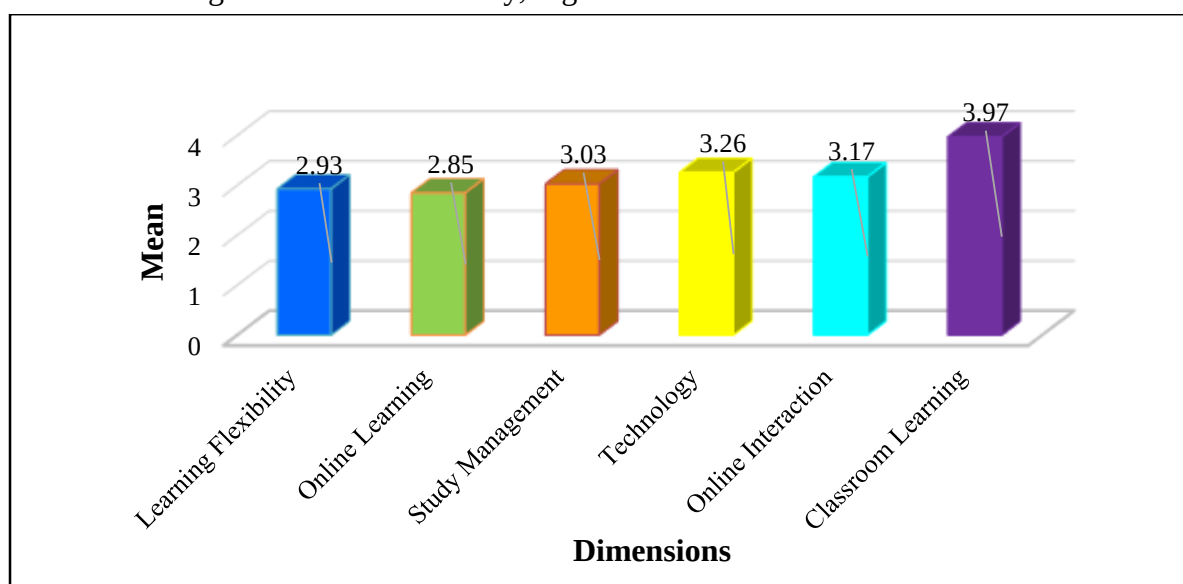


Figure 1. The comparison of means for each dimension of readiness towards blended learning.

Findings of Research Question (2)

The answers of research questions No.2 “How do student teachers differ the readiness towards blended learning in terms of gender and year of study?” were presented in this part.

(a) Comparison of Mean Scores on the Readiness towards Blended Learning in terms of Gender

Independent samples *t* test was performed to determine if any significant difference exists between readiness of male and female student teachers. Table 4 illustrates the means of the readiness of student teachers towards blended learning by gender to see clearly.

Table 4 t Values for the Readiness of Student Teachers towards Blended Learning in terms of Gender

Variable	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Readiness towards BL	male	112	208.97	21.01	256	0.618	.537 (ns)
	female	146	207.31	21.76			

Note. ns = not significant.

According to Table 4, it could be found that the means of male and female student teachers on the readiness towards blended learning were (208.97) in male and (207.31) in female respectively. The means of male and female student teachers were nearly the same. It showed that there was no significant difference between the male and female student teachers' readiness towards blended learning. According to this data, it can be interpreted that the attitudes of male and female student teachers towards blended learning were equivalent. It can be clearly seen in Figure 2.

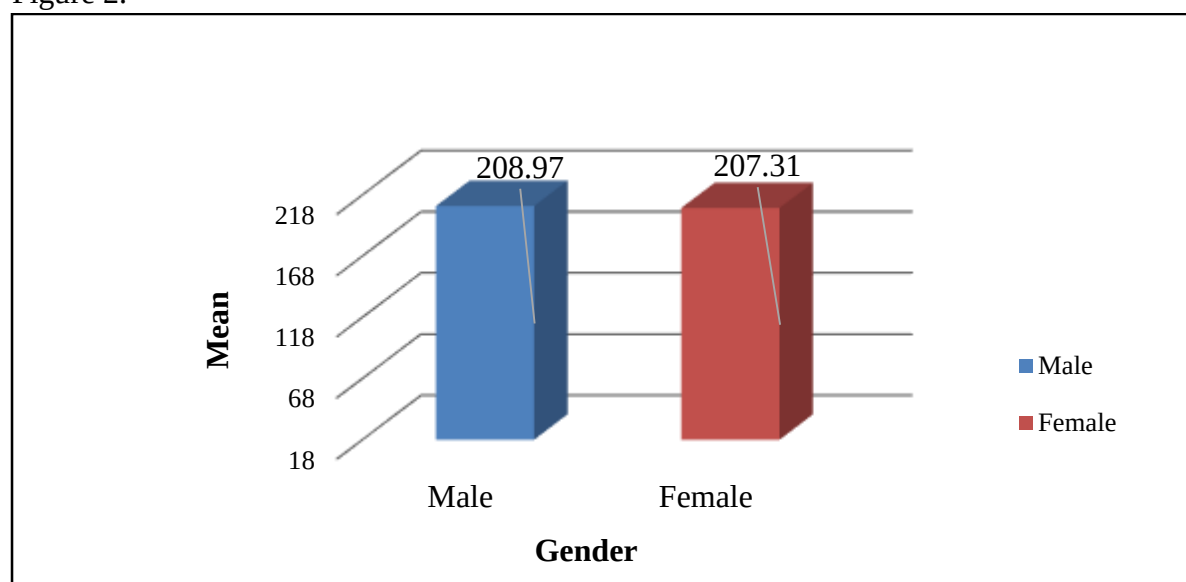


Figure 2. The comparison of means for readiness towards blended learning by gender.

(b) Comparison of Mean Scores on the Readiness towards Blended Learning in terms of Year of Study

Independent samples *t* test was performed to determine if any significant differences exists in readiness towards blended learning by year of study. Table 5 illustrates the means of the readiness of student teachers towards blended learning by year of study to see clearly.

Table 5 t Values for the Readiness of Student Teachers towards Blended Learning in terms of Year of Study

Variable	Year of Study	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Readiness towards BL	Second Year	108	204.6	21.07	156	-2.2	.029*
	Fourth Year	150	210.5	21.38			

Note. * $p < .05$.

Table 5 shows the means of fourth year student teachers ($M = 210.5$) was higher than that of second year student teachers ($M = 204.6$). Thus, the fourth year student teachers were significantly different from the second year student teachers on the readiness towards blended learning. It indicated that there was a significant difference in student teachers' readiness towards blended learning between the second year and fourth year student teachers. Therefore, the fourth year student teachers had more positive attitudes of readiness towards blended learning. To see clearly, Figure 3 is illustrated.

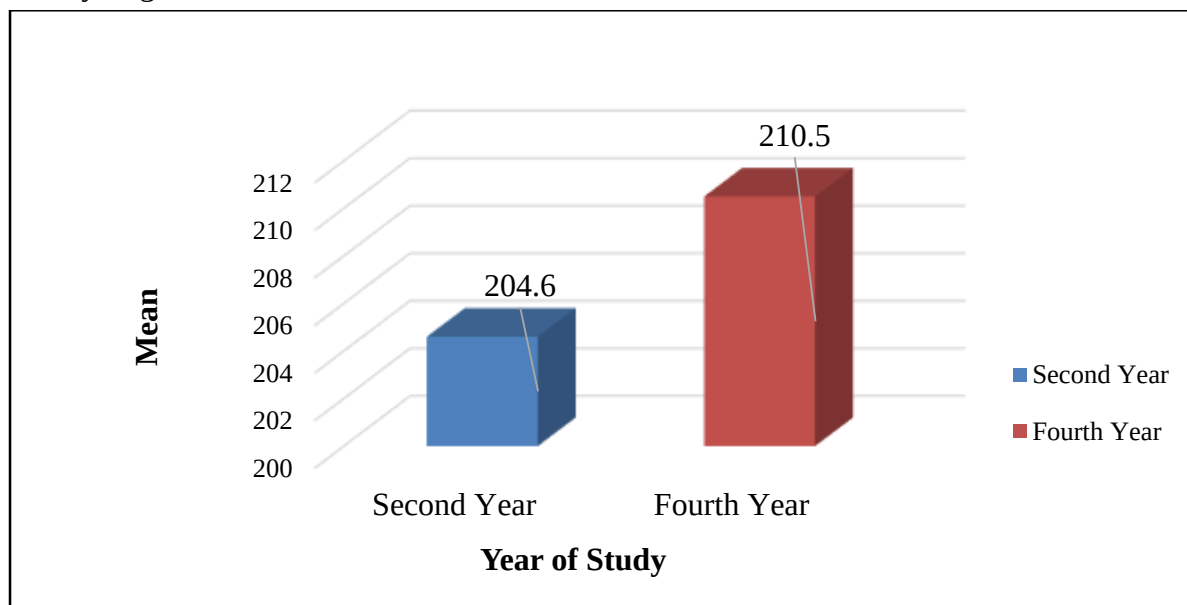


Figure 3. The comparison of mean for readiness towards blended learning by year of study.

Findings of Research Question (3)

The answers of research questions No.3 “How do student teachers vary the engagement towards blended learning in terms of gender and year of study?” were presented in this part.

(a) Comparison of Mean Scores on the Engagement towards Blended Learning in terms of Gender

To find out whether there is a significant difference in terms of gender, independent samples t test was used to examine the difference between the male and female student teachers. Table 6 illustrates the means of the engagement of student teachers towards blended learning by gender to see clearly.

Table 6 t Values for the Engagement of Student Teachers towards Blended Learning in terms of Gender

Variable	Gender	N	M	SD	df	t	p
Engagement towards BL	male	112	147.29	24.38	256	1.71	.089 (ns)
	female	146	142.41	20.45			

Note. ns = not significant.

According to Table 6, it can be found that the means of male and female on the engagement towards blended learning were (147.29) in male and (142.41) in female respectively.

It showed that there was no significant difference between the male and female student teachers' engagement towards blended learning. According to this data, it could be interpreted that the male and female student teachers had the same participation during blended learning activities. It can be clearly seen in Figure 4.

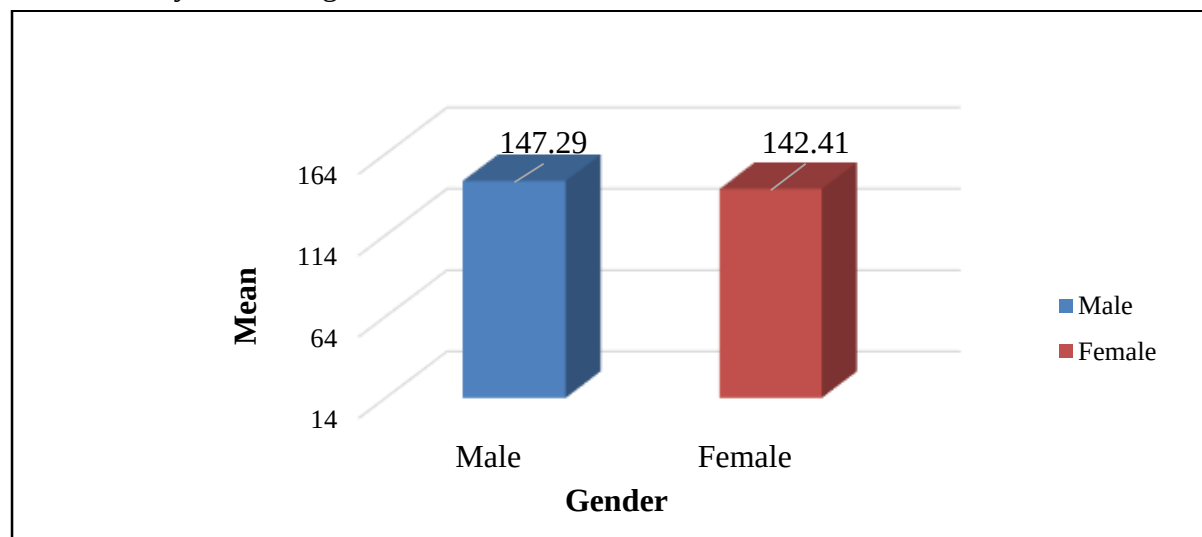


Figure 4. The comparison of means for the engagement towards blended learning by gender.

(b) Comparison of Mean Scores on the Engagement towards Blended Learning in terms of Year of Study

To explore whether there is a significant difference in terms of year of study, independent samples *t* test was used to examine the difference between years of study of student teachers. Table 7 illustrates the means of the engagement of student teachers towards blended learning by year of study to see clearly.

Table 7 *t* Values for the Engagement of Student Teachers towards Blended Learning in terms of Year of Study

Variable	Year of Study	<i>N</i>	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Engagement towards BL	Second Year	108	139.31	20.04	156	-3.25	.001**
	Fourth Year	150	148.29	23.19			

Note. ** $p < .01$.

Table 7 exhibits the means of the fourth year student teachers were significantly higher than those of the second year student teachers' engagement in blended learning. It indicates that there were a statically significant variation between the second year and fourth year student teachers to participate in blended learning activities. Therefore, the fourth year student teachers had a positive participation, completed their activities and assigned tasks during blended learning activities. In order to see clearly, Figure 5 is illustrated.

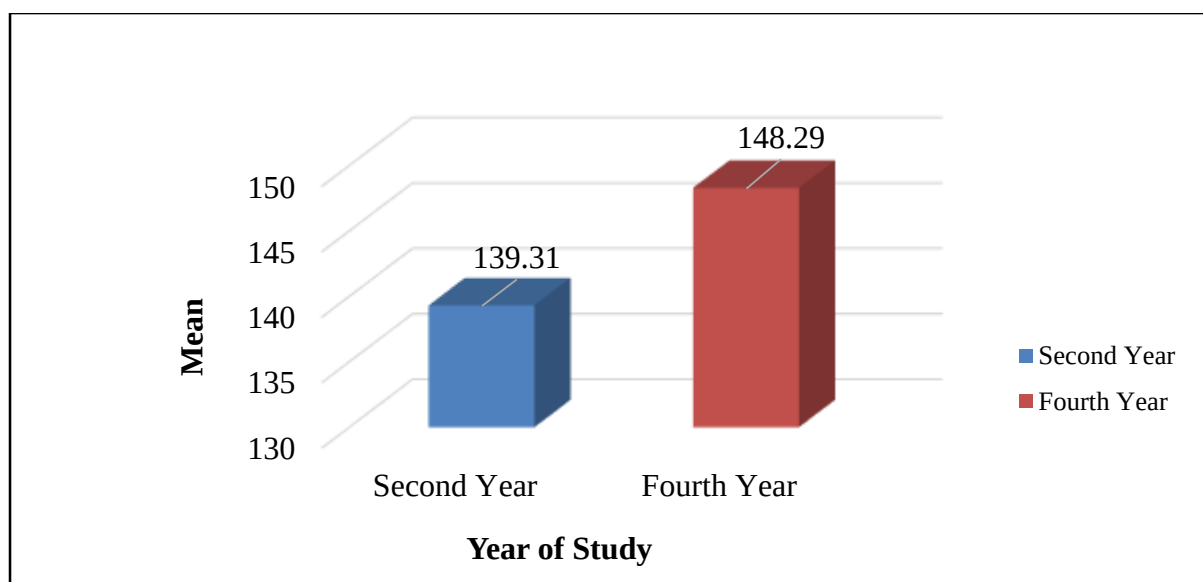


Figure 5. The comparison of means for engagement towards blended learning by year of study.

Findings of Research Question (4)

The answers of research questions No.4 “What is the relationship between the different factors of readiness and engagement towards blended learning?” were presented in this part.

To explore the relationship between the readiness and engagement of student teachers towards blended learning, Pearson product-moment was used. It was found that there was a significant correlation between the readiness and engagement of student teachers towards blended learning at the .01 level ($r = .614$). The result showed that the direction of correlation was positive. The more if the student teachers ready in blended learning, the more they participate in their learning activities. Table 8 shows the relationship between the readiness and engagement of student teachers towards blended learning.

Table 8 Pearson Product Moment Correlation Between the Readiness and Engagement of Student Teachers towards Blended Learning

		Correlations	
		Readiness	Engagement
Readiness	Pearson Correlation	1	.614**
	Sig. (2-tailed)	-	.000
	N	258	258
Engagement	Pearson Correlation	.614**	1
	Sig. (2-tailed)	.000	-
	N	258	258

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

According to Mills and Gay (2016), it can be interpreted that there was a positively moderate correlation between the readiness and engagement of student teachers towards blended learning. This means that the more ready student teachers are in blended learning, the more active they participate in their blended activities.

Discussion and Suggestions

Discussion

This study aims to investigate the readiness and engagement of student teachers towards blended learning based on gender, year of study in Sagaing University of Education. Firstly, the findings supported six factors of readiness towards blended learning: online learning, classroom learning, online interaction, technology, learning flexibility and study management. Based on the study results, classroom learning was rated as the most important factor of readiness towards blended learning followed by learning flexibility and technology. According to the highest mean in classroom learning factor, the possibility that the student teacher believed face-to-face classroom learning was more effective than online learning, and they could learn better through in-class learning. This meant students still perceived face-to-face learning essential for them, and they want to learn through the setting in which there were teachers and peers with them. However, the main problem mentioned by the questionnaire respondents was the considerable class size. Because of a large number of students in the class, the high level of noise was inevitable. This contributed to the lack of students' focus on study. Students also perceived that in the large class, it was not easy for interacting with teacher when they need help.

The total mean of the online learning factor was the lowest. It could be assumed that the student teachers might not feel comfortable and not be ready for a full online course in which they require to perform learning process by themselves. This echoed by Osman and Hamzah (2017) who stated that the lowest mean score of the item on self-learning could reflect students' low readiness to learn on their own since they still relied on the teacher.

Secondly, the study found no significant difference in blended learning readiness between male and female student teachers. This is consistent with past finding of Yagci, Sirakaya and Ozudogru (2015). They also found no significant difference in level of male and female pre-service teachers towards web-based learning. This finding means that male and female student teachers had similar levels in all readiness factors and they exhibited equal attitudes and behaviors.

The results of the study showed that there were significant differences between second year and fourth year student teachers in readiness towards blended learning. These findings differ from those of Yagci, Sirakaya and Ozudogru (2015) who found that there were no significant differences in readiness at the grade level. These differences in attitude may be because the second year student teachers have a preference for greater teacher-directed learning which may be as a result of their past experiences in the authoritarian classrooms that still exists in both secondary and primary schools. This finding is consistent with Hung and et al (2010) reported that there was significant difference in online learning readiness levels of students according to their grade level.

Thirdly, for student teachers' engagement in blended learning based on gender, it showed that there was no significant difference based on female and male student teachers. This means that male and female student teachers were the same participation in blended learning activities. This is an interesting finding as other studies have reported that male pre-service teachers were more ready for online classes as compared to female pre-service teachers (Win & Wynn, 2015).

Additionally, male students preferred online learning as compared to female students who preferred traditional face-to-face learning (Yu, 2021).

In term of year of study, there was significant difference across year groups in their blended learning engagement. This finding disclosed the fourth year student teachers were more engaged in blended learning activities than the second year student teachers. Similar findings were reported by Adams et al. (2018) who also found mature students, compared to younger students, were more engaged and adaptable in blended learning activities. A possible explanation for this result might be that the fourth year student teachers are more mature and independent in utilizing information technology for their learning.

Finally, the descriptive result of the study showed that there was a significant correlation between the readiness and engagement of student teachers towards blended learning at the .01 level ($r = .614$). According to Mills and Gay (2016), it can be interpreted that there was a positively moderate correlation between the readiness and engagement of student teachers towards blended learning. This means that the more ready the student teachers are in blended learning, the more active they participate in their blended activities. Additionally, active participation, which gives students a feeling of stronger engagement and a better learning quality, is a key for students to perform well in blended learning courses.

Suggestions

As more education institutions move towards e-learning as a means of enhancing teaching and learning, it is important to understand the students' readiness for engaging in e-learning. As the findings of this study show, the readiness of student teachers to participate in blended learning is moderate level among second year and fourth year of the Bachelor of Education programme. The second year student teachers showed a less positive attitude towards many factors involved in blended learning. This study has raised a number of issues pertaining to university student teachers' e-readiness that need to be considered before students can successfully engage in blended learning. This suggests that improvement and preparation of students in many aspects of blended learning is necessary to implement blended learning in a teacher education programme.

As such, one of the recommendations for success in adopting a blended learning approach in teacher education would be to familiarise all stakeholders with the concept of blended learning and the advantages and disadvantages of this type of learning before its implementation.

Moreover, based on the findings of the study, several recommendations for further research are presented as follows:

1. Firstly, this study was conducted only on Sagaing University of Education in Myanmar. Thus, generalizing the finding is not possible as one group of students in this university cannot represent all students in other universities. Therefore, future studies could be conducted and expanded to other universities.
2. Secondly, the current study is limited to a quantitative research design, where data were collected from 258 student teachers from SUOE. As such, future studies could involve a larger sample size to include more undergraduate or postgraduate students to ensure data are representative and generalizable.

3. Furthermore, the addition of qualitative data such as interviews and focus group interviews are needed to further explore and explain the quantitative findings.
4. Future research on blended learning could also look specifically into students' engagement and how pedagogy and course designs affect their participation in a blended learning model of instruction (Adams et al., 2018).
5. Furthermore, investigating what specific blended learning strategies are most effective for different fields of studies would add significantly to the body of knowledge.

Conclusion

The widespread of the COVID-19 pandemic has challenged training institutions to rethink the execution of their training programs. New approaches to teaching and learning are now needed due to the forced shift to e-learning modes. The student teachers need to adapt to this change. Overall findings of this study revealed many student teachers were not ready for blended learning during 2022-2023 Academic Year. However, student teachers were found to be actively engaged in blended learning. Further analysis indicated there were differences in student teachers' readiness and engagement in online learning based on their year of study. Therefore, future student teachers' online trainings, class activities, and its facilitation need to be devised according to student teachers' interest, competencies, and skills. However, the readiness of students must be taken into consideration first. From this research, it can be concluded that the implementation of a blended learning model of instruction is closely tied with institutional policy and adoption practices. As blended learning continues to grow in popularity, so must support systems and training programmes be developed and are in place to ease the transitional process of students and instructors from traditional methods to a blended learning model of instruction.

Acknowledgements

We would like to offer 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) who gave us the permission to undertake this research. We would like to express our great respect and heartfelt gratitude to Dr. Soe Than (Professor & Head of Department (Retired), Department of Curriculum and Methodology, Sagaing University of Education) for his invaluable suggestions, encouragement and patience throughout the research.

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THE EFFECTIVENESS OF E-LEARNING INTEGRATION MODEL IN THE TEACHING OF MIDDLE SCHOOL SCIENCE

Kay Zin Phoo¹ and Kyi Swe²

Abstract

This research aimed to examine the effectiveness of an e-learning integration model in teaching middle school science. The study employed an experimental research design, utilizing quantitative methodologies. Specifically, a non-equivalent control group design, a type of quasi-experimental design, was implemented for the quantitative research methodology. The participants of the study consisted of Grade Six science teachers and Grade Six students selected from four different schools: No. 3 BEHS, Bahan, No. 1 BEHS, Sanchaung, No. 2 BEHS, South Okkalapa, and No. 1 BEHS, Latha. The study involved an experimental group of teachers who received the proposed e-learning integration model, while the control group received a formal teacher guide book. Then, the intact groups of Grade Six students were divided into the experimental and control groups. Pretests and posttests were administered to both groups to assess science knowledge. The data analysis utilized one-way analysis of covariance (One-Way ANCOVA) to compare posttest scores, controlling for pretest scores as a covariate. The study revealed a significant increase in science achievement among students whose teachers received instruction using the proposed e-learning integration model compared to those whose teachers did not. Furthermore, the researchers employed the Wilcoxon Signed Rank test to assess the change in students' attitudes towards science learning before and after the instruction. The results indicated a positive impact of the proposed e-learning integration model on students' attitudes. The overall findings of this research support the notion that the integration of e-learning in middle school science instruction has a beneficial effect on both student achievement and attitudes towards learning science.

Keywords: Science, e-Learning, Flipped Classroom, Blended Learning, e-Learning Integration Model

Introduction

National education strategic plan emphasizes that upgrading education system is the keystone to improve the country and the quality of teacher must be prioritized in education reform movements of Myanmar. Curriculum reform progresses continuously in recent years and as a result in-service teachers have being polished with curriculum update training. However, it seems limited training time for their proficiency on new curriculum and it was also finite to train face to face on their compass because of many constraints. In recent years, pressures have emerged from policymakers and other stakeholders to embed e-learning technologies in ordinary basic education sector. However, Myanmar teachers are often limiting their classroom teaching and it is seemed that the use and development of e-learning approaches has limitations and teachers have insufficient support and training to use e-learning at the basic education level. Although MOE has started the curriculum reform movement, there are some challenges lying ahead for its implementation in basic education sector, in ensuring how to implement that new curriculum on the role of teachers, background knowledge of teachers, and resources available to adopt and adapt international standard in new curriculum.

Purposes of the Study

The main purpose of the study is to investigate the effectiveness of e-learning integration model in science teaching at the middle school level. The specific objectives are as follows:

- To find the effect of e-learning integration model on the achievement of students in learning science

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- To investigate the attitudes of students towards learning science as the effect of e-learning integration model before and after intervention
- To make suggestions for the improvement of e-learning in teaching learning process based on the results of this study

Research Questions

This study is intended to answer the following research questions.

- To what extent does the e-learning integration model have any effect on the achievement of students in learning science?
- Is there a change on the attitudes of students towards learning science as the effect of e-learning approach before and after intervention?

Scope of the Study

The scope of the study is as follows:

- This study is geographically restricted to Yangon Region.
- Participants in this study are junior and senior assistant teachers who teach Grade Six science subject and (211) Grade Six students from the selected schools in the academic year (2021-2022).
- The content area is limited to eight chapters such as Chapter 1: Nature of Science, Chapter 2: Matter, Chapter 3: Force, Chapter 4: Living Things, Chapter 5: Cell and Cell Structure, Chapter 6: Reproduction, Chapter 7: Planet Earth, and Chapter: 8 Ecosystem from Grade Six science textbook and the study is conducted in four sample schools in Yangon Region.

Definition of Key Terms

The definitions of key terms used in this study are described as follows.

Science: Science is the study of knowing about the universe through data collected by observation and controlled experimentation (Carin & Sund, 1985).

e-Learning: e-Learning is an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning (Sangra, Vlachopoulos & Cabrera, 2012).

Flipped Classroom: Flipped classroom is a student-centered learning method consisting of two parts with interactive learning activities during lesson and individual teaching bases directly on computer out of lesson (Bishop & Verleger, 2013).

Blended Learning: Blended learning can be defined as the organic integration of thoughtfully selected and complementary face to face and online approaches and technologies (Graham, 2006).

e-Learning Integration Model (Operational Definition): The e-learning integration model is intended to guide teachers with the integration of e-learning approach to enhance the conceptual understanding on science teaching and to ensure the effective teaching-learning process.

Review of Related Literature

Philosophical Foundations

Behaviorism, cognitivism, and constructivism are deeply taken into philosophical consideration.

The behaviorist school of thought views the mind as a 'black box,' focusing on observable behavior rather than internal mental processes. This approach disregards the influence of cognitive

processes occurring in the mind. Early computer learning systems were designed based on behaviorist principles. Therefore, when implementing the proposed model, activities were designed to stimulate students and elicit desired responses. The model takes into consideration the use of stimuli to encourage students to achieve the desired outcomes.

According to Alzaghouli (2012), cognitive theories go beyond behavior and aim to understand the brain-based processes involved in learning. These theories emphasize the role of memory, motivation, and thinking in the learning process. In line with this perspective, the proposed model incorporates multimedia presentations to support student motivation and memory. The use of multimedia engages learners cognitively and aligns with the principles of cognitive theories.

Constructivism is a learning theory that emphasizes the active construction of new ideas or concepts by the learner. Scott (2010, as cited in Sabri, 2017) explains that constructivist learning theory highlights the importance of student's actively connecting new information with their existing knowledge and modifying their previous understanding to accommodate new insights. However, it is noted that much of the current e-learning content available is simply a digitized version of traditional materials, lacking the incorporation of constructivist principles (Tavangarian, Leypold, Nolting, Roser, & Voigt, 2004). Consequently, the customization of learning materials becomes imperative in order to effectively support the principles of constructivist learning theory.

Psychological Foundations

The e-learning integration model takes into consideration additional theories, including situated cognition theory, sociocultural learning theory, and information processing theory. These theories offer valuable perspectives for guiding the design and implementation of the model.

The situated cognition theory asserts that knowledge and action are interconnected, emphasizing the significance of applying learned concepts within relevant contexts. It highlights the social nature of learning, promoting collaborative activities and discussions that enable individuals to expand their understanding through group problem-solving tasks.

The sociocultural learning theory focuses on three key components: culture, language, and the zone of proximal development. This theory emphasizes the significance of the learner's environment in their development. For instance, peers can significantly influence a learner's thoughts and emotions related to a specific subject or topic.

Information theory, also known as communication theory, finds application in the field of pedagogy. It encompasses concepts such as the amount of information, channel capacity, and redundancy (Khin Zaw, 2001b). The information processing theory, on the other hand, posits that the mind acts as a receiver of information rather than simply responding to stimuli. It views the mind as a computer-like system responsible for analyzing information obtained from the environment.

Description of Proposed e-Learning Integration Model

e-Learning integration model was developed with four components based on the related theories and models. In accordance with the objectives of the research, this study is intended to guide and practice teachers by using e-learning approach and how to use e-learning to enhance the conceptual understanding on middle school science teaching. The proposed e-learning integration model includes four components:

- (1) Analyse
- (2) Develop
- (3) Implement
- (4) Evaluate

Phase (1) Analyse

The priority component of the proposed model is “analyse” phase that needs to be conducted to investigate the core characteristics and expectations of the participants. The stages of this phase include characteristics and expectation.

Characteristics

The characteristics of the participants impact on the design and delivery of e-learning system. The background knowledge and skills of the learner on the course content, geographical provenience, internet access and electrical devices, have a significant impact for the course designer to develop an effective and efficient course that save costs, time and resources.

Expectation

The expectations of the participants need to be considered to fulfill their desire on the lesson: what the participants thought of the lesson, and what the participants expect from the lesson.

Phase (2) Develop

The next component is to develop the course. In this step, the instructors and administrators have to consider and prepare the course that need to align with the expectation of the participants. To implement the course, context and tools become important in their respective roles.

Context

The context defines the curriculum or course content that will shape the objectives of the model or the needs of the participants. Moreover, the management context referred to e-learning management that means technology skills of the instructors.

Tools

The instructors and the participants must communicate face to face or virtual environment or both. Therefore, the instructor had to encourage and motivate the participants to take part in activities using both internal and external reinforcement. And also need to support interaction between the instructors and the learners and, between the learners. Constructing positive relation between the instructors and the learners will be the key to succeed the programme.

Tools to enhance the knowledge and skills of the participants accommodate learning management system. Learning management system contains tools and elements for instructors, learners and administrators that depend on the lesson objectives, and the desired outcomes including course management system, content delivery system, and communication tools. Media can be used to deliver content via electronic media so that the learner can study anytime and anywhere. The instructor record and share lecturer notes and information, and uploaded to the learning management system to easily accessible for the remote learners.

Phase (3) Implement

The third component of the model is to implement the model and the instructors have to choose appropriate ways to deliver context based upon socio-economic status of the participants. Wholly online mode of e-learning model will be applied to deliver context to achieve the desired outcomes. Wholly online mode of e-learning model can be divided into two parts: collaborative learning and individualized learning. And then, collaborative learning can also be divided into two parts: synchronous and asynchronous modes.

Phase (4) Evaluate

The last phase of the model is evaluating whether the objectives of the model that accommodate the needs and expectations of the participants at the first step of the model might be fulfilled or not. To evaluate the effectiveness of the model, it is divided into two parts: apply and reflect.

Apply

The first one is to evaluate whether the participants can apply or not what they have learned directly or indirectly. Instructors need to observe their students to check how they progress and record class activities of the participants to assist them.

Reflect

Reflection means final assessment of what the participants learned and how they applied in their situation. Instructor allows participants to consider and reflect the process and become aware of what they learned from the whole discussion and what are their strengths and weaknesses.

Feedback Loop

If the expectations of the participants were not accomplished at the end of the discussion, feedback loop could be inserted to adjust the second step and third step of the model. Each part of these steps needs to be checked and modified again to reach the desired outcomes. If the discussion can fulfill the expectations of the participants, the instructor can move to the next lesson. The e-learning integration model can be described as follows in Figure 1.

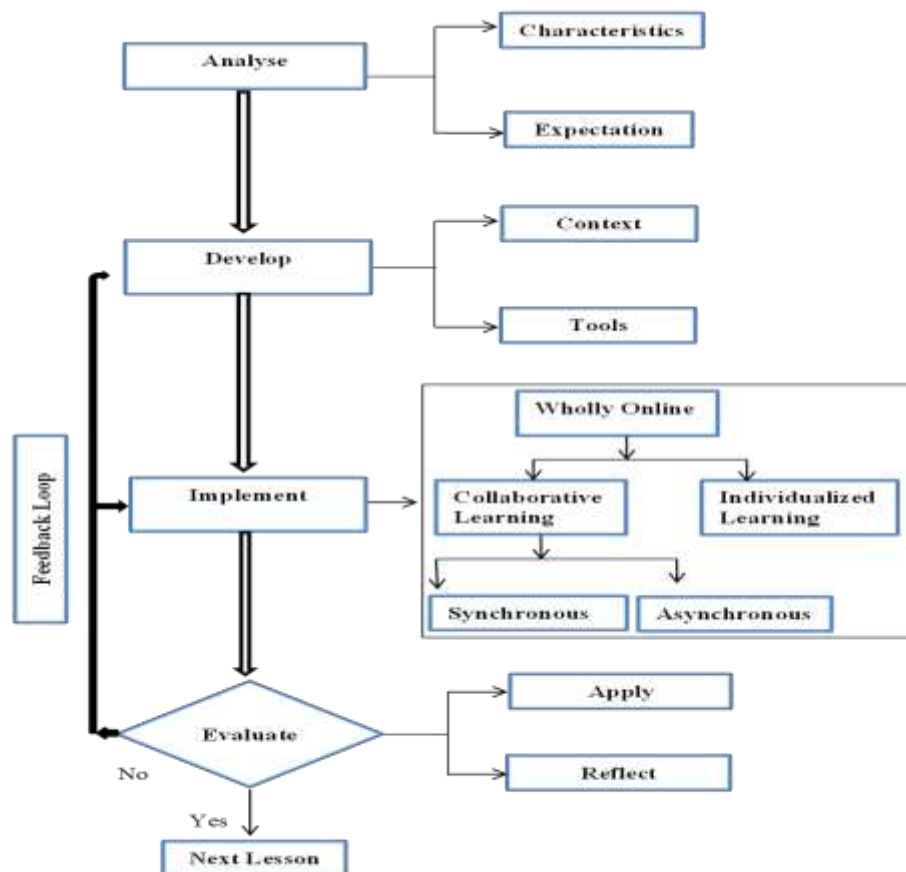


Figure 1: e-Learning Integration Model

Method

The research design for this study was the experimental research design. Therefore, quantitative methodologies were used in this study. For the quantitative research methodology, the adopted design was non-equivalent control group design, one of quasi-experimental designs. From the intact groups, the two measures: pretest (before) and posttest (after) can be compared and any differences in the measures are assumed to be the result of the treatment. All participants in this study were Grade Six science teachers and Grade Six students, and this study was conducted in Yangon Region. The teachers from experimental group received instruction on e-learning integration model. Before the treatment period, the students from experimental group were administered pretest before the instruction. Then, all the students in the experimental and control groups were administered posttest after the instruction. Quantitative data will be analyzed by applying inferential statistics (ANCOVA) to determine whether there are significant differences in the science scores of experimental groups before and after instruction. And then, Wilcoxon Signed Rank test was used to investigate the attitude of students on science learning before and after instruction. Thus, teachers and students from selected schools were participants for the quantitative research methodology.

Instruments

The study employed pretest, posttest, and attitude questionnaires as instruments. These instruments were developed with guidance from the supervisor and validated by thirteen experts. A pilot study was conducted with 32 Grade Six students from Practicing Middle School, Yankin, to evaluate the effectiveness of their achievement. After the pilot study, the reliability of the instruments was determined by the value of Cronbach's Alpha coefficient. Pretest was .765 and posttest was .731. A pretest was used to measure the entry behavior of the students. A posttest was used to measure the students' science achievements after treatment as the effects of e-learning integration model. The questions were constructed based on Bloom's taxonomy of cognitive domain (remembering level, understanding level, and applying level). The pretest items were derived from the content covered in Chapter 1, Chapter 2, Chapter 3, and Chapter 4 of the Grade Six science textbook. Similarly, the posttest items were constructed based on the content covered in Chapter 5, Chapter 6, Chapter 7, and Chapter 8 of the same textbook.

The pretest and posttest consist of 40 multiple-choice question items, with three options each. Each item is assigned one mark. The test covers 10 items from each chapter of the Grade Six science textbook. Participants are required to answer all the questions, and there is no choice of items in the test. The allocated time for the test is 45 minutes, and a total of 40 marks are available.

For the questionnaire assessing students' attitudes towards learning science, it was constructed with 20 items organized as five-point Likert-type items. The questionnaire covered four dimensions: improving personality, connection with real life, attitude towards the science teacher, and attitude towards science learning. The questionnaire was administered to the students in the experimental group before and after the treatment. The internal consistency of the questionnaire, as measured by Cronbach's alpha, was found to be .782, indicating a satisfactory level of internal consistency.

Findings

For the quantitative research findings, the data were recorded and analyzed systematically. According to the selected quantitative research design, the data from the pretest question were analyzed by using the one-way analysis of covariance (One-Way ANCOVA) to compare the differences between the experimental and the control groups (see Table 1).

Table 1 Analysis of Covariance (ANCOVA) Results on the Pretest Question

School	Group	N	M	SD	MD	F	p
S1	Experimental	16	20.56	1.71	-2.04	5.43	.027 *
	Control	15	22.60	3.02			
S2	Experimental	15	20.27	1.98	1.58	5.81	.023*
	Control	16	18.69	1.66			
S3	Experimental	42	22.33	2.66	1.57	7.59	.007**
	Control	45	20.76	2.68			
S4	Experimental	31	20.35	1.92	-1.52	5.42	.023*
	Control	31	21.87	3.07			

Note. S1 = No. 3, BEHS, Bahan; S2 = No. 1 BEHS, Sanchaung; S3 = No.2, BEHS, South Okkalapa; S4 = No. 1 BEHS, Latha.

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

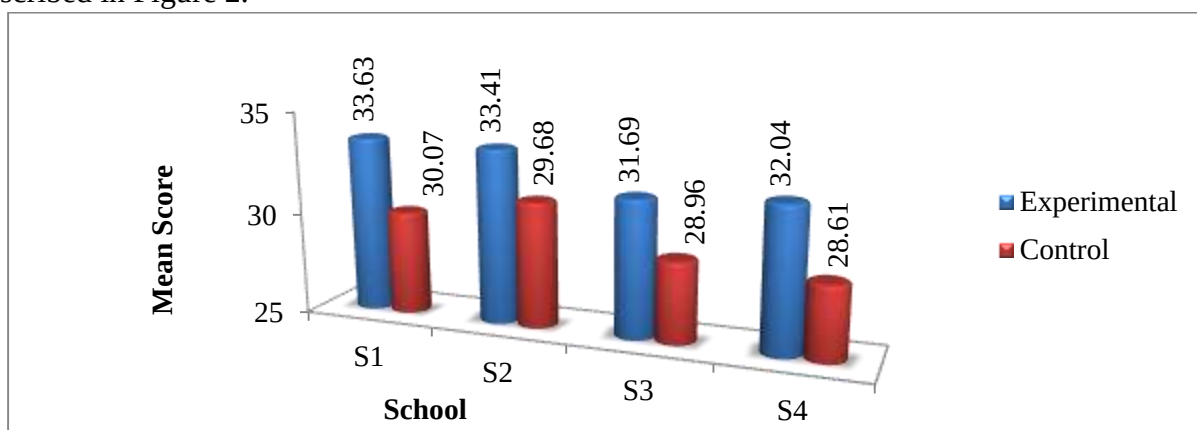
The results showed that there was a significant difference between the entry behavior of experimental groups and control groups in each school. It can be interpreted that there were initial differences between the experimental groups and the control groups. Therefore, the data from posttest questions were analyzed by using a one-way analysis of covariance (see Table 2).

Table 2 Analysis of Covariance (ANCOVA) Results on the Posttest Question

School	Group	N	M	SD	MD	F	p
S1	Experimental	16	33.63	3.18	3.56	8.92	.006**
	Control	15	30.07	3.19			
S2	Experimental	15	33.41	2.1	3.73	22.39	.000***
	Control	16	29.68	2.1			
S3	Experimental	42	31.69	3.35	2.73	13.88	.000***
	Control	45	28.96	3.35			
S4	Experimental	31	32.04	2.87	3.43	21.14	.000***
	Control	31	28.61	2.87			

Note. ns = not significant, ** $p < .01$, *** $p < .001$.

The results showed that there was a significant difference between the science achievement of experimental groups and control groups in the four selected schools. It can be interpreted that the proposed e-learning integration model has a significant effect on the students' science achievements. According to the results, the comparison of mean scores on science achievement is described in Figure 2.

**Figure 2** The Comparison of Mean Scores on Science Achievement

The results of one-way analysis of covariance (One-Way ANCOVA) indicated that e-learning integration model had a significant effect on the achievement of Grade Six students in all selected schools (see Table 3).

Table 3 ANCOVA Results for Posttest Scores on Students' Science Achievement

School	Test of Between- Subject Effects					Unadjusted Mean		Adjusted Mean	
	Source	df	F	p	Partial Eta Squared	EG	CG	EG	CG
S1	Pretest	1	1.87	.182 (ns)	.06	33.31	30.4	33.63	30.07
	Group	1	8.92	.006**	.24				
	Error	28							
S2	Pretest	1	0.75	.395 (ns)	.03	33.27	29.81	33.41	29.68
	Group	1	22.39	.000***	.44				
	Error	28							
S3	Pretest	1	17.47	.000***	.17	32.14	28.53	31.69	28.96
	Group	1	13.88	.000***	.14				
	Error	84							
S4	Pretest	1	20.74	.000***	.26	31.55	29.1	32.04	28.61
	Group	1	21.14	.000***	.26				
	Error	59							

Note. EG = Experimental Group, CG = Control Group.

ns = not significant, ** $p < .01$, *** $p < .001$.

In school 1, after adjusting the pre-intervention scores (pretest scores) as the covariate, there was a significant difference between the two groups on post-intervention scores (posttest scores) on science achievement according to the adjusted mean scores (33.63, 30.07) and $F(1, 28) = 8.92$, $p = .006$, with the small effect size (partial eta squared = .24). There was no significant relationship between the pretest scores (covariate) and posttest, $F(1, 28) = 1.87$, $p = .182$. In school 2, after adjusting the pre-intervention scores (pretest scores) as the covariate, there was a significant difference between the two groups on post-intervention scores (posttest scores) on science achievement according to the adjusted mean scores (33.41, 29.68) and $F(1, 28) = 22.39$, $p = .000$, with the medium effect size (partial eta squared = .44). There was no significant relationship between the pretest scores (covariate) and posttest, $F(1, 28) = 0.75$, $p = .395$.

In school 3, after adjusting the pre-intervention scores (pretest scores) as the covariate, there was a significant difference between the two groups on post-intervention scores (posttest scores) on science achievement according to the adjusted mean scores (31.69, 28.96) and $F(1, 84) = 13.88$, $p = .000$, with the small effect size (partial eta squared = .14). There was a significant relationship between the pretest scores (covariate) and posttest, $F(1, 84) = 17.47$, $p = .000$. In school 4, after adjusting the pre-intervention scores (pretest scores) as the covariate, there was a significant difference between the two groups on post-intervention scores (posttest scores) on science achievement according to the adjusted mean scores (32.04, 28.61) and $F(1, 59) = 21.14$, $p = .000$, with the medium effect size (partial eta squared = .26). There was a significant relationship between the pretest scores (covariate) and posttest, $F(1, 59) = 20.74$, $p = .000$. Therefore the

results indicated that e-learning integration model had a significant effect on the science achievement of Grade Six students in all selected schools.

The attitudes of students who participated in the experimental groups before and after the intervention were investigated in terms of Wilcoxon Signed Rank Test. The questionnaire was constructed based on four dimensions: improving personality, connection with real life, attitudes for science teachers, and attitudes for science learning. The results of Wilcoxon Signed Rank Tests for students' attitudes towards learning science are described in Table 4.

Table 4 Results of Wilcoxon Signed Rank Tests for Students' Attitudes towards Learning Science

School	N	Dimension of Students' Attitudes towards Learning Science	Md (Before)	Md (After)	z	p	r
All Four Schools	104	Improving Personality	18	20	-3.056	.002**	.21
		Connection with Real Life	18	20	-2.766	.006**	.19
		Science Teachers	18	20	-4.353	.000***	.30
		Science Learning	15	19	-6.587	.000***	.45

Note. Md = Median.

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

Wilcoxon Signed rank Test revealed that attitudes of improving personality were significantly higher after the intervention ($Md = 20$, $N = 104$) compared to before ($Md = 18$, $N = 104$), $z = -3.056$, $p = .002$, with a small effect size, $r = .21$.

Wilcoxon Signed rank Test revealed that attitudes of connection with real Life were significantly higher after the intervention ($Md = 20$, $N = 104$) compared to before ($Md = 18$, $N = 104$), $z = -2.766$, $p = .006$, with a small effect size, $r = .19$.

Wilcoxon Signed rank Test revealed that attitudes of science teachers were significantly higher after the intervention ($Md = 20$, $N = 104$) compared to before ($Md = 18$, $N = 104$), $z = -4.353$, $p = .000$, with a medium effect size, $r = .3$.

Wilcoxon Signed rank Test revealed that attitudes of science learning were significantly higher after the intervention ($Md = 19$, $N = 104$) compared to before ($Md = 15$, $N = 104$), $z = -6.587$, $p = .000$, with a medium effect size, $r = .45$. Wilcoxon Signed rank Test revealed a significant difference in attitudes of learning science as the effects of e-learning integration model before and after intervention. According to the results, the comparison of median scores for students' attitudes towards learning science is described in Figure 3.

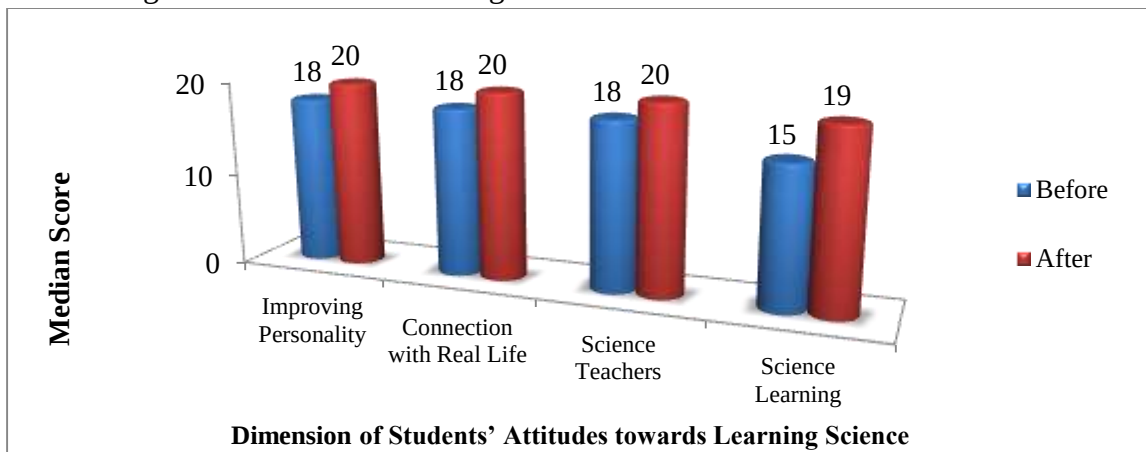


Figure 3 Comparison of Median Scores for Students' Attitudes towards Learning Science

Discussion

The comparison of mean scores on posttest questions showed significant differences between the experimental and control groups, indicating that the proposed e-learning integration model positively impacted students' science achievement. These findings align with the study conducted by Chen and Lin (2021), which found that e-learning had a positive influence on academic achievement, particularly in subjects like mathematics and science.

The findings from the attitude questionnaire further support the results of the study. Through the application of the Wilcoxon Signed Rank Test, significant differences were observed in the attitudes of students in the experimental group before and after the treatment across all selected schools. These results align with the research conducted by Tham and Tham (2016), who also found a significant influence of students' attitudes towards e-learning on their science achievement. Their study suggested a positive association between favorable attitudes towards e-learning and higher levels of science achievement. The current study's outcomes reinforce these previous findings.

Suggestions

Suggestions for Teachers: Science teachers should integrate e-learning tools, such as educational software and online resources, into their teaching to engage students and promote interactive learning. Teachers should have access to sufficient equipment, such as computers and laboratory equipment, and teaching resources, such as textbooks and curriculum materials, to support effective teaching and learning. Science teachers in Myanmar should use locally relevant resources when integrating e-learning into their teaching. This could include using videos and other resources created by local universities and research institutions, as well as utilizing local case studies and examples. Science teachers should carefully plan and prepare instructional materials, such as printed and non-printed materials, to develop problem-solving skills and scientific attitudes among students.

Suggestions for School Administrators: School administrators should prioritize providing professional development opportunities for science teachers to enhance their knowledge and skills in utilizing the latest e-learning tools and strategies for technology integration.

Suggestions for Curriculum Planners: Curriculum planners should conduct a needs assessment to evaluate the current state of e-learning integration in the school and identify areas for improvement. Based on the assessment, they should develop a customized e-learning integration plan with specific goals, a timeline, and action items. They also need to prioritize teacher training to ensure effective implementation of e-learning strategies. Curriculum planners should prioritize training teachers on incorporating technology into their teaching practices. They should also focus on creating localized content in diverse formats such as videos, articles, and social media posts to establish a stronger connection with the local culture and language, fostering greater audience engagement and comprehension. Establishing appropriate educational partnerships is essential, and involving stakeholders is crucial for developing successful strategies and implementing effective plans. Engaging stakeholders is essential for diverse perspectives, increased support, and addressing concerns. Integration of ICTs across the curriculum prepares students for the technology-driven workforce. Clear communication and goal alignment are keys for effective stakeholder involvement.

Recommendations

Some recommendations for further study are as follows:

- In this study, sample schools were randomly selected from Yangon. Thus, further research studies should be carried out in other States and Regions by using different participants for replication.
- In this study, the content areas were limited to Grade Six science textbook. So, further study should be carried out for the other content areas at the middle school level.

- In this study, the proposed e-learning integration model was developed for the middle school level. Further research should be carried out for various school levels such as primary school level and high school level.

Conclusion

This study has shown that the integration of e-learning in teaching science at the basic education level is advantageous for teachers, as it encourages students to become independent learners who actively engage with the learning process. This model aligns with constructivist principles, where students are expected to develop a range of skills, including improved science achievement and broader competencies.

To effectively address the demands of 21st century competencies and educational goals in Science education, teachers must employ innovative teaching strategies. The integration of e-learning as demonstrated in this model proves to be beneficial, as it helps teachers to foster cognitive competencies such as academic mastery, and intrapersonal competencies such as intrinsic motivation among students. By incorporating this model, teachers can better equip students with the necessary skills to thrive in the 21st century educational landscape. Therefore, this model should be considered for implementation to enhance the teaching of science at the middle school level. It is hoped that the findings of this study can contribute to the improvement of science education in middle schools in Myanmar, to some extent.

In today's rapidly changing world, educators and teachers need to acquire teaching methodologies that prepare students for a future that is largely unknown and may remain unknown, as people are finite beings in a constantly evolving and unpredictable universe of possibilities (Khin Zaw, 2001a). This emphasizes the importance of equipping students with the skills, knowledge, and adaptability to thrive in a world that is characterized by uncertainty and change. Educators must be proactive in keeping up with the evolving needs of students and aligning their pedagogical approaches accordingly, to effectively prepare students for the challenges and opportunities of an uncertain future.

Acknowledgements

We would like to express our appreciation 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 their permission to conduct this research. We also wish to express profound and sincere thanks to Dr. Khin Mar Khine (Professor and Head, Curriculum and Methodology Department, Yangon University of Education) for her administrative support, and guidance throughout the study.

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THE EFFECTS OF METACOGNITIVE TEACHING MODEL ON GRADE SIX STUDENTS' ATTITUDE TOWARDS MATHEMATICAL PROBLEM SOLVING

Yin Mon Aung¹ and Naing Naing Thein²

Abstract

The main purpose of this study is to investigate the effectiveness of the metacognitive teaching model for teaching mathematics at the Middle School level in Myanmar. In this study, a mix-methods (QUAN → qual) design was adopted. The single-group pretest/posttest design, one of the designs of quasi-experimental research was adopted to collect the quantitative data and the case study design was applied to collect the qualitative data. It started in the first week of November 2021 and ended in the second week of January 2022. The study is geographically restricted to Yangon Region and a total of 129 Grade Six students participated. An attitude questionnaire and semi-structured interview questions were used as the research instruments. The data got from the attitude questionnaire were analyzed through descriptive statistics and Wilcoxon Signed Rank Test and the results showed that there were significant differences in the attitude of students towards problem solving before and after the study. According to the analysis of the responses of students and teachers to interview questions through the constant comparison method, it was found that the proposed model supported positive effects on problem solving behaviors of students, students' attitude towards problem solving and twenty-first century skills, and teachers' mathematics teaching. Additionally, qualitative findings supported the quantitative findings. Therefore, the research findings proved that the proposed metacognitive teaching model has a positive contribution to teaching problem solving at the Middle School level in Myanmar.

Keywords: Metacognition, Teaching Model, Mathematics, Problem Solving, Attitude towards Problem Solving

Introduction

Nowadays, exponential growth in science and technology has been demanding individuals with the skills necessary to find solutions to the problems in twenty-first century society. The Organization for Economic Co-operation and Development (OECD) (2014) stated that students who completed compulsory education should have sound mathematics skills and be able to apply these skills to solve the problems that they encounter in their lives.

In the school curriculum, mathematics is the best domain for problem solving and students need to become aware of their strengths, weaknesses, procedures, and strategies in problem solving (Jaye & Posamentier, 2006). Teaching problem solving through metacognition promotes self-directed learning and aims to develop individuals who are self-reliant and intrinsically motivated to seek the solution to any kind of problem (Zimmerman, 2000).

Research findings point out that students who have cognitive and metacognitive conflicts at the age of nine through eleven may develop negative emotions and poor motivation towards learning mathematics and which may interfere with their mathematical confidence and problem solving skills success for many years (Artino, 2009). Thus, teaching and learning mathematics should aim to develop students' ability and attitude in mathematical problem solving through metacognition.

Purpose of the Study

The main purpose of this study is to investigate the effectiveness of the metacognitive teaching model for teaching mathematics at the Middle School level in Myanmar.

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The specific objectives of the study are identified as follows:

1. To investigate the effects of the metacognitive teaching model on the attitude of the students towards mathematical problem solving
2. To examine the perception of students on solving mathematics problems through the metacognitive teaching model
3. To explore the opinions of teachers on teaching mathematics problems through the metacognitive teaching model

Research Questions

In this study, the three research questions are formulated as follows.

1. Is there a significant difference in the attitude of the students towards mathematical problem solving before and after the treatment?
2. What are the perceptions of the students on solving mathematics problems through the metacognitive teaching model?
3. What are the opinions of the teachers for using the metacognitive teaching model in teaching mathematics problems?

Scope of the Study

This study is geographically limited to Yangon Region. Participants in this study are Grade Six students and Mathematics teachers from the selected schools in (2021-2022) Academic Year.

Definitions of Key Terms

(i) Metacognition. Metacognition refers to thinking about thinking, and its main function is to plan, direct, control, examine, and evaluate all cognitive thinking processes; covering critical and creative thinking; to make appropriate decisions to solve a problem (Sang, 2003).

(ii) Teaching Model. A teaching model is an overall plan or pattern to learn specific kinds of knowledge, attitudes, and skills. It has a theoretical basis or philosophy behind it and encompasses specific teaching steps designed to accomplish desired educational outcomes (Joyce & Weil, 1972, as cited in Arends, 2007).

(iii) Mathematics. Mathematics is the investigating and use of patterns and connections in measures, space, and time (Ministry of Education [MoE], 2019).

(iv) Problem Solving. Problem solving is a multiple steps process where the problem solver must find relationships between the past experience (schema) and the problem at hand and then guide thinking directed towards the successful solution of a problem (Mayer, 1980).

(v) Attitude towards Problem Solving. Attitude towards problem solving refers to an individual emotion towards mathematical problem solving (either positive or negative), belief in mathematics, and also how that individual behaves towards problem solving (Hart, 1989, as cited in Ayob & Yasin, 2017).

Statement of the Problem

It can be easily seen that one of the problems encountered by Myanmar students while doing problem solving is that when they see a problem, they focus on getting the right answer and if the answer is right, they do not check, evaluate, and reflect on the whole process and they move to the next problems. However, if the answer is right by chance and the steps of the solution are wrong, this will lead to underachievement and lower motivation towards problem solving.

Another problem stated by Hardman, Stoff, Aung, and Elliott (2014) is that Myanmar teachers are using the transmission of knowledge and rote learning in teaching mathematics. Besides, creating opportunities for the cooperative and collaborative learning environments to

promote critical thinking and a positive attitude towards problem solving is observed infrequently.

Significance of the Study

In Myanmar, mathematics is a compulsory subject in KG + 12 curriculum and the contents of mathematics are organized for students to understand new concepts and develop higher-order thinking skills and strongly focused on the development of students' thinking skills in problem solving. In mathematical problem solving, competent problem solvers are efficient at keeping track of what they know and how well or poorly their attempt to solve the problem (Jaye & Posamentier, 2006).

San Win (2010) also suggested that mathematics teachers should place an emphasis not on memorizing problem solving procedures but on developing students' thinking skills. Schraw (1998) and Applebaum (2015) also stated that when teachers themselves do not think critically or fail to share their thinking process through modeling and think-aloud in teaching mathematics problems, their students will be unlikely to develop mathematical thinking skills and positive attitudes towards problem solving.

Teaching that emphasizes mastering mathematics formulae seems questionable and wrong because it prevents students from understanding that mathematics can be meaningful. The way to solve the problem is that students need to be taught mathematical problem solving through metacognition. According to Kuiper (2002), metacognition supports reflective thinking, helps problem solving, gives responsibility, improves self-confidence for quicker decisions, and consequently develops positive attitudes towards problem solving.

In Mathematics classrooms, students often solve the problems superficially and produce the incorrect answers frequently (Nu Nu Nyunt & Aye Aye Myint, 2009). In order to improve achievement and positive attitude towards mathematics, students need to become aware of their strengths, weaknesses, typical behaviors, repertoire of procedures, and strategies in problem solving. Thus, mathematics teachers need to consider metacognition in the teaching-learning process not only for resulting the output but also for monitoring and controlling cognitive activities.

Review of Related Literature

Background Philosophical (Theoretical) and Psychological Considerations

All educational practices and research studies should be scientifically philosophic or philosophically scientific and the area of the investigation should be based on sound philosophical background (Khin Zaw, 2001). Thus, this study is mainly based on the following philosophical and psychological considerations.

In progressivism, learning is always an active process, the brain is not a passive receiver of knowledge but an active constructor of meaning through problem solving. According to this philosophy, mathematical problem solving involves reflection in action and reflection on action and these two concepts are closely related to metacognition (Schon, 1983).

From the cognitive perspective, learning is a change in a person's mental structure that provides the capacity to demonstrate different behaviors (Eggen & Kauchak, 1999). Cognitivists view that metacognition and problem solving are interrelated and these are the complex higher-order thinking skills in the human learning process. Metacognitive knowledge about problems and strategies and metacognitive skills of planning, monitoring, and evaluation are essential for successful problem solving (Gredler, 2001).

According to constructivism, to achieve the aim of effective learning, students need to plan their learning tasks, think of effective strategies to learn, as well as to evaluate, and make reflections on what they have learned. Constructivism also views learners as self-regulated and active participants in their learning (Churchill et al, 2013). Self-regulation also requires metacognitive mediators such as planning, monitoring, and evaluating (Schunk, 2012).

Gestalt theorists pointed out that the process of problem solving is based on the whole and the part relationship. They described that mathematics teachers should encourage both reproductive and productive thinking in the mathematics classroom with the caution of giving ready-made steps (Katona, 1940, as cited in Moslehpour, 1995).

Bruner (1964, as cited in Gredler, 2001) said that mathematical problem solving will be more effective and simpler by using symbols to represent abstract concepts and the think-aloud strategy can be used effectively in teaching students what and how to think about mathematical problem solving.

According to Piaget's developmental stages, Grade Six students fall into the formal operation stage and metacognition begins to develop during this stage and further in life (Flavell, 1977, as cited in Tarricone, 2011).

Besides, Vygotsky (1978) pointed out that metacognition develops from other regulations to self-regulation through modeling and scaffolding. Verbalization and internal verbalization of thought processes while doing problem solving support the development of metacognition. According to him, peer interaction, modeling, instructional scaffolding, verbalization of thought processes, and ZPD should be considered to develop metacognition in mathematical problem solving.

According to Bandura's social cognitive perspective on learning, metacognition is considered a sub-component of self-regulated learning in which, learning occurs through the interaction of personal, environmental, and behavioral factors (Bandura, 1986 as cited in Churchill et al., 2013). He also stated that cognitive modeling is one of the best strategies for demonstrating how to regulate cognition in mathematical problem solving and fosters the development of metacognition (Bandura, 1977, as cited in Gredler, 2001)

Theoretical Perspectives on Metacognition and Mathematical Problem Solving

Historically, the earliest philosopher who introduced the concept of metacognition in teaching is Buddha. According to scholars of Buddhism and Western psychologists, mindfulness (Samma-sati) is central to Buddhist teaching and has been closely associated with metacognition (Heys, Bang, Shea, Frith, & Fleming, 2020).

Mindfulness is a part of self-regulation and involves two related processes: monitoring and control (Schraw & Moshman, 1995). The metacognitive function of the right mindfulness includes not only observation and monitoring but also the skill of discrimination, refinement, and maintenance between thoughts, feelings, and behaviors (Ricketts, 2016).

In the realm of education and cognitive psychology, the first researcher who used the term metacognition was John Flavell (Zechmeister & Nyberg, 1982). Metacognition has been simply defined as thinking about thinking (Nazarieh, 2016). The main distinction between cognition and metacognition is that cognition is a constant flow of information (Langford, 1986) and metacognition is knowledge and awareness of processes and also the observance and management of such knowledge and processes (Flavell, 1979).

Looking back in the history of mathematics, since the 1980s, the studies conducted on mathematical problem solving have emphasized on if students are capable of monitoring their

thinking process while solving problems and the term metacognition has been recognized as a key factor in problem solving (Ken, Clements, & Ellerton, 1996). In the context of mathematical problem solving, metacognition is the process used by students to analyze what they know about their learning, and to plan, monitor, evaluate, and modify the solution process (Bryce, Whitebread, & Szucs, 2014).

According to Flavell (1979), students can be trained to become aware of their cognitive processes through problem solving. Mayer (1998) also mentioned that successful problem solving depends on three components: (i) skills, (ii) meta-skills, and (iii) will. In these three components, metacognition in the form of meta-skill is central in problem solving because it monitors and controls the other components.

Goldberg and Bush (2003) also stated that teachers at all grade levels must learn how to develop and assess the metacognitive skills of their students to become proficient problem solvers in mathematics. Wilson and Conyers (2016) stated that the metacognitive approach to teaching directs students to focus their attention, monitoring their learning process and how well they are applying the selected strategies, and practicing the use of selective attention across contexts in the classroom and their personal lives.

To summarize, problem solving in mathematics is helpful in the proper development of one's mental power. No matter what types of problems are submitted, students who are competent problem solvers identify the problem, plan the strategy, ask themselves whether they are doing makes sense or not, adjust their problem solving strategies when necessary, and look back to reflect on the reasonableness of their solution and their approaches.

The Metacognitive Teaching Model for Problem Solving

This model is developed based on theoretical concepts of the information processing model, basic teaching model, psychological cybernetic model, algorithmic model, heuristic/plan generating model, multiplicity model, and multi-modal model. Additionally, the components of Brown's model, general problem solving model, Polya's problem solving model, and IDEAL problem solving model were taken into consideration.

The six components of metacognitive teaching model are as follows.

(i) Stimulating/Eliciting Domain-Specific Knowledge. Domain-specific knowledge is information that leads action to complete specific tasks. Thus, task-relevant prior knowledge to the student is elicited at the beginning of the lesson.

(ii) Informing Learning Outcomes. In the second stage, learning outcomes are informed to students to provide a set of shared expectations between the teacher and the students.

(iii) Presenting the Problem. In the third stage, a word problem from the prescribed textbook is presented to all students. This stage includes reading aloud, silent reading, and verbalization of the parts of the problem statement.

(iv) Solving the Problem through Explicit Modeling/Think-Aloud. This component is based on social cognitive theory and involves four stages: (i) identifying, (ii) planning, (iii) implementing, and (iv) evaluating. In each stage of the solution process, the teacher has to do explicit modeling through think-aloud. Five kinds of metacognitive questions: comprehension questions, connection questions, strategic questions, checking questions, and reflection questions are used to demonstrate what is going on in the teacher's head and how to monitor and control the thinking process while solving the problem.

(v) Consolidating in a Collaborative Setting. In this stage, students are formed into heterogeneous learning groups and they have to solve the problems by taking the role of thinker and listener. The thinkers have to explain their reasoning through verbalizing, while the listeners

have to listen, record, ask questions, and make sure what the thinkers say. A set of metacognitive question cards are delivered to each group to help students to be aware of and monitor the problem solving phases.

(vi) Evaluating Performance and Transferring Learning. In this stage, students have to solve the problem independently. They have to do think-aloud about all the steps to monitor and control their thinking process. Next, they have to do reflective writing.

Method

The explanatory sequential (QUAN → qual), one of the basic mixed methods designs was adopted in this study.

Quantitative Research Method

Research Design. Jackson (2012) stated that the single-group pretest/posttest design is one of the variations of quasi-experimental research in which the two measures pretest (before) and posttest (after) can be compared and any differences in the measures are assumed to be the result of the treatment. Thus, the single-group pretest/posttest design was adopted to investigate the research question (1).

Subject. The sample size of the quantitative study is presented in Table 1.

Table 1 Population and Sample Size for Quantitative Study

No.	School	Population	Sample	Pretest	Treatment	Posttest
1	Practicing Middel School, Yankin	67	31	Attitude	MTM	Attitude
2	No. (5) BEHS, Mayangone	129	29	Attitude	MTM	Attitude
3	No. (2) EEHS, Thanlyin	79	36	Attitude	MTM	Attitude
4	No. (4) BEMS, Mingaladon	144	33	Attitude	MTM	Attitude
Total		419	129			

Note. BEHS = Basic Education High School; BEMS = Basic Education Middle School; MTM = Metacognitive Teaching Model

Instrument. The main instrument for quantitative study is an attitude questionnaire. The questionnaire is four points Likert scale and the items were categorized into three subscales: (i) emotion, (ii) belief, and (iii) behavior. There are eight items for each subscale, and a total of 24 items are included in the questionnaire. The internal consistency of the questionnaire was (Cronbach Alpha = .722).

Qualitative Research Method

Research Design. In qualitative research, case study design is a unique way of observing any natural phenomenon which exists in a set of data (Yin, 2003). Thus the case study design was adopted for research question (2) and (3).

Subject. In each school, students were assigned to groups A, B, and C. In each group, a student was elicited by using the random purposive sampling. Thus, a total of 12 students participated in the qualitative study. In addition, three Grade Six mathematics teachers also participated.

Instrument. The main instruments to collect data for the qualitative study are semi-structured interview questions for students and teachers.

The semi-structured interview questions for the students involve 17 questions and the items are divided into two categories: (i) problem solving behavior and (ii) perceptions on the metacognitive teaching model. The semi-structured interview questions for the teachers include

18 questions and the items are divided into two categories: (i) opinions on problem solving behavior of students and (ii) opinions on the metacognitive teaching model.

Study Procedure

This study started in the first week of November 2021 and ended in the second week of January 2022. The duration of the study was taken about eleven weeks. The pilot study was conducted with 25 Grade Six students from No. 2 Basic Education Middle School, Yankin.

Before the treatment period, students from each selected school were administered the attitude questionnaires. Then, they were taught problem solving through the stages of the metacognitive teaching model.

At the beginning of the lesson, students' domain-specific knowledge needed to solve the particular problems was elicited through different interaction patterns. Then, they were informed of the learning outcomes, and a word problem was presented. They were instructed to read the problem aloud and then silently, underline the keywords, and verbalize the parts of the problem statements to get a clear understanding of the problem context.

Then, the teacher's explicit modeling through thinking aloud was continued by four stages: (i) identifying, (ii) planning, (iii) implementing, and (iv) evaluating. In each stage of the solution process, five kinds of metacognitive questions: (i) comprehension question, (ii) connection question, (iii) strategic question, (iv) checking question, and (v) reflection question were used through thinking aloud.

Next, students solved the subsequent problems in a collaborative setting by taking the role of thinker and listener alternately. Throughout the solution process, all learning groups received metacognitive question cards.

After solving the problem in the collaborative setting, all students were instructed to solve the subsequent problems individually by verbalizing the solution process. Then, they were asked to do reflective writing based on what went well, what did not go well in the solution process, and what they would do next. After the treatment period, students were administered the attitude questionnaire.

Before the end of the study period, semi-structured interviews were conducted to explore the perspectives of students on solving problems through the metacognitive teaching model and to elicit teachers' opinions on teaching problem solving through the metacognitive teaching model.

Data Analysis

According to Pallant (2013), Wilcoxon Signed Rank Test can be used to measure the participants under two different conditions and the pretest results can be compared with the posttest results. Thus, the quantitative data were analyzed through descriptive statistics and Wilcoxon Signed Rank Test already installed in the Statistical Package for the Social Science (SPSS) version (24). In the qualitative data analysis, the constant comparison method is a very common type (Gay & Airasian, 2003). Thus, the qualitative data were analyzed through the constant comparison method.

Findings

Quantitative Research Findings

1. Findings of Students' Attitude towards Mathematical Problem Solving

Table 2 describes the comparison of the descriptive statistic results for students' responses to each item in the attitude questionnaire before and after the treatment.

Table 2 Descriptive Statistics Results for Students' Responses to Attitude Questionnaire

Emotion		Before		After	
No.	Statement	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1	Have good feelings about learning mathematics	2.96	0.66	3.42	0.55
2	Solving mathematics problems is fun	2.99	0.74	3.34	0.53
3	Do not like sharing ideas with classmates	2.81	0.94	3.42	0.58
4	Think mathematics is a boring subject	3.13	0.92	3.53	0.58
5	Enjoy thinking aloud while solving problems	2.67	0.84	3.16	0.63
6	Enjoy to listen the thoughts and ideas of classmates	2.78	0.87	3.19	0.62
7	Enjoy sharing thoughts and ideas with classmates	3.02	0.79	3.29	0.61
8	Feel nervous to solve problems	2.86	0.89	3.40	0.58
Belief		Before		After	
No.	Statement	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
9	Mathematics is useful in real life situation	3.46	0.65	3.61	0.52
10	Feel confident in solving any kinds of problems	2.79	0.75	3.23	0.49
11	Mathematics is easy subject	2.45	0.80	3.01	0.53
12	Most problems are too hard to solve	2.42	0.84	3.10	0.59
13	Mathematics is useful only for exam	2.75	1.06	3.44	0.62
14	Good at giving reasons in solving problems	2.87	0.67	3.29	0.53
15	Can use mathematics to solve real life problems	2.82	0.80	3.16	0.57
16	Have confident only numerical calculation	2.19	0.82	3.09	0.63
Behavior		Before		After	
No.	Statement	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
17	Underline the key points while reading	2.79	0.73	3.47	0.54
18	Divide the problem statements into different forms	2.95	0.77	3.40	0.53
19	Do not check on answer	2.99	0.85	3.66	0.55
20	Write down any answer	2.96	0.93	3.68	0.54
21	Give up if do not get the answer	3.07	0.89	3.56	0.55
22	Go through the solution and check if any mistakes	3.16	0.78	3.55	0.51
23	Try to find out the causes of mistakes	3.00	0.76	3.42	0.55
24	Find out different ways	2.84	0.71	3.29	0.49

Note. Number of Students = 129; Cronbach Alpha = .722.

According to the results of the descriptive statistics described in Table 2, it was found that the mean scores of each item before the treatment were increased after the treatment.

2. Findings of Wilcoxon Signed Rank Test Results on Attitude Questionnaire

Table 3 shows the Wilcoxon Signed Rank Test results for students' responses to the attitude questionnaire before and after the treatment.

Table 3 Wilcoxon Signed Rank Test Results for Students' Responses to Attitude Questionnaire

No.	School	Pair	<i>N</i>	<i>M</i>	<i>SD</i>	<i>Md</i>	Wilcoxon (<i>z</i>) test	<i>p</i>	<i>r</i>
1	Practicing Middel School, Yankin	Before	31	66.67	6.95	67	-4.63	.000***	.83
		After	31	77.64	5.10	77			

No.	School	Pair	N	M	SD	Md	Wilcoxon (z) test	p	r
2	No. (5) BEHS, Mayangone	Before	29	69.24	11.58	70	-4.67	.000***	.87
		After	29	80.17	7.00	79			
3	No. (2) EEHS, Thanlyin	Before	36	70.50	7.50	71	-5.16	.000***	.86
		After	36	81.36	6.34	81			
4	No. (4) BEMS, Mingaladon	Before	33	68.36	6.55	71	-5.02	.000***	.87
		After	33	83.51	4.58	84			

Note. BEHS = Basic Education High School; BEMS = Basic Education Middle School.

*** $p < .001$.

The results in Table 3 point out that there were significant differences in the experimental group students' responses to the attitude questionnaire before and after the treatment.

Qualitative Research Findings

1. Findings on Perceptions of the Students on Solving Mathematics Problems through The Metacognitive Teaching Model

The perceptions of students on solving mathematics problems through the metacognitive teaching model were found follows.

(i) Problem Solving Behaviors

- They usually read the problem aloud and then read silently.
- They did underlining the keywords in the problem and paraphrased.
- They wrote givens and what was asked for.
- They performed drawing to visualize the context of the problem.
- They often explored the solution by comparing the similarities and differences between the problems previously solved and the problem at hand.
- They arranged the computation steps and did draft calculations.
- They usually took monitoring on computation steps.
- They usually evaluated the answers, units, numbers copied from the problem, computation steps, and whether the solution was relevant to the problem context.
- They took reflective writing after solving the problems.

(ii) Perceptions on Metacognitive Teaching Model

- Solving mathematics problems through the proposed model could change their feelings to become positive towards problem solving.
- They became confident in solving word problems.
- They had got the habit of controlling, monitoring, and taking reflection.
- They had developed twenty-first century skills.
- Metacognitive question cards gave clear instructions and helped them instead of the teacher.
- They wanted to learn problem solving through the teaching-learning procedure of the proposed model in further grades.
- Sharing reflective writing with the whole class and finding solutions through heuristic strategies could be enjoyable in doing problem solving.

2. Findings on Opinions of the Teachers for Using the Metacognitive Teaching Model in Teaching Mathematics Problems

The opinions of teachers on teaching problem solving through the metacognitive teaching model were found as follows.

(i) Problem Solving Behavior of Students

- All students read the problem aloud. Then, they continued silent reading and underlined the keywords given by the problems.
- They did paraphrasing to get a clear understanding of a problem.
- They looked back at the previously solved problems and analyzed the similarities and differences between problems and the given problem.
- They found the solution through drawing, arranged the computation steps, and did the draft calculations.
- They performed monitoring on writing givens, numbers, and calculation steps through thinking aloud.
- They checked the answers, units, numbers copied from the given problem, and computation steps.
- They wrote reflective writing based on what went well, what did not go well, and what they would do next.

(ii) Opinions on the Metacognitive Teaching Model

- Teaching problem solving through the metacognitive teaching model could solve the underachievement problem in mathematics due to careless mistakes.
- Solving problems within groups through metacognitive question cards could change students' attitudes to become positive towards problem solving.
- Students got the habit of controlling, monitoring, and self-reflection.
- Twenty-first century skills could be trained through the proposed model.
- The proposed model was relevant to all grades at the Middle School level.
- They had learned metacognition is an important concept in teaching problem solving.
- The proposed model had positive effects on their mathematics teaching.

Discussion

Research question (1) addressed the students' attitude towards problem solving before and after the treatment period and the results showed that there were significant differences in the attitude of the students before and after the treatment in all selected schools.

This finding is consistent with Cardelle-Elawar (1995) who examined Middle School students' performance in problem solving and found that students who have got metacognitive training are significantly improved in their attitude towards problem solving compare to students who got traditional teaching in the control condition. Correspondingly, the result supports to Kendir and Sahin (2013) who examined the effect of using metacognitive strategies for problem solving in geometry on Grade five students' achievement, metacognitive skills, and attitude and they discovered that students in the experimental group have developed better attitudes towards solving geometry problems.

Research question (2) and (3) explored the perceptions of the students and the opinions of teachers on the metacognitive teaching model. According to the data analysis results on students' responses to interview questions, the results were found that the metacognitive teaching model had effects on their problem solving behaviors, they had developed positive attitude towards problem solving, and they had developed twenty-first century skills. The findings on teachers' responses to interview questions showed that they advocated that the proposed metacognitive teaching model could change the problem solving behavior of students, could solve the underachievement problem of students in mathematics due to careless mistakes, and could

support the students' attitudes to become positive towards problem solving and twenty-first century skills.

According to these findings, it was found that students' responses to interview questions were consistent with teachers' responses. These findings support to Schoenfeld (1987) who said that students who are trained to stop periodically during problem solving and ask themselves questions are able to control and reflect on the problem solving process and consequently improve their performance and attitude. In addition, these findings also advocate to Bandura's social cognitive learning theory in which a student could imitate certain skills from the teacher's skillful demonstration as his model and can master the skills if he acquires satisfaction and appropriate reinforcement (Gredler, 2001). These findings also acknowledge the constructivism in which learning is enhanced when individuals are socially participated in the learning process and engaged in new learning with prior knowledge and engaged in authentic learning tasks (Eggen & Kauchak, 1999).

Suggestions

In mathematics, problem solving is the core of the subject and it helps individuals to tackle the problems in their lives with confidence. Practically, to encourage a positive attitude towards problem solving, through metacognition, mathematics teachers should be familiar with teaching with and for metacognition. Teaching with metacognition is similar to reflection in action and teaching for metacognition looks like reflection on action.

The metacognitive approach to teaching emphasizes more on heuristics and strategies, not on algorithms and tactics (Biggs & Telfer, 1987). In the KG + 12 curriculum, starting from Grade two, some of the heuristic strategies such as drawing and finding patterns have been introduced to explore the solutions to particular problems. Therefore, mathematics teachers at the Middle School level should be familiar with heuristic strategies and metacognitive strategies such as explicit modeling, think-aloud, self-questioning, think-pair-share, and know-want to know-learned (KWL) techniques could be used depending on the nature of lessons and the level of students.

Reflective practice is one of the best strategies for improving metacognition and it is an authentic way to assess the performance of students. After solving the problems, teachers should instruct students to do reflective writing based on what went well, what did not go well, and what will do differently next time. If possible, teachers should give constructive feedback on individual students' reflective writing and that could be used as a formative assessment. Engaging students to assess reflective writings through self-assessment and peer assessment could improve metacognition and could be enjoyable for mathematical problem solving.

Research points out that stress, frustrations, embarrassment, and boredom lead to aversive attitudes towards learning mathematics (Mager, 1984). Thus, teachers should create a positive learning environment in which the development of students' thinking is encouraged, planning is shared between each other, monitoring, and evaluation is ongoing. Moreover, such an environment should involve teacher modeling and explanation, communicating students to students and students to teacher, students' discussions, teacher's encouragement and support, constructive feedback, and emotional support.

Additionally, knowing students' beliefs, emotions, and behaviors towards mathematics could help teachers to design the lessons more effectively. Possibly, mathematics teachers should explore the attitude of students towards mathematics through attitude inventory questionnaires at the beginning of the school year.

In the present study, the single-group pretest/posttest design, one of the designs of quasi-experimental research was adopted. Thus, in further study, a true experimental study should be conducted to get more valid findings. In addition, the development of metacognitive skills across different age groups and/or the correlation between metacognitive skills, students' attitudes, and achievement in problem solving should be studied.

Conclusion

According to the findings, the proposed metacognitive teaching model supported the positive effects on problem solving behaviors of students, and supported positive effects on their attitude towards problem solving, and twenty-first century skills. Similarly, mathematics teachers advocated that the proposed model had effects on the problem solving behaviors of their students, and positive effects on students' attitude towards mathematics and twenty-first century skill. Additionally, the proposed model had positive effects on their mathematics teaching approaches and it was relevant for teaching problem solving for all Grades at the Middle School level. Therefore, this study pointed out that integrating metacognition in teaching problem solving is one of the reasonable solutions for negative attitudes towards problem solving due to lack of control and monitoring of the solution process.

Acknowledgements

First and foremost, we would like to express our respectful gratitude to Dr. Khin Zaw (Retired Rector, Yangon University of Education) and Dr. Htoo Htoo Aung (Retired Pro-Rector, Yangon University of Education) for their professional guidance and constructive criticism. We would like to express our deepest appreciation to Dr. Kay Thwe Hlaing (Rector, Yangon University of Education) for permitting us to conduct the study. We would like to express our genuine gratitude to Dr. Khin Aye Myint, Daw Aye Aye Kywe, and Dr. Myo Win (Retired Professors, Curriculum and Methodology Department, Yangon University of Education) for their pedagogical advice, constructive suggestions, and extensive knowledge. We also express our deep and sincere gratitude to Dr. Khin Mar Khine (Professor and Head, Curriculum and Methodology Department, Yangon University of Education) for giving precise instructions and management.

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AN INVESTIGATION INTO THE EFFECTIVENESS OF ACTIVITY-BASED LEARNING IN THE TEACHING OF MIDDLE SCHOOL GEOGRAPHY

Cho Cho Win¹, Khaing Khaing Lwin²

Abstract

The purpose of this study is to investigate into the effectiveness of activity-based learning in comparison to traditional learning in teaching of Middle School Geography students. Quantitative and qualitative QUAN → qual which is known as an explanatory sequential mixed method and nonequivalent control group design were used. The subjects were selected from three Basic Education schools (one from downtown, one from urban and one from outskirts) located in one out of eight townships in Nay Pyi Taw and three Basic Education schools (one from downtown, one from urban and one from outskirts) located in one out of ten townships in Mon State by using simple random sampling method. The instruments include pretest, posttest, teachers' attitudinal questionnaires, students' attitudinal questionnaires, observation checklist, teacher's interview questions and student's interview questions. The experimental groups were taught by activity-based learning while the control groups were taught by traditional methods to cover (20) lesson plans for Grade Seven geography. Students' geography learning achievement was compared and analysed by using one-way ANCOVA. The findings show that there were significant differences in posttest results between experimental and control groups, and most questionnaires and interview results were positive except moderately satisfactory responses from observation checklists.

Key words: Learning, Activity-Based Learning, Effectiveness, Geography, Model

Introduction

An effective way to facilitate learning is by creating a learning environment which gives learners opportunities to work collaboratively with others (Kagan, 1994, as cited in Kivunja, 2015). Activity-Based Learning (ABL) helps learners to construct mental models that allow for higher-order performance such as application of problem solving and transfer of information and skills. Therefore, teachers can create an effective learning environment by using ABL to promote student's engagement and learning achievement. Moreover, some researches show that (ABL) is a great importance in secondary school geography and lower secondary level geography by using different activities and tools (Demirci, Kesler & Kaya, 2010).

In Myanmar, the aim of teaching geography in middle school is to give students necessary knowledge and skills to understand the earth as their home and utilize its resources sustainably during their life-time (Department of Educational Research, Planning and Training, 2017). In order to meet these aims, teachers need to use effective instructional activities, assessment types which focus on promoting of students' active participation in their learning.

Statement of the Problem

The world in the 21st century has found enormous changes in education mainly due to the advance in science and technology. It is important to create an active learning environment for students to participate in any activities and practices. Traditional classroom practices seem to have many limitations such as large student-teacher ratio, teacher's role as of information distributor rather than as a facilitator of learning. Students are weak in conducting deep learning in some subjects, especially in learning geography. Consequently, the entrees to Middle Schools and High Schools seem to have little interest in learning geography. The activity-based learning (ABL) model could be able to reduce many of these barriers.

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The Main Purpose of the Study

The main purpose is to investigate into the effectiveness of activity-based learning in comparison to traditional learning in the teaching geography to Middle School students.

Specific Objectives

The specific objectives are as follows:

- To develop an activity-based learning model for geography teaching and learning
- To investigate the effectiveness of activity-based learning model in Grade Seven geography teaching
- To explore teachers' perceptions on activity-based learning in Grade Seven geography teaching
- To explore students' perceptions on activity-based learning in Grade Seven geography teaching
- To make suggestions and recommendations based on the research results for the improvement of geography teaching in Middle Schools of Myanmar

Research Hypotheses

- (1) There is a significant difference in achievement of geography learning between Grade Seven students who are taught by activity-based learning model and those who are not taught it in responding the “remembering” level questions, “understanding” level questions, “applying” level questions, and “analysing” level questions.
- (2) Students who are taught by the proposed activity-based learning model will have positive perception on Grade Seven geography learning.
- (3) Teachers who use the proposed activity-based learning model will have positive perception on Grade Seven geography teaching.

Scope of the Study

The following points indicate the scope of the study.

1. This study is geographically restricted to one region and one state: Nay Pyi Taw region and Mon state.
2. Participants in this study are Grade Seven geography teachers and students from selected schools in 2022-2023 Academic Year.
3. The content area covered to some lessons of new Grade Seven geography curriculum.
4. The lessons are those that have not been taught to students before the experiment period.

Definitions of Key Terms

Essential terms are defined for the proposed study. They are described as follows:

Learning

Learning is a process that leads to change, which occurs as a result of experiences and increases the potential for improved performance and future learning (Kivunja, 2015, p. 526).

Activity-based learning

Activity-based learning is defined as learning by doing and comprises many different in and out-of-school activities practiced by students either individually or as a group (Demirci, Kesler & Kaya, 2010, p. 53).

Effectiveness

Effectiveness is the extent to which an activity fulfills its intended purpose or function (Harvey, 2004-19, p.35).

Geography

Geography refers to the examination, description, and explanation of Earth—its variability from place to place, how places and features change over time, and the processes responsible for these variations and changes (Petersen, Sack & Gabler, 2011, p. 2).

Model

A model is a conceptual structure that represents a way of thinking or understanding relationships involved in a process (Kivunja, 2015, p. 67).

Significance of the Study

Learning is acquiring new knowledge, understanding, behaviour, skills, values and preferences and it also involves synthesizing different types of information. It is also important that student processes the information with higher level thinking such as remembering, understanding, applying and analyzing. When this happens, the student is able to relate the information to any life situation, connects it with past learning, builds his or her own knowledge and becomes a knowledgeable and contributing citizen.

Geography is a vital subject for students to become knowledgeable and global citizens in 21st century, to enable students to face questions of what it means to live sustainably in an interdependent world (Harichandan, Shaik & Sunni, 2000). According to Demirci, Kesler, and Kaya (2010), the activity-based learning is especially important in teaching geography in secondary school. Myanmar education system must ensure for students to meet minimum national learning standards and to develop their critical, creative thinking skills, to understand, respect and fulfill rights and responsibilities of citizens and to gain leadership skills in communities (Ministry of Education, 2016).

Review of Related Literature**Foundational Philosophies of Activity-Based Learning**

Educational philosophies related to this study include pragmatism, progressivism, cognitivism, constructivism, social-cognitive constructivism. Pragmatists believe that school programs should involve learners with practice in working with problems. The class discussions are the methods of the pragmatists. Progressivists believe that learning should be related to the interests of the child. Experience and experiment are two key words for the progressive educators (Kneller, 1976, as cited in Hessong & Weeks, 1991). Bloom and his colleagues claimed that there are three important domains of learning: cognitive domain (thinking), affective domain (feeling), and psychomotor domain (doing). In the activity-based learning, students will be given opportunity to learn how to learn, how to do, how to participate in their learning, and how to collaborate with the peer. The activity-based learning follows the constructivist educational theory. Geography teachers can apply the child-centered pedagogy with the relevant activities in their teaching. Group activity is necessary to use in teaching-learning process of geography. Group work can be a very effective way of using scaffolding principles in the classroom because students can learn from each other while working together on a project.

Learning Theories of the Activity-Based Learning

A theory of learning is a general concept which applies to all organisms, to all learning tasks, and to situations, both in and out of school, in which learning may occur (Khin Zaw, 2001). This study includes experiential learning theory, Jean Piaget cognitive development theory, constructivist learning theory and cognitive learning theory. Kolb's experiential learning theory works on two levels: a four-stage cycle of learning and four separate learning styles. He also states that learning involves the acquisitions of abstract concepts that can be applied flexibly

in a range of situations (McLeod, 2017). The researchers assume that laboratory activity, projects, inquiry activity and field work in Geography lesson are related to the experiential learning theory.

Formal operational stage (12 and up) of Jean Piaget's theory of cognitive development is related to the age of Grade Seven Middle School students in Myanmar. From the constructivists' theory, learners interact more with the subject matter and with one another, to construct and own knowledge. They are not considered to be empty vessels into which knowledge is poured. Active learning activities are important to promote thoughtful engagement, to encourage analytical thinking and reasoning, to foster the integration and application of knowledge, and are designed around well-defined learning activities (Greeno, 2006, as cited in Mohammed, 2014).

Foundational Models Related to Activity-Based Learning

This study uses some models, namely, the Interaction analysis model, Robert Glaser basic teaching model, Psychological Cybernetic model, Multimodal model, 5E instructional model, and Cooperative Learning model.

Ned Flanders has developed social-interaction models in learning psychology. He classifies the statements of students and teachers into ten categories. It is found that the stated model can be used in implementing the activity-based learning.

A brief analysis of each of the four components of the Robert Glaser basic teaching model is as follows-

- (i) **Instructional Objectives (IO)** are those the students should attain upon completion of one segment of instruction. Instructional objectives should be EXPLICIT, PRECISE and EASILY VERIFIABLE.
- (ii) **Entering Behavior (EB)** describes the student's level before instruction begins. It refers to what he has previously learned, his state of MOTIVATION, and certain social and cultural determinants of his learning ability. Entering behavior is a more precise term than the usual alternatives – human ability, individual differences, and readiness.
- (iii) **Instructional Procedures (IP)** describes the teaching process; most decisions a teacher makes are on these procedures. Proper management of this component results in those changes which are generally called learning or achievement.
- (iv) **Performance Assessment (PA)** of the tests and observations used to determine how well the student has achieved the instructional objectives. Important points to ponder here are those concerning objective and non-objective testing methods, and TERMINAL or AUXILIARY performance evaluation procedures.

The components of this teaching model play an important part in implementing activities such as group work, pair work and inquiry learning activities by students and teacher. So, this model was based in designing activity-based learning model for the current study.

The works of Galperin, Slavina and Talyzina are deemed today as most valuable to the international field of ontogenetic research. The implication of this work is that the results may be generalized to normal children. In teaching geography, teacher will provide initial orientation for prior knowledge, explain students to make relevant physical responses with concrete objects like maps, globe and some real objects related to the lessons. Children will master their activities as long as teacher can guide them well.

Professor Dr. Khin Zaw's Multimodal Model's Theoretical Constructs consist of five main principles.....

- (1) Channel Capacity;
- (2) Brain Resilience;

- (3) Redundancy;
- (4) Unitizing/ Symbolizing Modes, and
- (5) Diffusing/ Re-synthesizing Mode.

The five main principles of Professor Dr. Khin Zaw are related to the activity-based learning model in teaching geography. Only when teacher understands the importance of Channel Capacity, Brain Resilience, Redundancy, Unitizing/ Symbolizing Modes, and Diffusing/ Re-synthesizing Mode, students will learn more and geography teaching will be more effective.

The steps of 5E instructional model 'Engage', 'Explore', 'Explain', 'Elaborate' are useful for a geography teacher in assigning mind map, map works, pair works, group works, observation activities and inquiry activities to students during the activities. Therefore, this study was based on 5E instructional model phase to make intervention in teaching Grade Seven Geography to students in Myanmar.

Cooperative learning is effective for encouraging content learning, and social effectiveness by a meta-analysis of the research by Marzano et al. (2001) and studies by Maheady, Michielli-Pendl, Mallette, and Harper (2002, as cited in Kivunja, 2015) and Baker, Gersten, and Lee (2002, as cited in Kivunja, 2015). The cooperative learning is necessary to organise team work, group work, pair work in teaching Grade Seven Geography to students in Middle Schools in Myanmar.

Proposed Activity-Based Learning Model for Grade Seven Geography Teaching

Proposed model is based on the above theoretical foundations and models. In the proposed model, four stages are sequentially organized: Pre-Planning, Student engagement, Sequential learning process and Summative assessment. Therefore, this proposed model is named as PS3 Activity-Based Learning model. This model is presented in Figure 1.

The Proposed Activity-Based Learning (ABL) Model

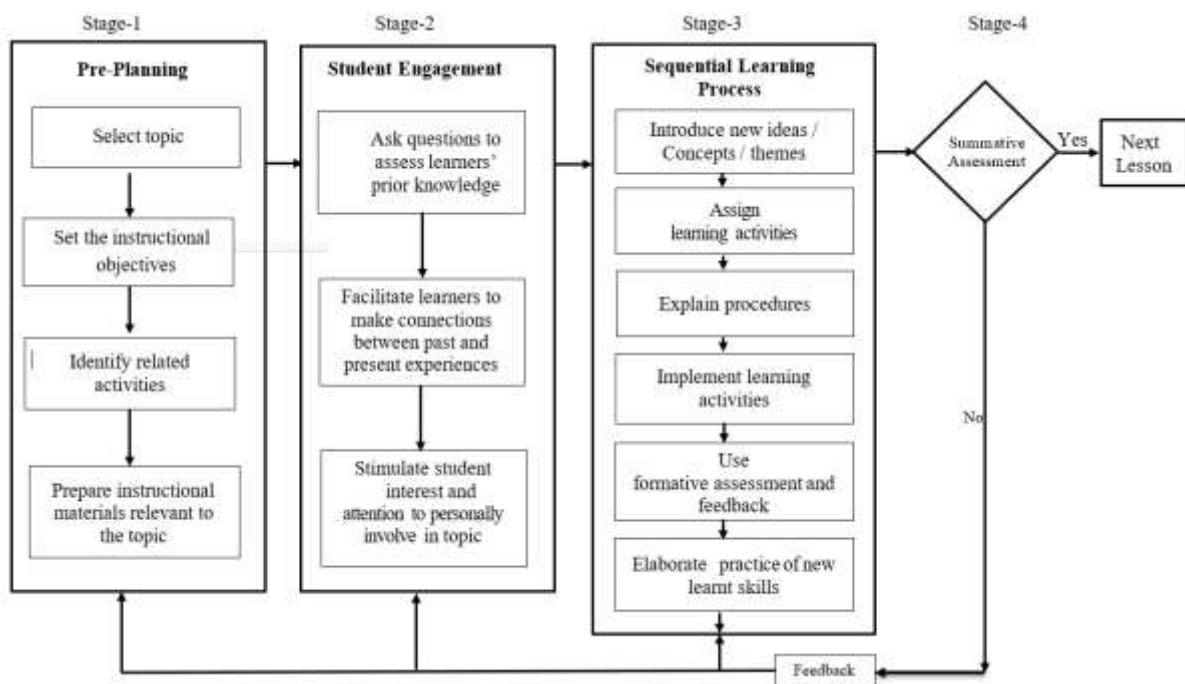


Figure 1 PS3 Activity-Based Learning Model for Grade Seven Geography Teaching

Research Method

Research Design

This study used the quantitative and qualitative QUAN $\rightarrow$ qual (Creswell & Plano Clark, 2011; Mills & Gay, 2019). This study also used nonequivalent control group design known as quasi-experimental design.

Quantitative Research Method

Quantitative research method was used to reveal the results of hypotheses such as there is a significant difference in achievement of geography learning between Grade Seven students who are taught by activity-based learning model and those who are not taught it in the performing various levels such as remembering, understanding, applying, and analyzing.

Population and Sample Size

One out of eight townships from Nay Pyi Taw Region, and one out of ten townships from Mon State and three Basic Education Schools from each sample township were selected by using simple random sampling respectively. Schools were one from downtown, one from urban, and one from outskirt in each township. Students, teachers and head teachers from sample schools were involved in this study.

Instruments

Pretest and posttest were used as quantitative research instruments. Pretest question includes multiple choice items, completion items, shorts answer questions and essay type questions in the posttest. Posttest includes ten multiple choice items, ten completion items, two shorts answer questions, and two essay type questions. The overall scores for posttest were (50) marks and one hour was allowed for test time. For pretest, test items were constructed based on the Grade Six geography textbook and the posttest items were constructed based on Grade Seven geography textbook.

The questionnaires include close-ended questions and Five-point Likert scale items with five strands to indicate the perceptions on each item. In teachers' questionnaires, there are four components to explore perception on activity-based learning model in geography teaching. Moreover, there are (5) open-ended questions to get in-depth discussions. Similarly, students' questionnaires involved (20) items and it took about (30) minutes for students and about (60) minutes for the teachers to complete the questionnaires. Observation checklist for teaching and learning were distributed to experienced teachers to get the validation and it was also modified. It included (10) items on teaching and (10) items on learning.

Learning materials

Learning materials included lesson plans, variety of teaching learning aids, and textbook and teachers guide.

Procedures

Firstly, pilot study was done with a sample of (40) Grade Seven students at No. 11 Basic Education High School in Nay Pyi Taw. It was conducted from third week of June to second week of July, 2022. In the posttest, among (39) geography periods, (20) periods (lesson plans) were taught for this study. Cronbach's Alpha was calculated and the value range is 0.80 to 0.89.

Qualitative Research Method

Qualitative research method was used to investigate the hypothesis 2: Teachers who use the proposed activity-based learning model will have positive perception on Grade Seven geography teaching and hypothesis 3: Students who are taught by the proposed activity-based learning model will have positive perception on Grade Seven geography learning.

Population and Sample Size

One out of eight townships from Nay Pyi Taw Region, and one out of ten townships from Mon State and three Basic Education Schools from each sample township were selected by using simple random sampling respectively. To explore students' perceptions and teachers' perceptions on activity-based learning model, two participants from each school were interviewed and there were twelve participants in total selected by simple random sampling method.

Instruments

In this phase, teachers' interview questions were involved (10) items and students' interview questions were involved (5) items. Moreover, video recording was made for teachers and students during the interview. Observation checklist included (10) items for teaching and (10) items for learning.

Procedures

A semi-structured interview form was developed. Then, the developed interview question form was presented to the experienced teachers. After that, the interview questions were modified according to the feedback provided by the experienced teachers. During the interview, the video recording was made for clear evidence, and it was transcribed. The interview took about 10 minutes for each person.

Data Analysis

Data are analyzed to test the research hypothesis or answer the research question (Mills & Gay, 2016). Both quantitative and qualitative analysis of the data were used in this study. Quantitative data obtained through the test results of the students and questionnaires (close-ended questions) were analyzed via Statistical Package for the Social Studies, (SPSS, 2018) by using One-Way analysis of covariance (ANCOVA) to compare the differences between the experimental groups and the control groups. Qualitatively, a thematic analysis approach was used manually.

Findings

Quantitative Research Findings

In this study, the findings from such areas as remembering level, understanding level, applying level, and analysing level questions were analysed by using One-Way ANCOVA to find out significant differences between experimental and control groups. Data were collected and analysed to show whether they are compatible to the research hypotheses or not.

Findings of the Students' Achievement in Pretest

Findings of the students' achievement in pretest show that there were no significant differences between experimental groups and control groups in five schools except school six which had significant difference. The following Table 1 depicts students' achievement results from pretest.

Table 1 Findings of the Students' Achievement in Pretest

School	Group	N	M	SD	MD	F	p
S1	EG	45	19.58	4.12	0.31	107	.745 (ns)
	CG	37	19.27	4.38			
S2	EG	53	20.58	2.69	-0.05	0.01	.925 (ns)
	CG	52	20.63	2.69			
S3	EG	36	15.39	3.35	-0.61	0.57	.453 (ns)
	CG	43	16.00	3.78			
S4	EG	31	23.71	2.97	1.21	2.02	.161 (ns)
	CG	30	22.50	3.66			

School	Group	N	M	SD	MD	F	p
S5	EG	30	28.37	1.25	0.20	0.29	.595 (ns)
	CG	23	28.17	1.37			
S6	EG	41	17.54	6.51	3.04	7.75	.007**
	CG	40	14.50	2.32			

Note. S1 = Basic Education Middle School (Branch), Myoma; S2 = Basic Education High School, Alar, S3 = Basic Education High School (Branch), Tharyargone; S4 = Basic Education Middle School (Branch), Set Thit; S5 = Basic Education High School, Kyonkadat; S6 = Basic Education High School (Branch), Anin; EG = Experimental Group; CG = Control group; ns = not significant, ** $p < .01$.

Findings of Students Achievement in Posttest

Relating to posttest results, findings show that most schools had significant differences at applying and analysing level while no significant difference was found at understanding level and remembering level questions in a few schools. The following Table 2 summarises ANCOVA results of both groups in each school.

Table 2 Summary of ANCOVA Results of both Groups in each School

School	Group	N	M	SD	MD	F	p
S1	EG	45	28.11	5.49	2.77	7.89	.006**
	CG	37	25.34	2.69			
S2	EG	53	35.85	2.99	8.14	145.64	.000***
S3	EG	36	20.70	1.71	0.24	0.13	.724 (ns)
	CG	43	20.46	3.83			
S4	EG	31	33.45	3.39	3.22	9.41	.003**
	CG	30	30.23	4.79			
S5	EG	30	38.57	2.52	3.78	27.27	.000***
	CG	23	34.79	2.66			
S6	EG	41	35.29	5.81	8.97	37.29	.000***
	CG	40	26.32	6.96			

Note. S1= Basic Education Middle School (Branch), Myoma; S2 = Basic Education High School, Alar, S3 = Basic Education High School (Branch), Tharyargone; S4 = Basic Education Middle School (Branch), Set Thit; S5 = Basic Education High School, Kyonkadat; S6 = Basic Education High School (Branch), Anin; ns = not significant, ** $p < .01$, *** $p < .001$.

The following Figure 2 compares ANCOVA results of posttest scores achieved by both groups in each school.

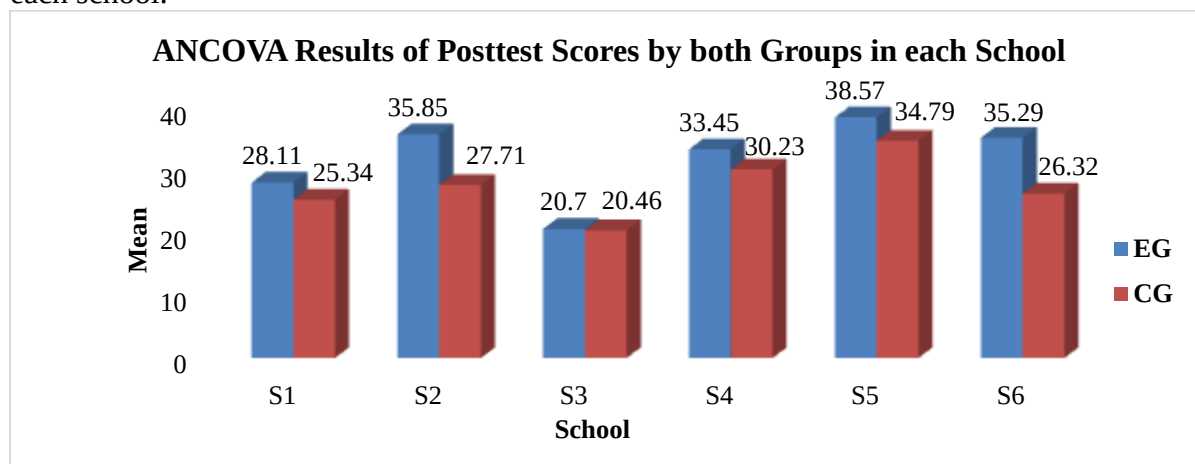


Figure 2 Comparison of ANCOVA Results of Posttest Scores by both Groups in each School

Note. S1 = Basic Education Middle School (Branch), Myoma; S2 = Basic Education High School, Alar, S3 = Basic Education High School (Branch), Tharyargone; S4 = Basic Education

Middle School (Branch), Set Thit; S5 = Basic Education High School, Kyonkadat; S6 = Basic Education High School (Branch), Anin.

Table 3 Summary of Students' Questionnaires Results

Area A	Attitudes towards the Development of Subject Mastery					
Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)
1	240	-	0.8	2.1	50.8	46.3
2	240	-	0.8	2.1	36.3	60.8
3	240	-	5.4	22.5	45	27.1
4	240	0.4	3.4	7.9	47.5	40.4
5	240	-	1.6	9.2	50.4	38.8
Area B	Attitudes towards the Development of Self-Confidence					
1	240	0.8	1.7	4.6	38.3	54.6
2	240	-	3.7	7.9	44.6	43.8
3	240	-	2.9	6.7	39.2	51.2
4	240	-	3.3	10	51.2	35.4
5	240	-	2.9	5.8	39.6	51.7
1	240	0.4	2.5	11.7	62.9	22.5
2	240	-	2.1	9.1	54.2	34.6
3	240	-	0.4	0.4	39.6	59.6
4	240	1.3	4.1	10	50	34.6
5	240	1.3	2.5	4.1	32.9	59.2
Area D	Attitudes towards the Development of Creativity					
1	240	1.3	4.6	13.3	47.5	33.3
2	240	3.3	3.8	28.7	45	19.2
3	240	1.7	5	15.5	52.1	25.7
4	240	1.3	2.4	3.8	39.2	53.3
5	240	1.7	1.3	9.5	42.5	45

Note. SD = Strongly Disagree; D = Disagree; N = Neutral; A = Agree; SA = Strongly Agree

Table 4 Summary of Teachers' Questionnaires Results

No.	Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)
A	Teachers' Attitude towards Lesson Preparation in Teaching Geography through Activity-Based Learning						
1	Suitable lesson activities should be prepared in teaching through activity-based learning (ABL).	6	-	-	-	83.3	16.7
2	In teaching by ABL, I assume that lessons should be prepared not only with activities in the textbook but also with the teacher's creativity.	6	-	-	-	83.3	16.7
3	In order to teach lessons by ABL, it is necessary to include learning outcomes when learning objectives are set.	6	-	-	-	66.7	33.3
4	In preparing the lesson by ABL, teacher should consider students' mental development when the activities are planned.	6	-	-	-	33.3	66.7
5	In preparing the lesson by ABL, it is necessary to consider students' prior knowledge to lesson topic.	6	-	-	-	33.3	66.7
6	In preparing the lesson by ABL, the teaching aids must be planned in advance.	6	-	-	-	33.3	66.7
7	In preparing the lesson by ABL, it is necessary to plan formative assessments to be carried out during instructional process.	6	-	33.4	-	33.3	33.3

No.	Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)
8	In preparing the lesson by ABL, written questions should be prepared to find out the achievement of learning objectives.	6	-	-	33.4	33.3	33.3
9	In preparing the lesson by ABL, it is necessary to prepare Observation Checklist to assess state of the learning.	6	-	-	-	100	-
10	In preparing the lesson by ABL, not only the activities in the textbook but also extended assignments should be planned.	6	-	-	33.4	33.3	33.3
B	Teachers' Attitudes towards Geography Teaching by Activity-Based Learning						
1	In teaching lessons by ABL, the teacher should study concepts and principles of ABL to carry out the learning activities.	6	-	-	-	33.3	66.7
2	In teaching lessons by ABL, the teacher must prepare active learning activities before instruction begins.	6	-	-	-	83.3	16.7
3	In teaching lessons by ABL, the teacher needs to explain procedures of individual and group activities before they are carried out.	6	-	-	-	83.3	16.7
4	I think the ABL is helpful to motivate students to develop creative activities related to the lesson.	6	-	-	-	50	50
5	In teaching lessons by ABL, the teacher must allow students to ask questions about unclear information during learning activities.	6	-	-	-	66.7	33.3
6	In teaching lessons by ABL, the teacher should provide constructive criticism and advice to supplement what students need during their learning activities.	6	-	-	-	66.7	33.3
7	In teaching lessons by ABL, I think that the teacher needs to continuously check and evaluate the progress of the work while the students are doing the learning activities.	6	-	-	-	66.7	33.3
8	In teaching lessons by ABL, the teacher must evaluate the students' learning, review his teaching, and prepare the necessary steps.	6	-	-	-	50	50
9	In teaching lessons by ABL, it is not necessary to assess learning by assigning project work.	6	-	-	-	83.3	16.7
10	I think that the set teaching duration is not enough when ABL is implemented properly.	6	-	-	-	83.3	16.7
C	Teachers' Attitudes towards Students' Learning in Teaching Geography through Activity-Based Learning						
1	In using ABL, students must be given the opportunity to practice learning materials related to the lesson.	6	-	-	-	66.7	33.3
2	When learning lessons by ABL, I think that teacher should help students to present how the learning activities have been carried out.	6	-	-	-	83.3	16.7
3	When learning lessons by ABL, it is considered that learning activities should be clear before students learn.	6	-	-	-	100	-
4	When learning lessons by ABL, students are allowed to discuss and exchange their ideas with each other while doing learning activities.	6	-	-	-	50	50
5	When learning lessons by ABL, the teacher must plan activities for all students in advance so that they participate in learning.	6	-	-	-	50	50
6	The ABL helps students acquire the ability to apply what they have learned in the classroom to an environment outside of school.	6	-	-	-	66.7	33.3
7	When learning lessons by ABL, students will develop accountability for their learning.	6	-	-	-	50	50

No.	Statement	N	SD (%)	D (%)	N (%)	A (%)	SA (%)
8	When learning lessons by ABL, I think that students will get more team spirit by doing learning activities together.	6	-	-	-	33.3	66.7
9	When learning lessons by ABL, students are more interested in Geography.	6	-	-	-	66.7	33.3
10	I think that the ABL can contribute to get more students' interest in teaching not only Geography but also other subjects.	6	-	-	-	50	50
D	Teachers' Attitudes on Assessment of Students' Learning Achievement in Teaching Geography through Activity-Based Learning						
1	In teaching lesson by ABL, I think that formative assessment can identify the state of students' learning.	6	-	-	-	66.7	33.3
2	In using ABL, the written test is considered essential in evaluating end-of-year achievement.	6	-	-	-	16.7	83.3
3	Peer assessment can also be used in using ABL.	6	-	-	-	100	
4	In ABL, learning achievement can be evaluated by keeping Performance Assessment Record.	6	-	-	-	66.7	33.3
5	The teacher should use portfolios of student to evaluate the individual learning progress.	6	-	-	-	33.3	50
6	In teaching lesson by ABL, it is assumed that formative assessment can identify students' strengths and weaknesses and necessary feedbacks can be given.	6	-	-	-	83.3	16.7
7	In using ABL, it is necessary to give individual activities and check them when learning achievement is assessed.	6	-	-	-	16.7	50
8	In using ABL, learning achievement can be assessed not only directed assessment techniques but also using extended activities.	6	-	-	-	33.4	33.3
9	In using ABL, assigning homework and assessment are essential.	6	-	-	-	33.3	66.7
10	As the ABL activities take time, I think that there is not enough time to do assessment after learning a lesson.	6	-	-	-	33.3	66.7

Note. SD =Strongly Disagree; D =Disagree; N =Neutral; A =Agree; SA = Strongly Agree
The following Figure 3 describes observation results by teachers to Geography teacher.

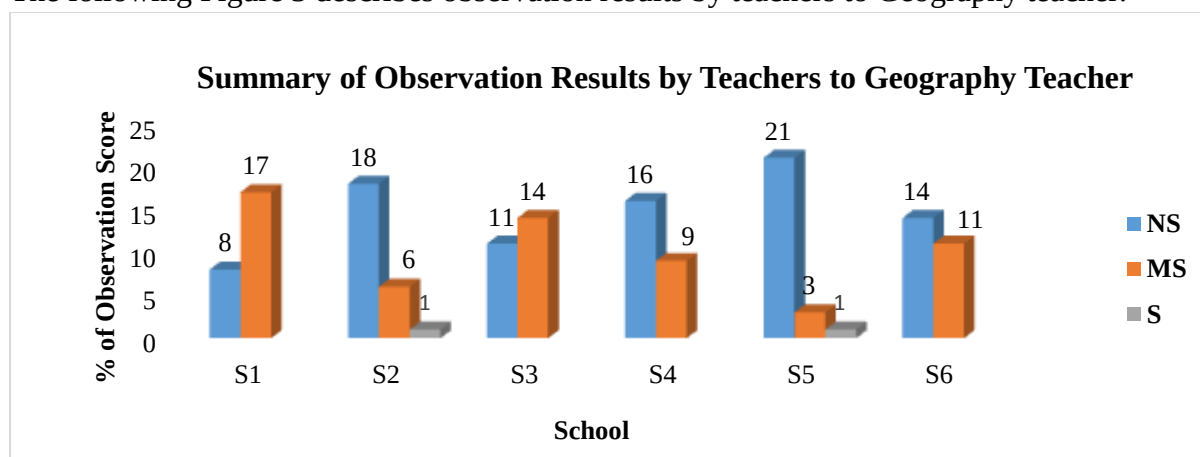


Figure 3 Summary of Observation Results by Teachers to Geography Teacher

S1 = BEMS Myoma; S2 = BEHS Alar; S3 = BEHS (Branch) Tharyargone;
S4 = BEMS Set Thit; S5 = BEHS Kyonkadat; S6 = BEHS (Branch) Anin
NS = Not Satisfied; MS = Moderately Satisfied; S = Satisfied

The Table 5 described below summarises the observation results by teachers to geography teacher.

Table 5 Summary of Observation Results by Teachers to Geography Teacher

School	S1	S2	S3	S4	S5	S6
NS	8	18	11	16	21	14
MS	17	6	14	9	3	11
S	-	1	-	-	1	-

Note. NS = Not Satisfied; MS = Moderately Satisfied; S = Satisfied

Table 6 described below summarises observation results by principals to geography teachers.

Table 6 Summary of Observation Results by Principals to Geography Teachers

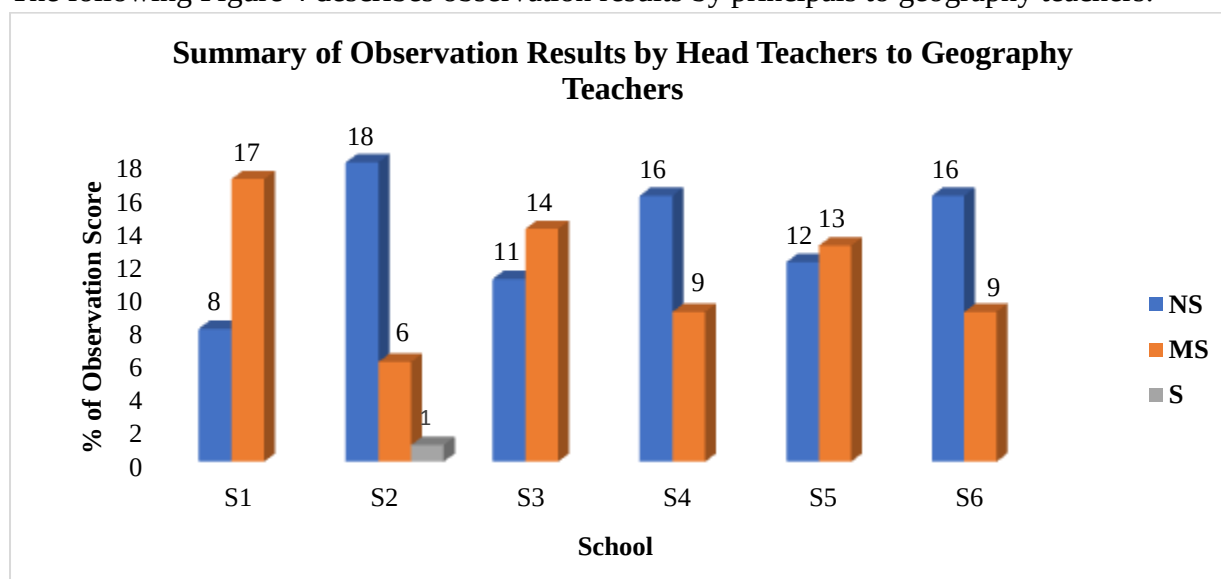
School	S1	S2	S3	S4	S5	S6
NS	8	18	11	16	12	16
MS	17	6	14	9	13	9
S (%)	-	1	-	-	-	-

Note. S1 = BEMS Myoma; S2 = BEHS Alar; S3 = BEHS (Branch) Tharyargone;

S4 = BEMS Set Thit; S5 = BEHS Kyonkadat; S6 = BEHS (Branch) Anin

NS = Not Satisfied; MS = Moderately Satisfied; S = Satisfied

The following Figure 4 describes observation results by principals to geography teachers.

**Figure 4** Summary of Observation Results by Principals to Geography Teachers

Note. S1 = BEMS Myoma; S2 = BEHS Alar; S3 = BEHS (Branch) Tharyargone;

S4 = BEMS Set Thit; S5 = BEHS Kyonkadat; S6 = BEHS (Branch) Anin

NS = Not Satisfied; MS = Moderately Satisfied; S = Satisfied

Data Analysis Method and Interview for Qualitative Findings

Interviews were conducted to a teacher and 2 students from each school to know their insights towards the proposed ABL model in teaching and learning Grade Seven Geography and so there were 6 teachers and 12 students in total. Coding analysis and thematic analysis were done to explore appearing themes from the study.

Thematic Analysis on Findings from Teacher

There are some similarities among observed teachers and so, their responses are analysed and synthesized into themes. Based on responses of teachers, the following themes can be explored. For preparation, teachers replied that they prepared lessons to include all students, like verbal questions and written questions, preparation of necessary teaching aids and use of more

time to study lessons in advance. For Preferences, teachers found students satisfied the ABL, for example, use of different soils for growing plants, active participation in activities, more enjoyment of ABL. For benefits of using ABL, teachers found that students improved reflective skills, participation of lone learner in group work, and improvement of team-work skills.

For difficulties, teachers saw poor learners reluctant to come to the front and so they gave answers from their place. Some students were not interested in and some were afraid of telling answers. For suggestions, teachers responded that ABL could be used for mathematics, science, history subjects because these subjects also need group work and hands-on activities.

Thematic Analysis on Findings from Student

There are some similarities among observed students and so, their responses are analysed and synthesized into themes. Based on responses of students, the following themes can be explored. For preparation, interviewed students also responded that they used soft pens, colour pens, maps, filling in maps and different soils. For preferences, students responded that they were happy to learn Geography by ABL because they got experiences of working in groups. They preferred group activities to individual activities that take time in finding answers. In group work, they can ask help from others, exchange knowledge and discuss among friends. For benefits of Activity-based learning, students responded that they got more friendship with group members and teacher. And doing competition motivated them to get more marks and facts compared to other groups. For suggestions, students replied that they wanted to learn history, science subjects and mathematics volume 2 by ABL.

Discussion

In terms of statistical results, experimental groups students from Nay Pyi Taw and Mon State got higher achievement than those from control groups. Most of the positive responses from teacher questionnaires and student questionnaires show that ABL model has positive impact on teachers and students in Geography teaching. However, observation results by Grade six teachers and principals to Grade seven geography teachers show that geography teachers instruction remained at moderately satisfactory level. This could be that observers reached the classroom at busy hours of students and observers' little knowledge on ABL nature. Based on findings from interview responses, five themes were explored and they are preparation, preferences, benefits of activity-based learning, difficulties and suggestions. Both teachers and students expressed the importance of lesson preparation, their likes and dislikes, improvement and advantages of activity-based learning, some difficulties experienced by teachers and students and their suggestions. In summary, among 236 students from six schools, around 80% of responses were positive replies while less than 10% were negative replies from those schools. The remaining percentages were neutral responses on given statements. The questionnaire responses show that students from experimental groups in both locations (Nay Pyi Taw and Mon State) preferred activity-based learning model and related activities to those of traditional learning method. All in all, the findings agree with hypothesis 6: students who are taught with the proposed Activity-Based Learning (ABL) Model will have positive attitudes towards Grade Seven Geography learning. The current findings are supported by previous studies as follows.

Study of (Anwer, 2019) who included students' favorite learning strategy found that, in experimental group, 46% students selected usage of activities, 20% found conceptual worksheet and 13% found questioning technique helpful for better understanding.

Noreen and Rana (2019) and Anwar and Majoka (2011) argued that activity-based learning integrated with peer instruction creates an ideal situation for teaching science subjects and

especially physics. Students are actively involved in hands-on experiences and get chance to relate abstract ideas and theories with concrete observations. This helps them to make deep understanding of scientific concepts. Moreover, Anwer (2019) stated that students liked those teachers most who were energetic and enthusiastic, gave hands-on activities and used visual aids to make the class interesting. Some liked group work and explanation through real examples. Moreover, activity-based learning engaged more students compared to formal teaching in that study. Therefore, these related studies agree with findings from current study of the proposed ABL Model.

Suggestions

According to the research findings, the following suggestions are provided to different stakeholders.

(a) Suggestion to Middle School Geography Teachers

In carrying out effective geography teaching, geography teachers play an important role and the following suggestions are provided for further implementation.

- Teachers should take time to prepare lessons and teaching-learning materials. It should be developed by teachers and students collaboratively. It is also necessary to use suitable teaching-learning materials which are relevant to the content.
- Based on students' responses, they were happy to learn Geography by getting experiences of working in groups, asking help from others, exchanging knowledge and discussing with friends. So, knowledge on different methods of teaching, especially, teamwork and collaborative learning are necessary for instructional process. In this case, teacher should spend time on preparation and it saves time of teachers and students.

(b) Suggestion to Middle School and High School Principals

Quality education is not the work a person and it is the concerted effort of all stakeholders. Based on the research findings, the following suggestions are given to middle school and high school principals.

- Principals should monitor and assess instructional process of Geography teaching. Principals should catch up with updated knowledge, information and educational technology so that they can provide teachers to conduct effective teaching-learning environment.
- It is also necessary to mentor and coach teachers to fulfill their professional development. In this case, principals should have instructional leadership skills so that they can lead not only administrative but also instructional roles.
- Principals should learn the activities of certain method that they are going to observe in class so that their findings will not have negative effect on research results.

(c) Suggestion to Administrators

Administrators play an important role in implementing effective teaching and learning as they are superior and more powerful compared to classroom teachers. The following suggestions are provided for administrators.

- Administrators at different levels should pay attention to develop school appearance and quality learning such as supporting necessary furniture and teaching-learning materials.
- It is essential to provide teachers to take continuous professional development (CPD) programmes in their respective fields. Refresher courses and workshops should be arranged regularly for Geography teachers to promote their professional knowledge, skills, and attitude.

(d) Suggestion to Curriculum Planners

In carrying out the curriculum effectively, curriculum planners play an important role as they need to disseminate necessary knowledge to curriculum workers. Therefore, some suggestions are provided for curriculum planners.

- Based on findings, curriculum planners play an important role of effective curriculum implementation. Therefore, they should provide updated knowledge of curriculum implementation to teachers at the grass-root level.
- Moreover, core curricular activities have to be implemented to middle and high school students so that they will not waste much of their free time on games, drugs and other violent activities.

Recommendations

Based on the findings from the current study, the following considerations are thought to be important to do further research.

- The current study was carried out in one region and one state: Nay Pyi Taw Region and Mon State. Future research should be done in other regions and states in order to validate the current results.
- Participants in the current study are Grade Seven Geography teachers and students from selected schools in 2022-2023 Academic Year. The proposed ABL Model should be researched with teachers and students from other grades and other schools to get comprehensive results.
- The current study covered 20 lessons of new Grade Seven Geography curriculum. Further research could be done with more content areas and more lessons not only in Geography but also in other subjects, for example, science, history, economics and languages at different grades in order to validate the result of this study.

Conclusion

In conclusion, the results of quantitative and qualitative study show that ABL model is an effective model for higher achievement of teachers and students. It is recommended to do further research with this model in other subjects, other grades, other regions and states. Further study should be carried out to study at creating level of Bloom's Taxonomy with different learning styles, learning methods, perceptions of administrators and to achieve linkage between KG+9 and vocational education policy. By using ABL model, teaching learning situation will become active learning environment. As a final conclusive recommendation, the researcher would like to present a felt need for elaborate investigations into cyberspace and virtual reality-based models of teaching and/or learning. In this ultra-modern age of cybernetics and information technology, VR (virtual reality) is meant to be a computer-mediated, multisensory experience. Brand new perceptions and ideas may thus arise as a consequence of such multichanneled sensory input. Cyberspace or CS, as the sharing by two or more individuals of a VR experience, also invites new thoughts, and ideas. Unfortunately, there is very little psychological knowledge to help guide teachers and/or students along this cybernetics-based path of technological development. Hence the need for research into CS/VR based pedagogics has become extremely acute, urgent, and highly prioritized.

Acknowledgements

Firstly, I would like to offer my gratitude to respectful Dr. Kay Thwe Hlaing, (Rector), Dr. May Myat Thu, Dr. Khin Khin Oo, and Dr. Nyo Nyo Lwin (Pro-Rectors, YUOE), Daw Aye Aye K`ywe (Retired Associate

Professor, YUOE) who allowed me to carry out this study successfully. Then, I would like to express my thanks to Dr. Khin Zaw (Retired Rector, YUOE), and my co-supervisor, Professor Dr. Khin Mar Khine (Professor and Head of Department, Department of Curriculum and Methodology, YUOE), and to my supervisor, Professor Dr. Khaing Khaing Lwin (Professor, Department of Curriculum and Methodology, SUOE), who guided me with their expertise and patience to accomplish this study. Finally, I am indebted to all people who provided me insightful guidance suggestions and time to achieve until this stage.

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TEACHER EDUCATORS' PERCEPTION TOWARDS THE EFFECTS AND CHALLENGES OF FLIPPED CLASSROOMS IN TEACHING

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Abstract

The major purpose of this paper is to study teacher educators' perception towards the effects and challenges of flipped classrooms in teaching. The study was conducted with a descriptive research method. Three sample education degree colleges from Yangon Region were selected. In this study, the subjects were teacher educators from Yankin Education Degree College, Thingangyun Education Degree College, and Hlegu Education Degree College from Yangon Region. The subjects, (127) teacher educators, were chosen from three education degree colleges. The instrument used in this study was a questionnaire that was constructed based on better performance of flipped classroom, and customized, active, and engaging environment of flipped classroom developed by Bergmann and Sams (2012), and challenge of flipped classroom in teaching (operational challenge and faculty challenge) developed by Betihavas, Bridgman, Kornhaber and Cross (2016). This questionnaire consists of (40) items with a five-point Likert-Scale. For obtaining questionnaire reliability, a pilot test was administered. The internal consistency (Cronbach's Alpha) was (.918). In order to describe the extent of the study teacher educators' perception towards the effect and challenge of flipped classroom, mean, standard deviation, and percentage were used. According to the study, the mean score of customized, active, and engaging environment, ($M = 39.92$, $SD = 2.62$) was higher than that of better performance ($M = 39.69$, $SD = 2.85$). The mean score of the operational challenge ($M = 34.57$, $SD = 4.72$) was higher than that of the faculty challenge, ($M = 33.38$, $SD = 4.90$). Research findings indicated that some of the teacher educators who received treatment by using flipped classrooms had a good perception to use it in higher education.

Keywords: Challenge, Effect, Flipped Classroom, Perception, Teaching

Introduction

Education is an instrument to support the creative development of any attainable and sustainable society in the world. Education is also one field that is constantly changing. Education should be well understood and implemented in modern mass society. Education should provide individual learners with differentiated educational opportunities to develop the present features of the particular community. Therefore, learners will acquire the essential competencies to support and maintain the welfare of a safe and healthy society.

Technology is growing rapidly nowadays. Technology is a tool used in education and not an end in itself. The vision of Myanmar in the education sector is to create an education system that can generate a learning society capable of facing the challenges of the Knowledge Age. The promise of educational technology lies in what educators do with it and how it is used to best provide the students' needs. Technology in the twenty-first century puts instantaneous access to information and the Internet can be handily accessed through numerous technology tools such as laptops, computers, and smartphones (Fu, 2013).

A widespread push towards the implementation of technology in education is present throughout the country. Flipped classroom approach has become a popular strategy in higher education around the world. The basic notion of flipped classroom strategy is to deliver the teacher's lectures before class through online videos in order to free-up the in-class time for active learning and problem-solving activities. As students' learning habits change with their interests in new technologies, education must adapt to match those learning habits.

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Flipped classroom strategy enables teachers to spend more in-class time on student-centered instructions such as group discussion and teachers' individual assistance that student's perceptions and engagement towards flipped classroom approach are generally positive and that some indirect educational outcomes such as improving students' communication skills, promoting more independent learners and changing in learning habits (e.g., revisit the online learning materials before examination) can result from the application of this instructional strategy.

In 2000, Lage, Platt and Treglia introduced the idea of using technology to flip a traditional classroom environment. This method is known as the flipped classroom, inverted classroom or reverse instruction, among others, what is traditionally done in class is switched with what is traditionally done for homework. Recently, the flipped classroom strategy has grown in popularity in the basic and higher education. By using flipped classroom, it can save time, can increase discussion period, can improve interaction between teacher and students, can cultivate presentation skill, and can share the learned information.

Purposes of the Study

The main purpose of this paper is to study the teacher educators' perception towards the effects and challenges of flipped classrooms in teaching.

The specific objectives of the study are as follows:

- To investigate the teacher educators' perception towards the effects of flipped classroom
- To study the teacher educators' perception towards the challenges of flipped classrooms
- To compare the teacher educators' perception towards better performance of flipped classroom and their perception towards the customized, active, and engaging environment of the flipped classrooms
- To compare the teacher educators' perception towards operational challenge of the flipped classroom and their perception towards faculty challenge of flipped classrooms
- To give suggestions for improving the flipped classroom strategy based on the results of this study

Research Questions of the Study

The research questions of the study are described as follows:

- Q1: To what extent do the teacher educators have the perception towards the effects of the flipped classrooms?
- Q2: To what extent do the teacher educators have the perception towards the challenges of the flipped classrooms?
- Q3: Which is more effective in better performance of flipped classroom and customized, active, and engaging environment of flipped classroom?
- Q4: Which is the more challenging the operational challenge of the flipped classroom and the faculty challenge of a flipped classroom?

Definition of Key Terms

The five key terms are described as follows:

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. Challenge should

ideally trigger positive emotions such as excitement and confidence as well as the trepidations of fear doubt (Neill, 2002, as cited in Onyeachu, 2008).

Effect. Effect means having power to produce, or producing a desired result (Cruishank & Bainer, 1999).

Flipped Classroom. Flipped classroom is a setting where students take charge of their own learning and this increases communication and contact time between students and teachers (Bergmann & Sams, 2012).

Perception. Perception is the process by which organisms interpret and organize sensation to produce a meaningful experience of the world (Lindsay & Norman, 1977, as cited in Picken, 2005).

Teaching. Teaching refers as an activity or process which is related with the impact of certain specific knowledge or skill, guiding and assessing, with the aim of assisting students to learn effectively (Sang, 2003).

Scope of the Study

The scope of the study is presented as follows:

- This study is geographically restricted to Yangon Region.
- The participants in this study are 127 teacher educators from the Yankin Education Degree College, Thingangyun Education Degree College, and Hlegu Education Degree College during the period within the academic year 2021-2022.

Review of Related Literature

Philosophical and Theoretical Foundations of Flipped Classroom

This study was based on philosophy of cognitivism, constructivist learning theory, and Vygotsky's social development theory.

Cognitivism. Cognitivism emphasizes the role that environmental conditions play in facilitating learning. Instructional explanations, demonstrations, illustrative examples and matched non-examples are all considered to be instrumental in guiding learning. However, the active nature of the learner is perceived quite differently. The cognitive approach focuses on the mental activities of the learner that lead up to a response and acknowledges the processes of mental planning, goal-setting and organizational strategies (Shuell, 1986, as cited in Presmeg, 2006). Cognitive theories contend that environmental cues and instructional components alone cannot account for all the learning that results from an instructional situation.

Additional key elements include the way that learners attend to code, transform, rehearse, store and retrieve information. Learners' thoughts, beliefs, attitudes and values are also considered to be influential in the learning process (Winne, 1985, as cited in Presmeg, 2006). Therefore, this study was based on the philosophy of cognitivism, particularly the ideas of the acquisition of knowledge and internal mental structures, the ideas of the way that learners attend to code, transform, rehearse, store and retrieve information, the ideas of how information is stored in memory and how to apply knowledge in different contexts and the ideas of practice with corrective feedback.

Constructivist Learning Theory. Constructivist learning emphasizes learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner (Elliott, Kratochwill, Cook, & Travers, 2000). Learners are expected to make their own judgments of what they are experiencing. E-learning programmes often ask to carry out tasks, to read and consider evidence and to explore resources. The new experiences will

need to be related to the existing knowledge and understanding. The teacher's role is often to facilitate the learning through questions or discussion. In active learning method based on constructivist theory, the students take an active role. Therefore, this study was based on the emphasis of constructivism, especially the ideas of teaching perspective, the ideas of the ways in which students generate their own understanding, the ideas of opportunities for the learners to question, probe and ponder and the ideas of creating situations in which the learners and the teacher work together to solve problems, engage in inquiry and construct knowledge.

Vygotsky's Social Development Theory. Vygotsky explains that learning is influenced when children are engaged with individuals that possess the mathematical knowledge they are developing, labeling this as the social development theory. This theory introduces three key ideas: social interaction, the more knowledgeable other and the zone of proximal development (Vygotsky, 1978, as cited in Nábělková, 2014). Vygotsky suggests that social interaction plays a fundamental role in cognitive development, children's cognitive development first happens with the interactions between two people followed by an individual making sense of knowledge on their own and interaction with a more knowledgeable other helps with this development and providing the interaction is within the child's zone of proximal development. Therefore, Vygotsky's social development theory was taken into account for this study.

View on Flipped Classroom

In recent years, the flipped classroom has become one of emerging technologies in education and it can be a standard of teaching-learning practice to foster students' active learning in higher education (Hamdan, McKnight, McKnight, & Arfstrom, 2013). Flipped classroom is also known as a student-centered approach to learning where the students are more active than the instructor in the classroom activity. In this case, the teacher acts as a facilitator to motivate, guide, and give feedback on students' performance (Bergmann & Sams, 2012). By flipping the class, the students will not spend so much time on listening to long lectures in the classroom but will have more time to solve problems individually or collaboratively through distance learning with peers.

Flipped Classroom in Higher Education

For higher education courses, flipped classroom has become the reality characterized by continuous investigation and debates of the benefits, potential and effectiveness to transform and improve the learning process. New, highly interactive, meaningful and student-centered flipped classroom environments have been developed fostered by the current and advanced technologies. The student is forced to approach with more responsibility towards flipped courses with continuous and active involvement. At home, students are able to pause and rewind the lecture to go back, find unknown answers and review confusing information (Bergmann & Sams, 2012). Students can understand well the lesson by watching the video lessons repeatedly.

Different media or method combinations and person to person classroom activities, and distance learning system base on self-paced learning. The primary changes in the roles and expectations of faculty, students, and administrators are presumed. As regards the student population, the learning environment drastically differs from face-to-face one. The student is forced to approach with more responsibility towards flipped courses with continuous and active involvement. Fu (2013) notes that students who live in the current digital age can easily access educational materials anytime, anywhere, using educational technology tools. Therefore, it became necessary based on the educational universities or colleges in the educational field to seek this development and take advantage of new technologies and integrate them into education.

Effectiveness of Flipped Classroom

According to Bergmann and Sams (2012), the flipped classroom is inverted from the traditional learning experience. Lectures are shared outside of class time for individual review as homework, and classroom time is reserved for students to complete assignments and activities. The main goals of flipping are:

- to make the classroom an active learning environment,
- to enable students to learn at their own pace, and
- to give the instructor more time to teach each student individually, rather than the class as a whole.

Flipping enhances the learning experience. Through student-led active learning, coupled with peer-to-peer collaboration and individualized guidance, flipping a classroom enables teachers to adapt each lesson to the individual needs of their students. Teachers can flip the classrooms on the basis of the handful of key effects such as:

1. Flipping allows students to learn at their own pace,
2. Flipped learning is customized, active, and engaging,
3. Flipped lecture videos help student review for exams,
4. Flipped content can be richer through continuous improvement, and
5. Students in flipped classrooms perform better.

Challenges of Using Flipped Classroom in Education

According to Betihavas, Bridgman, Kornhaber and Cross (2016), the challenges were categorized into two main themes for the teachers, namely, faculty-related challenges and operational challenges. The two faculty challenges are related to teachers' familiarity of flipped classroom approach and the preparation of flipped classroom. There are four operational challenges identified in flipped classrooms. The four operational challenges are students' IT resources, monitoring students outside class, teachers' IT skills and institutional supports.

Method

Research Design

The research design for this study was a descriptive research design. In this study, the quantitative research method was used to collect, analyze, and summarize the required data for this study.

Procedure

The problem was first formulated. Secondly, the literature related to this study was sought out through reading books and Internet sources. Thirdly, a set of questionnaire was constructed and four experts' review was conducted. Then, some modifications were made. And, a pilot testing was conducted. The internal consistency of the questionnaire was (.918). The participants were selected and the modified instruments were distributed to all the participants. After the data collection was done, the data were analyzed.

Instrument

In this study, the instrument was the questionnaire for the teacher educators' perception towards the effects and challenges of flipped classrooms in teaching. The items in the questionnaire for this study were designed by the adaption of effectiveness of flipped classroom by better performance of flipped classroom and customized, active, and engaging environment of flipped classroom developed by Bergmann and Sams (2012) and challenge of flipped classroom in teaching (operational challenge and faculty challenge) developed by Betihavas, Bridgman,

Kornhaber and Cross (2016). This research questionnaire was modified to suit the purpose of the study with the advice and guidance of the supervisor.

It was constructed based on the four major dimensions. There were (40) five-point Likert-scale items to examine the teacher educators' perception towards the effect and challenge of flipped classroom in teaching. Each item in the questionnaire was described by five responses (strongly disagree = 1, disagree = 2, undecided = 3, agree = 4, and strongly agree = 5).

Population and Sample Size

All participants were teacher educators from Education Degree Colleges in Yangon. Yankin Education Degree College, Thingangyun Education Degree College, and Hlegu Education Degree College were selected as the sample Colleges. The total number of participants was 127.

Data Analysis

Data collected through questionnaires were analyzed quantitatively by using the descriptive statistics. In order to examine the teacher educators' perception towards the effects and challenges of flipped classrooms in teaching, mean, standard deviation, frequency, and percentage were used. The obtained data were analyzed and interpreted in align with the basic research questions.

Findings

Research Findings for Teacher Educators' Perception towards the Effect of Flipped Classroom

Table 1 presents the mean scores of teacher educators' perception towards the effect of flipped classroom.

Table 1 Mean Scores of Teacher Educators' Perception towards the Effect of Flipped Classroom

Dimension	N	Mean	Standard Deviation	Minimum	Maximum
Better Performance	127	39.69	2.85	29	50
Customized, Active, and Engaging Environment	127	39.92	2.62	30	50

According to the data in Table 1, the mean score of the perception towards better performance was (39.69) and the standard deviation was (2.85). The mean score of the perception towards the customized, active, and engaging environment of flipped classroom was (39.92) and the standard deviation was (2.62). Then, the mean scores of the two dimensions of teacher educators' perception towards the effect of flipped classrooms were compared. By comparing the mean scores, teacher educators' perception towards the effect of customized, active, and engaging environment of flipped classroom was higher than that of better performance.

Table 2 shows the percentage levels of teacher educators' perception towards the better performance of flipped classroom.

Table 2 Percentage Levels of Perception towards Better Performance of Flipped Classroom

Level of Perception towards Better Performance of Flipped Classroom	Score	No. of Teacher	Percentage (%)
Low	$x < 36.84$	13	10
Moderate	$36.84 \leq x \leq 42.54$	114	90
High	$x > 42.54$	0	0
Total		127	100

According to the data in Table 2, most of teacher educators' perception towards better performance of flipped classroom was at the moderate level.

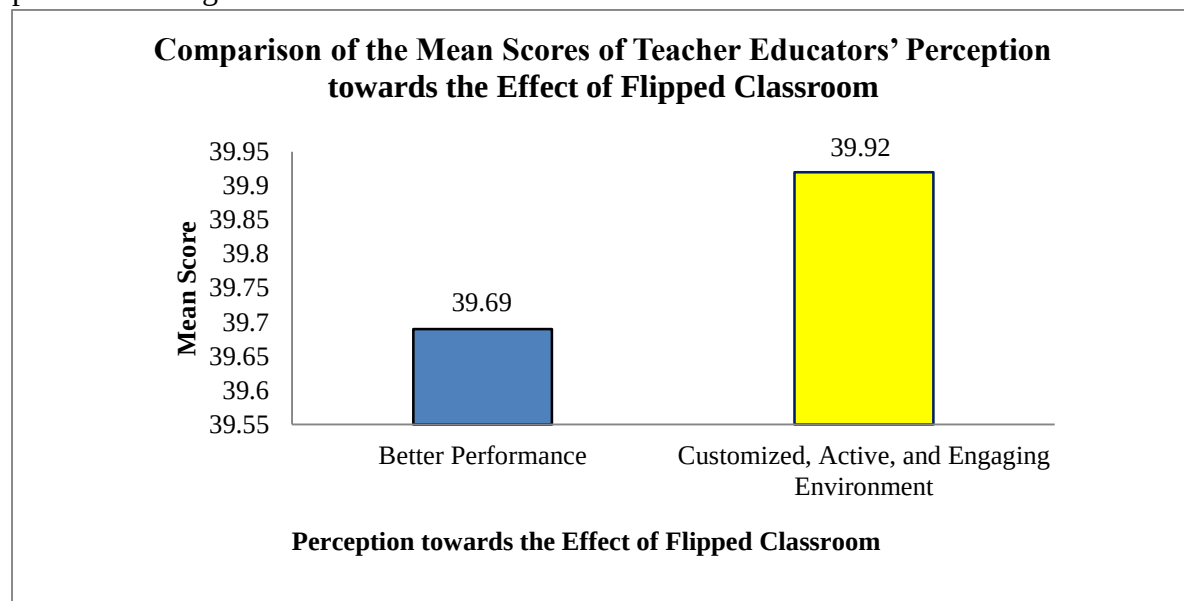
Table 3 presents the percentage levels of teacher educators' perception towards customized, active and engaging environment of flipped classroom.

Table 3 Percentage Levels of Perception towards Customized, Active, and Engaging Environment of Flipped Classroom

Level of Customized, Active and Engaging Environment	Score	No. of Teacher	Percentage (%)
Low	$x < 37.30$	16	13
Moderate	$37.30 \leq x \leq 42.54$	97	76
High	$x > 42.54$	14	11
Total		127	100

According to the data in Table 3 most of teacher educators' perception towards customized, active, and engaging environment of flipped classroom was at the moderate level.

Based on the data in Table 1, the comparison of the mean scores of teacher educators' perception towards the challenge of flipped classroom in terms of the two dimensions is presented in Figure 1.

**Figure 1** Comparison of the Mean Scores of Teacher Educators' Perception towards the Effect of Flipped Classroom

Research Findings for Teacher Educators' Perception towards the Challenge of Flipped Classroom

Table 4 presents the mean scores of teacher educators' perception towards the challenge of flipped classroom.

Table 4 Mean Scores of Teacher Educators' Perception towards the Challenge of Flipped Classroom

Dimension	N	Mean	Standard Deviation	Minimum	Maximum
Operational Challenge	127	34.57	4.72	21	49
Faculty Challenge	127	33.38	4.90	22	46

According to the data in Table 4, the mean score of the perception towards operational challenge of flipped classroom was (34.57) and the standard deviation was (4.72). The mean score of the perception towards faculty challenge of flipped classroom was (33.38) and the standard deviation was (4.90). Then, the mean scores of the teacher educators' perception towards the challenge of flipped classroom were compared. By comparing the mean scores, the teacher educators' perception towards operational challenge of flipped classroom was higher than that of faculty challenge.

Table 5 shows the percentage levels of teacher educators' perception towards the operational challenge of flipped classroom.

Table 5 Percentage Levels of Perception towards Operational Challenge of Flipped Classroom

Level of Operational Challenge	Score	No. of Teacher	Percentage (%)
Low	$x < 29.85$	13	10
Moderate	$29.85 \leq x \leq 39.29$	92	73
High	$x > 39.29$	22	17
Total		127	100

According to the data in presented in Table 5, most of teacher educators' perception towards operational challenge of flipped classroom was at the moderate level.

Table 6 shows the percentage levels of teacher educators' perception towards the faculty challenge of flipped classroom.

Table 6 Levels of Perception towards Faculty Challenge of Flipped Classroom

Level of Faculty Challenge	Score	No. of Teacher	Percentage (%)
Low	$x < 28.48$	23	18
Moderate	$28.48 \leq x \leq 38.28$	85	67
High	$x > 38.28$	19	15
Total		127	100

According to the data in Table 6, most of teacher educators' perception towards faculty challenge of flipped classroom was at the moderate level in.

Based on the data presented in Table 4, the comparison of the mean scores of teacher educators' perception towards the challenge of flipped classroom in terms of the two dimensions is presented in Figure 2.

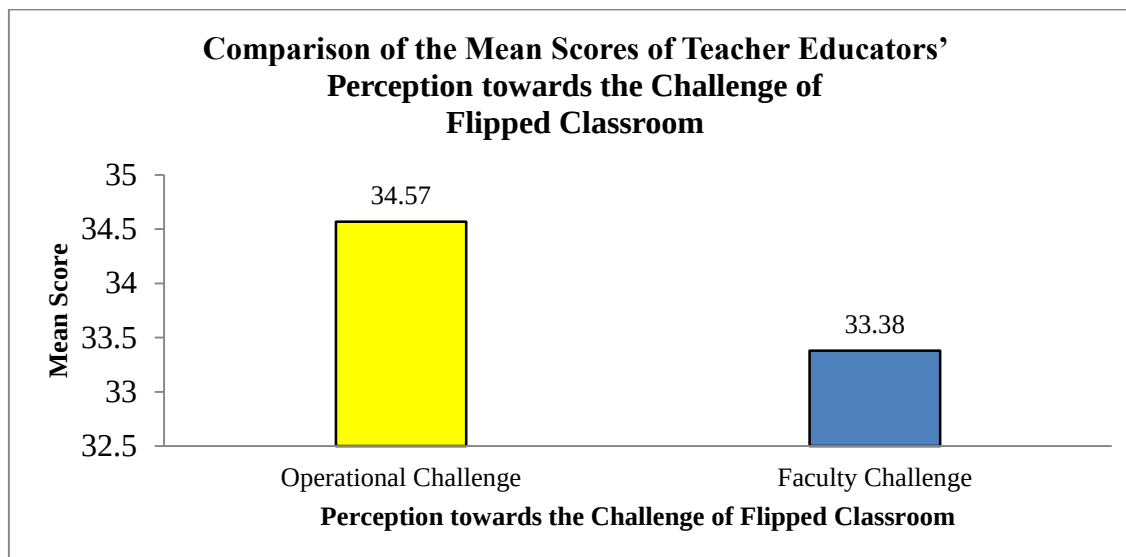


Figure 2 Comparison of the Mean Scores of Teacher Educators' Perception towards the Challenge of Flipped Classroom

Summary of Research Findings

To sum up, the findings for teacher educators' perception towards the effects and challenges of flipped classrooms was generalized.

1. For the comparison of teacher educators' perception towards the effects of the flipped classrooms, the mean score of teacher educators' perception towards the customized, active, and engaging environment of flipped classroom was higher than that of the teacher educators' perception towards better performance.
2. For the comparison of teacher educators' perception towards the challenges of the flipped classrooms, the mean score of teacher educators' perception towards the operational challenge of flipped classroom was higher than that of teacher educators' perception towards the faculty challenge of the flipped classroom.

Discussion

Based on the findings of the study, the following discussion was made.

For the first research question, the findings of teacher educators' perception towards the better performance and customized, active, and engaging environment of flipped classroom in teaching were discussed. The mean score of teacher educators' perception towards the effect of better performance was (39.69) and the standard deviation was (2.85). The mean score of teacher educators' perception towards the effect of the customized, active, and engaging environment of flipped classroom was (39.92) and the standard deviation was (2.62). According to the data, most teacher educators accepted that using flipped classrooms can perform in the teaching and learning process. The use of flipped classroom increases trainees' communication skills and improve their performance. Some teachers accepted student teachers felt confident in flipped classroom environment because they had participated actively.

For the second research question, the findings of the percentage of teacher educators' perception towards the operational challenge and the faculty challenge of flipped classroom were

discussed. The mean score of teacher educators' perception towards the operational challenge was (34.57) and the standard deviation was (4.72). The mean score of teacher educators' perception towards the faculty challenge of flipped classroom was (33.38) and the standard deviation was (4.90). According to the data, few teacher educators faced some challenges of using IT resources, monitoring students outside class, training teachers' IT skills and providing institutional support. Therefore, few teacher educators faced insufficient on preparation and familiarity with the flipped classrooms to teach students in teaching.

For the third research question, the mean scores of the two teacher educators' perception towards the effect of flipped classroom were compared. By comparing the mean scores, teacher educators' perception towards the effect of customized, active, and engaging environment of flipped classroom was higher than that of better performance. According to the data, learning environments created by the flipped classroom approach are likely to satisfy student teachers' needs for competence, autonomy and relatedness.

For the fourth research question, the mean scores of the two teacher educators' perception towards the challenge of flipped classroom were compared. By comparing the mean scores, teacher educators' perception of operational challenges was higher than that of faculty challenges. According to the data, most student teachers had their own mobile devices but many did not have enough time to use internet access, and it was difficult to ensure that they had truly watched the video.

According to the above mentioned results, a generalization can be drawn that some teacher educators believe that flipped classroom can improve students' performance and has improved students' exam performance. Most teacher educators think that using flipped classrooms can improve students' engagement. They learned more and enjoyed the opportunity to work with peers and explore new learning techniques. Some teacher educators perceived that students struggle with engaged and active learning which requires them to collaborate with others in a nonsynchronous environment. Some student teachers cannot get enough training in flipping the class by adjusting to students' learning styles. Therefore, teacher educators can apply the flipped classroom to help students in acquiring the necessary twenty first century skills and should try to be active and effective in teaching and learning processes.

Suggestions

Based on the major findings of this study, all teachers should recognize that every classroom is filled with a variety of different students who come from different backgrounds, have different learning styles, and different needs. Teachers should know how to adjust it and try to meet the educational needs. Teacher educators should play as a facilitator to guide, stimulate, and support feedback on student's performance in the flipped classroom environment. As technology grows rapidly, Internet access can be available through numerous technology tools such as laptops, computers, and smartphones. Teachers should encourage participating all students to get required knowledge in modern mass society.

Schools, colleges or universities should be assisted to get the Internet access and use sufficiently. It should be available for Internet access and connect with teachers and friends, not only in the classroom but also outside the classroom through distance learning by using this technology. Therefore, students will be able to study at different times and places through collaborative distance learning. The need for differentiation to prevent the challenges of using the flipped classroom should be known. Modern education trend to be qualified teacher educators should also be filled. Students in the flipped classroom should have greater flexibility in their learning because they have been given greater freedom in their learning choices. It can be suitable for slower students who can review lessons and watch the lesson videos as many times as they can to increase their understanding of lessons.

Recommendation

In this research study, the sample teacher educators were selected from the three Education Degree Colleges in Yangon Region: Yankin Education Degree College, Thingangyun Education Degree College, and Hlegu Education Degree College. The result of this research study cannot be generalized to the wider population. In addition, further studies should be carried out by considering other variables in order to validate the results of the present research study. Thus, carrying out larger research in a nationally representative area and for a larger duration is highly recommended to validate the present study results.

Conclusion

To sum up, this study highlights the role of flipped classrooms in the teaching-learning process. And, this study points out the effects and challenges of using flipped classrooms in the teaching-learning process. Flipped classroom provides many benefits to the school system, teachers and students. According to the study, the teacher creates a more customized, active, and engaging environment of the flipped classroom than the better performance of flipped classroom. And, teacher also faces two types of challenges: operational challenges and faculty challenges. Between the two problems, teacher educators faced operational challenge more than faculty challenge in the educational degree colleges. It is hoped that this study will contribute to the education system to some extent.

Acknowledgements

Firstly, we would like to express our respectful gratitude to Dr. Kay Thwe Hlaing, (Rector of Yangon University of Education), Dr. May Myat Thu, (Pro-Rector of 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 permission to carry out this research successfully. Secondly, we would like to express our special thanks to Professor Dr. Khin Mar Khine, (Head of Curriculum & Methodology Department, Yangon University of Education) for her valuable guidance, excellent advice and great support throughout this study.

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RELATIONSHIP BETWEEN ATTITUDES AND IMPLEMENTATION OF PRIMARY TEACHERS TOWARDS NEW CURRICULUM

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Abstract

The main purpose of this study is to explore the relationship between attitudes and implementation of primary teachers towards new curriculum. By using a stratified random sampling method, one of the random sampling strategies, sample of (196) primary teachers from the selected basic education schools in Taungtha Township, Mandalay Region was selected to collect the required data. A survey research design, one of the quantitative research designs, was used in this study. In the collection of data, two instruments: questionnaires for attitudes of primary teachers towards new curriculum and implementation level of new curriculum were employed. Descriptive and inferential statistics were used to analyze the collected data. The attitudes of participants towards new curriculum were analyzed by using descriptive statistics (means and standard deviations). To examine the differences between primary teachers' attitudes towards new curriculum, and implementation of new curriculum in terms of teaching experiences, teacher training programme and school level, inferential statistics such as one-way analysis of variance (ANOVA) and Post Hoc tests were utilized. And then, Pearson product-movement correlation was used to explore the relationship between attitudes and implementation of primary teachers towards new curriculum. The results revealed that there was positively moderately correlation between attitudes and implementation of primary teachers towards new curriculum at $r(1,196) = .401, p < .01$. It can be interpreted that the more the teachers have positive attitudes towards new curriculum, the more the teachers actively and successfully participate in the implementation of new curriculum.

Keywords: attitude, curriculum, curriculum reform, primary teacher

Introduction

Today the world is passing through rapid changes and in such a world, education cannot resist change. Qualitative education plays an important role and to be a good education, curriculum plays as one of the main concerns in the education system. It helps one plan the education process or procedure for a given period of time. In order to make education meaningful for the country, it depends on how the curriculum is developed.

Education reform is crucial to develop human resources in Myanmar. So, the Ministry of Education has started to transform to a new KG +12 education system since 2016-2017 Academic Year. In this process, teachers are the key players because they play as implementer role in curriculum reforming. Besides, teachers are the ones who bring theory into practice in real class settings. Kelly (2004) stressed the centrality of the teacher in curriculum planning and development process. He expressed that teachers have a make and break role in any curriculum innovation. According to national and international research evidence, teachers will play a key role in the successful new curriculum, as well as adoption of new interactive pedagogy and application of a new assessment system. MOE Ornstein and Hunkins (2018) stated that (2016), teachers are essential in implementation of new curriculum and they bring the curriculum to life through instruction. Moreover, their diverse methods of instruction will shape how students receive the curriculum.

The teachers may have many issues to deal with in their practice. So, they may have challenges in implementing new curriculum. The government needs to know how the teachers perceive, how they learn, how they teach and how they accept which the new curriculum gives because changing from old curriculum to new curriculum requires acceptance and cooperation of

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the teachers. Therefore, the attitude and perception of teachers with respect to curriculum and its implementation is very noteworthy for education system. Thus, this study deals with to examine how primary teachers perceive new curriculum and to find out their level of implementation of new curriculum.

Purpose of the Study

The main purpose of the study is to investigate the relationship between primary teachers' attitudes towards new curriculum and their implementation at school. The specific objectives are as follows:

- To investigate the primary teachers' attitudes towards new curriculum in terms of teaching experience, teacher training programme and school level.
- To find out their implementation at school in terms of teaching experience, teacher training programme and school level.
- To examine the relationship between attitudes of primary teachers towards new curriculum and their implementation at school.
- To explore the difficulties facing primary teachers in the implementation of new curriculum.
- To make suggestions and recommendations for successful implementation of new curriculum based on the results of this study.

Research Questions

Based on the objectives of the study, the following research questions are constructed.

1. What are the differences in the attitudes of the primary teachers towards new curriculum in terms of teaching experience, teacher training programme and school level?
2. How do primary teachers differ in their implementation at school in terms of teaching experience, teacher training programme and school level?
3. To what extent is there a relationship between attitudes of primary teachers towards new curriculum and their implementation at school?
4. What are the difficulties facing primary teachers in the implementation of new curriculum?

Definition of Key Terms

Attitude : Attitudes indicate favorable or unfavorable feelings; they reflect tendencies to accept or reject groups, ideas, or objects (Mills & Gay, 2016).

Curriculum : Curriculum is a systematic programme in which learning outcomes, contents, teaching and learning approaches and methods and assessment of respective subject areas to be learnt inside and outside schools are specified (MOE, 2017).

Curriculum Reform : Curriculum reform can be defined as the process of implementing changes to the curriculum with the intent of making learning and teaching more meaningful and effective (McCulloch, 2005, cited in Shala, 2019).

Operational Definition

Primary Teacher : Primary teacher is a teacher who specializes in teaching young children and helps them develop essential skills for life.

Scope of the Study

This study was geographically restricted to basic education schools in Taungtha Township in Mandalay Region. The number of participants in this study was (196) primary teachers from the selected schools in Taungtha Township within 2022-2023 Academic Year.

Review of Related Literature

The Role of Teachers in the Curriculum Reform

As this study examined recent curriculum reform from the perspectives of the teachers, it will be important to look at the role of the teachers involved. Kennedy (1996) emphasized the role of teachers and the importance of teachers in the implementation of change. He stated that teachers can be regarded as a powerful positive force for change only if they are given the resources and support which will enable them to carry out implementation effectively.

Kelly (2004) also expressed his opinion about the role of teacher in the curriculum that the quality of any educational experience will depend to a very large extent on the individual teacher responsible for it; and any attempt at controlling the curriculum from the outside which does not recognize that must be doomed to failure, or best to triviality. Therefore, the success of the changed curriculum depends on how it is interpreted by its implementers, that is, teachers and teachers have to take up the roles of facilitators, motivators and supporters to help children learn and grow.

Reasons of Making Basic Education Curriculum Reform in Myanmar

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 rationale behind revising and updating existing educational curricula is thus to provide learners with the very best opportunities and progression in local and global communities, Fullan) .(2007 A quality basic education curriculum is a critical building block for Myanmar's socio-economic development and it is an essential prerequisite for the provision of quality education and the improvement of student learning achievement. Thus, the main purpose of doing basic education curriculum reform in Myanmar is to implement a new curriculum that not only focuses on relevant 21st century skills but also aims to mend the deficiencies and weaknesses of the previous basic education curriculum (MOE, 2016) .

The Process of Basic Education Reform

In order to conform to the basic education structure of other countries in the ASEAN region, the previous education structure (5-4-2) (grade 1 to 5 for primary level, grade 6 to 9 for lower secondary level, and grade 10 to 11 for upper secondary level) was transformed into the KG+ (5-4-3) structure. The new basic education structure KG+12 (5-4-3) consists of kindergarten, five-year-schooling for primary level, four-year-schooling for lower secondary level and three-year-schooling for upper secondary level. Ministry of Education (MOE) stated that children who have attained the age of five years must enter kindergarten but who have attained the age of six years must enter the first grade of primary school and English must be taught starting from the primary level. In accordance with the changes of the education structure, the government and MOE make an effort to redesign the basic education curriculum in line with a focus on the 21st century soft skills and basic education assessment system has also changed from exam-dominated systems to four pillars of basic education assessment: classroom level, school-based, school completion, and sample-based that are mainly based on both summative assessment and formative assessment (MOE, 2015).

Research Method

Population and Sample

The basic schools in Taungtha Township in Mandalay Region were selected by the use of simple random sampling method, one of the random sampling strategies, to carry out the research. The sampling procedure used for this study was stratified random sampling method. As there are seven different school levels: Basic Education High School: BEHS, Basic Education High School (Branch): BEHS(B), Basic Education Middle School: BEMS, Basic Education Middle School (Branch): BEMS(B), Basic Education Post Primary School: BEPPS, Basic Education Primary School: BEPS, and Basic Education Primary School (Branch): BEPS(B) in the selected schools, the participants were selected from each stratum. There are (867) primary

teachers at the basic schools in Taungtha Township, the total population for this study, and (200) teachers (20%) of all the teachers were selected. But, when conducting the main survey, four participants were absent. Thus, the total participants for this study were (196) primary teachers (see Table 1).

Table 1 Population and Sample Size

Population	Sample
867	196

Research Design

In this study, a survey research design which is one of the quantitative research designs was used to determine the relationship between attitudes and implementation of primary teachers towards new curriculum.

Research Instruments

As for the instruments, a questionnaire for the attitudes and implementation of primary teachers towards new curriculum was used. In order to obtain participating teachers' information; age, years of teaching experience, qualification, teacher training programme, current teaching grade and current school level were asked by using multiple choice item format in part one. The instrument for the attitudes of primary teachers towards new curriculum was based on the questionnaires of Kasapogul (2010) and Aboagye and Yawson (2020). For the questions in part two of the questionnaire, there are twenty items and five-point Likert scale: (1) Strongly Disagree, (2) Disagree, (3) Undecided (4) Agree and (5) Strongly Agree was used for three dimensions: general views of the new curriculum; student-centeredness of the new curriculum; perceptions of teacher roles. In order to support the questionnaire, open-ended question was also used in this part.

The instrument for the primary teachers' implementation of new curriculum was developed based on the study of Kasapogul (2010) consisted of three dimensions: planning; instructional process; evaluation. In part three of the questionnaire, there are twenty-three items and participants will require answering each question using Rating scale (1 = Never, 2 = Seldom, 3 = Sometimes, 4 = Often and 5 = Always). Four open-ended questions were used in this section to get more detailed information.

Procedure

Firstly, the title was discussed with the supervisor. And then, the relevant data and information were collected to make literature review concerning the research. After collecting required data, the instruments were constructed under the guidance of the supervisor in order to survey the primary teachers' attitudes and implementation towards new curriculum. To get an expert validation, the copies of questionnaires were distributed to two experienced teachers from the Department of Curriculum and Methodology, Sagaing University of Education. These experienced teachers were requested to give their opinions and suggestions for the improvement of the questionnaires. And then, the items were modified according to their advice and guidance. The questionnaire was validated through the pilot testing. The pilot testing was conducted with a non-sample group of (14) primary teachers at Shwe Min Wun Practising Basic Education High School, Sagaing. Based on the pilot result, the internal consistency reliability of the questionnaire was determined by Cronbach's Alpha. The internal consistency reliability of the questionnaire for the attitudes towards new curriculum was (.832) and that of the questionnaire for the implementation of new curriculum was (.787). According to Morgan, Leech, Gloeckner and Barrett (2013), the questionnaires had good internal consistency reliability and so the researcher conducted the main survey with these questionnaires to get the required data. Then, the permission of the sample principals was requested to distribute the questionnaires to the participants and the major survey was conducted in October. The data collection process took place from 8th, October to 18th, October. The procedure did not disrupt the participants' normal,

daily and classroom activities. After that the data were entered into a computer data file and was analyzed by using the Statistical Package for the Social Science (SPSS).

Data Analysis

Two methods of quantitative data analysis were used in this study. The answers to the questionnaires were analyzed by using descriptive statistics and inferential statistics. To examine primary teachers' attitudes and implementation towards new curriculum, descriptive statistics (means and standard deviations) were used. Moreover, inferential statistics: one-way analysis of variance (ANOVA) and Post Hoc Multiple Comparison Test (Tukey HSD) was utilized to examine the differences between primary teacher's attitudes and implementation towards new curriculum in terms of teaching experience, teacher training programme and current school level. And then, Pearson product-movement correlation was used to explore the relationship between primary teachers' attitudes and implementation towards new curriculum.

Research Findings

Findings of Research Question (1)

Research question one investigated the differences of primary teachers' attitudes towards new curriculum in terms of teaching experience, teacher training programme and their school level.

Analysis of Teachers' Attitudes towards New Curriculum in terms of Teaching Experience

To find out whether there is a difference in the attitudes of the primary teachers towards new curriculum in terms of teaching experience, teachers' teaching experiences were divided into five groups such as (0-5) years, (6-10) years, (11-15) years, (16-20) years, and over 20 years and the collected data were analyzed by using descriptive statistics and one-way analysis of variance (ANOVA) (see Table 2 and Table 3).

Table 2 Means and Standard Deviations of Teachers' Attitudes towards New Curriculum in terms of Teaching Experience

Teaching Experience (Year)	<i>n</i>	<i>M</i>	<i>SD</i>
0-5	42	4.08	0.31
6-10	50	4.01	0.31
11-15	32	4.04	0.23
16-20	23	4.00	0.30
Over 20	49	4.12	0.34
Total	196	4.05	0.31

It was found that the mean value of primary teachers who have over 20 years of teaching experiences was the highest ($M = 4.12$) and the mean of primary teachers who have (16-20) years of teaching experiences was the lowest ($M = 4.00$). It can be stated that all the mean values of the primary teachers are slightly larger than 4 points on 1-5 rating scale. Based on the mean values, Figure 1 was illustrated to see clearly.

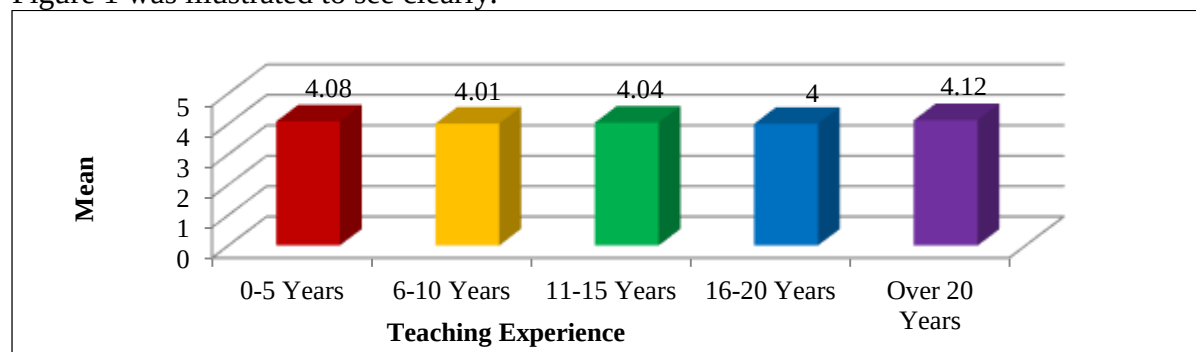


Figure 1. The comparison of means for teachers' attitudes towards new curriculum by teaching experience.

Table 3 ANOVA Results of Teachers' Attitudes towards New Curriculum in terms of Teaching Experience

	Sum of Squares	df	Mean Square	F	p
Between Groups	0.375	4	0.09	1.002	.408
Within Groups	17.887	191	0.09		(ns)
Total	18.262	195			

Note. ns = not significant.

According to Table 3, teaching experience did not create a significant difference in the primary teachers' attitudes towards new curriculum at $F(4, 191) = 1.002$, $p > .05$. In line with this result, it can be interpreted that the attitudes of researched primary teachers towards new curriculum were equivalent.

Analysis of Teachers' Attitudes towards New Curriculum in terms of Teacher Training Programme

In order to find out the differences in the attitudes of primary teachers towards new curriculum according to their teacher training programme, teachers' training programmes were categorized into five groups: DTED, DTEC, PPTT, Masaya, and Others. The means, standard deviations and one-way variance of analysis (ANOVA) were used for analyzing the collected data (see Table 4 and Table 5).

Table 4 Means and Standard Deviations of Teachers' Attitudes towards New Curriculum in terms of Teacher Training Programme

Teacher Training Programme	n	M	SD
DTED	34	4.01	0.31
DTEC	22	4.00	0.25
PPTT	35	4.05	0.31
Masaya	82	4.06	0.32
Others	23	4.15	0.29
Total	196	4.05	0.31

According to Table 4, the mean value of primary teachers who attended other teacher training programmes was the highest ($M = 4.15$) and the mean of primary teachers who got diploma from DTEC was the lowest ($M = 4.00$). Thus, all the mean scores of primary teachers grouped by training programme were greater than four points on 1-5 scale.

Table 5 ANOVA Results of Teachers' Attitudes towards New Curriculum in terms of Teacher Training Programme

	Sum of Squares	df	Mean Square	F	p
Between Groups	0.341	4	0.09	0.910	.459
Within Groups	17.920	191	0.09		(ns)
Total	18.262	195			

Note. ns = not significant.

Table 5 indicates that there were no statistically significant differences in the attitudes of primary teachers towards new curriculum at $F(4, 191) = 0.910$, $p > .05$. Based on the data, it can be interpreted that researched primary teachers who attended different teacher training programmes had the same attitudes towards new curriculum.

Analysis of Teachers' Attitudes towards New Curriculum in terms of School Level

To examine the difference of primary teachers' attitudes towards new curriculum in terms of school level, the researcher divided the school levels into seven groups. In order to get the required results, the collected data were analyzed by using descriptive statistics and one-way analysis of variance (ANOVA) (see Table 6 and Table 7).

Table 6 Means and Standard Deviations of Teachers' Attitudes towards New Curriculum in terms of School Level

School Level	<i>n</i>	<i>M</i>	<i>SD</i>
BEHS	22	4.14	0.12
BEHS(B)	27	4.15	0.34
BEMS	23	3.92	0.16
BEMS(B)	9	3.95	0.33
BEPPS	26	3.99	0.36
BEPS	87	4.06	0.32
BEPS(B)	2	4.52	0.05
Total	196	4.05	0.31

Table 6 shows that the mean value of teachers who work in BEPS(B) ($M = 4.52$) was the highest and the mean value for those who work in BEMS ($M = 3.92$) was the lowest. Thus, it can be stated that the primary teachers in this study did not possess the same attitudes towards new curriculum.

Table 7 ANOVA Results of Teachers' Attitudes towards New Curriculum in terms of School Level

	Sum of Squares	df	Mean Square	F	p
Between Groups	1.455	6	0.24	2.727	.015*
Within Groups	16.807	189	0.09		
Total	18.262	195			

Note. * $p < .05$.

ANOVA results reveal that there is a statistically difference among the mean scores regarding attitudes of teachers towards new curriculum in terms of their school level at $F(6, 189) = 2.727$, $p < .05$. Therefore, Post Hoc Multiple Comparison Test (Tukey HSD) was used to make more detailed information in which schools had better positive attitudes towards new curriculum than others (see Table 8).

Table 8 Results of Multiple Comparisons for Teachers' Attitudes towards New Curriculum in terms of School Level

Dependent Variable	School level (I)	School level (J)	Mean	p
D1	BEHS(B)	BEMS(B)	0.28	.021*
	BEPS(B)	BEMS	0.69	.044*
	BEPS(B)	BEMS(B)	0.71	.030*

Note. * $p < .05$.

According to Table 8, there was a significant difference between the teachers who work in BEHS(B) and the teachers who work in BEMS(B) at .05 level in general view of new curriculum, one dimension of attitudes of primary teachers towards new curriculum. In this dimension, the teachers who work in BEPS(B) significantly differ ones who work in BEMS and BEMS(B) at .05 level. Therefore, it can be interpreted that the researched primary teachers who work in BEHS(B) and BEPS(B) had more positive attitudes towards new curriculum.

Findings of Research Question (2)

Research question two examined the differences of primary teachers' implementation level of new curriculum in terms of teaching experience, teacher training programme and their school level.

Analysis of Teachers' Implementation at School in terms of Teaching Experience

In order to determine whether the primary teachers' implementation levels of new curriculum vary across their teaching experience, the obtained data were analyzed by using descriptive statistics and one-way analysis of variance (ANOVA) (see Table 9 and Table 10).

Table 9 Means and Standard Deviations of Teachers' Implementation at School in terms of Teaching Experience

Teaching Experience (Year)	<i>n</i>	<i>M</i>	<i>SD</i>
0-5	42	4.45	0.38
6-10	50	4.39	0.43
11-15	32	4.41	0.45
16-20	23	4.39	0.37
Over 20	49	4.56	0.43
Total	196	4.45	0.42

The results show that the mean value of over 20 years experienced teachers was the highest and the mean values of teachers who have (6-10) years and (16-20) years of teaching experience were the lowest.

Table 10 ANOVA Results of Teachers' Implementation at School in terms of Teaching Experience

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Between Groups	0.853	4	0.21	1.240	.295
Within Groups	32.838	191	0.17		(ns)
Total	33.691	195			

Note. ns = not significant.

Table 10 indicates that the teaching experiences of teachers did not make a statistically significant difference in the primary teachers' implementation level of new curriculum at $F(4, 191) = 1.240, p > .05$. According to the results, it can be interpreted that the researched primary teachers had the same participation during the implementation of new curriculum.

Analysis of Teachers' Implementation at School in terms of Teacher Training Programme

To examine whether there is a statistically difference in the primary teachers' implementation level of new curriculum, the required data were computed by descriptive statistics and one-way analysis of variance (ANOVA) (see Table 11 and Table 12).

Table 11 Means and Standard Deviations of Teachers' Implementation at School in terms of Teacher Training Programme

Training Programme	<i>n</i>	<i>M</i>	<i>SD</i>
DTEd	34	4.38	0.41
DTEC	22	4.44	0.47
PPTT	35	4.48	0.37
Masaya	82	4.48	0.44
Others	23	4.39	0.36
Total	196	4.45	0.42

According to Table 11, it can be found that the mean values of teachers who got diploma from two teacher training programmes: PPTT and Masaya were the highest ($M = 4.48$) and the mean of teachers who attended DTEd was the lowest ($M = 4.38$). Based on the data, it can be interpreted that the implementation of primary teachers in this study towards new curriculum was equivalent.

Table 12 ANOVA Results of Teachers' Implementation at School in terms of Teacher Training Programme

	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Between Groups	0.343	4	0.09	0.491	.742
Within Groups	33.348	191	0.18		(ns)
Total	33.691	195			

Note. ns = not significant.

According to Table 12, no significant differences were found between teacher training programme and their implementation level of new curriculum $F(4, 191) = 0.491, p > .742$.

Hence, it may be reported that the primary teachers' implementation of new curriculum did not differ in terms of their teacher training programme.

Analysis of Teachers' Implementation at School in terms of School Level

Descriptive statistics and one-way analysis of variance (ANOVA) were conducted to determine whether teachers' implementation level of new curriculum differ across their school level (see Table 13 and Table 14).

Table 13 Means and Standard Deviations for each Dimension of Teachers' Implementation at School

School Level	<i>n</i>	<i>M</i>	<i>SD</i>
BEHS	22	4.47	0.26
BEHS(B)	27	4.40	0.52
BEMS	23	4.12	0.34
BEMS(B)	9	4.70	0.24
BEPPS	26	4.37	0.50
BEPS	87	4.53	0.37
BEPS(B)	2	4.82	0.00
Total	196	4.45	0.41

According to Table 13, the highest mean ($M = 4.82$) was for teachers who worked in BEPS(B) and the lowest mean ($M = 4.12$) was for teachers who worked in BEMS. Based on the data, it can be stated that the researched primary teachers did not have the same participation in the implementation of new curriculum.

Table 14 ANOVA Results of Teachers' Implementation at School in terms of School Level

	<i>Sum of Squares</i>	<i>df</i>	<i>Mean Square</i>	<i>F</i>	<i>p</i>
Between Groups	4.160	6	0.69	4.438	.000
Within Groups	29.531	189	0.16		
Total	33.691	195			

Note. *** $p < .001$.

Table 14 indicates that working in different school levels created a statistically significant difference in teachers' implementation of new curriculum $F(6, 198) = 4.438$, $p < .001$. Therefore, Post Hoc Multiple Comparison Test (Tukey HSD) was used to make more detailed information in which schools had better positive attitudes towards the implementation of new curriculum than others (see Table 15).

Table 15 Results of Multiple Comparisons for Teachers' Implementation at School in terms of School Level

Dependent Variable	School Level (I)	School Level (J)	Mean	<i>p</i>
D1	BEHS	BEMS	0.51	.010**
	BEHS(B)	BEMS	0.42	.041*
	BEMS(B)	BEMS	0.71	.004**
	BEPS	BEMS	0.58	.000***
D3	BEPS	BEMS	0.42	.015*

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

According to Table 15, in the planning, one dimension of teachers' implementation of new curriculum, there were significant differences between teachers in BEHS and teachers in BEMS at .01 level. In the same dimension, the teachers who are in BEHS(B) significantly differ those who are in BEMS at .05 level and there was a significant difference between teachers who work in BEMS(B) and teachers who work in BEMS at .01 level and then there was a significant difference between teachers who are in BEPS and in BEMS at .001 level. Then, in another dimension: evaluation, there was also a significant difference between teachers who work in BEPS and teachers who work in BEMS at .05 level. Therefore, it can be interpreted that the researched primary teachers who work in BEMS participated in the implementation of new curriculum unenthusiastically.

Findings of Research Question (3)

In order to explore the relationship between attitudes of primary teachers and their implementation towards new curriculum, the Pearson product-movement correlation was used (see Table 16).

Table 16

Pearson Correlation between Attitudes of Teachers towards New Curriculum and their Implementation at School

		Correlations	
		Attitudes towards new curriculum	Implementation at school
Attitudes towards new curriculum	Pearson Correlation	1	.401**
	Sig. (2-tailed)	-	.000
	N	196	196
Implementation at school	Pearson Correlation	.401**	1
	Sig. (2-tailed)	.000	-
	N	196	196

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

According to Table 16, it was found that there was a significant correlation between attitudes of primary teachers towards new curriculum and their implementation at $r(1,196) = .401$, $p < .01$. The result showed that the direction of correlation was positive. Mills and Gay (2016) stated that the strength of correlation between +0.35 and -0.35 is weak, that of correlation between +0.35 and +0.65 or -0.35 and -0.65 is moderate and that of correlation between +0.65 and 1.00 or -0.65 and -1.00 is strong. Therefore, it can be interpreted that there was a moderate positive correlation between attitudes of primary teachers towards new curriculum and their implementation at school.

Discussion and Suggestions

Discussion for Research Question (1)

The findings of the study indicated that the mean values of primary teachers' attitudes towards new curriculum in terms of their teaching experience were greater than 3.86 in all dimensions. Therefore, it can be interpreted that the researched primary teachers had positive attitudes towards new curriculum. Shala (2019) highlighted that a positive attitude towards change is a prerequisite for change which occurs in the following steps: planning for change, implementation of change, and maintenance of change, respectively.

Research findings revealed that no significant differences were found in primary teachers' attitudes towards new curriculum in terms of teaching experience. Similarly, in the study of Akpinar (2007), significant changes between teachers' perceptions were not found in terms of experience. Thus, teaching experience did not have an impact on teachers' attitudes. It can be interpreted that most of the primary teachers in the selected basic education schools involved in the implementation of new curriculum for five years so they have equal attitudes towards new curriculum. Contrary to the study, the study of Unsal, Cetin, Korkmaz and Aydemir (2019) found significant differences in terms of teaching experiences.

In this study, another variable that did not create a significant difference was teacher training programme. Similar to the study, in the study of Shala (2019), significant differences between teachers' attitudes were not found in terms of faculty graduated. Contrary to these studies, Shaker and Saleh (2021) found significant difference in teachers' perceptions of science curriculum on behalf of teachers having accomplished from teacher training programme.

In addition, the result showed that attitudes of teachers differed significantly in terms of their school level. Thus, it can be stated school level had an impact on teachers' attitudes towards new curriculum. It can also be interpreted that teachers who work in BEHS(B) and BEPS(B) had

more positive attitudes than other researched teachers. Unlike this study, the study of Ozudogru (2021) found that the school level did not create a significant difference in teachers' perception of change. The difference of the results might also be due to the research sample and the research setting.

Discussion for Research Question (2)

Generally, the descriptive results showed that almost primary teachers highly implemented new curriculum in their classroom. Moreover, the results revealed that there were no significant differences in their implementation of new curriculum in terms of teaching experience and teacher training programme. It can be concluded that both the primary teachers who have different teaching experiences and the primary teachers who attended different teacher training programmes perceived that they often implemented new curriculum through planning, teaching-learning process and evaluation activities. This study is consistent with the study of Aboagye and Yawson (2020).

Furthermore, a statistically significant difference across teachers' implementation level of new curriculum was found in terms of their school level. The results showed that the teachers who work in BEMS perceived that they were less active participation on the implementation of new curriculum in various stages of teaching-learning process than other teachers. Unlike this study, statistically significant differences were not found in the studies of Kasapogul (2010) and Aboagye and Yawson (2020).

Discussion for Research Question (3)

Research question three explored the relationship between attitudes of primary teachers towards new curriculum and implementation at school. The research findings revealed that the attitudes of teachers towards new curriculum were significantly, positively and moderately correlated with the implementation at primary school level, $r = .401$, $p < .01$. This study is consistent with the results of a mixed-method study conducted by Lee (2000), teachers' attitudes towards curriculum change was the predictor for the teachers' implementation of curriculum change. It can be interpreted that the more positive attitudes towards new curriculum the teachers possess, the more frequently and actively they implement new curriculum at primary school level.

Discussion for Research Question (4)

The open-ended responses supported the quantitative data finding. According to open-ended data, related to the primary teachers' perception on new curriculum, almost teachers accepted that new curriculum is suitable for 21st century students. They perceived that the students' abilities, interests, creativity, analytical skills, critical thinking and problem-solving skills and needs can be revealed and enhanced because a major emphasis of teaching-learning approach is child-centered approach.

In implementing new curriculum, most primary teachers had challenges heavily in the planning new curriculum. Although lesson plans were already presented in their Teacher's Guide, teachers needed necessary preparation such as choosing appropriate class activities and managing time for each activity. They also had difficulties in preparing teaching methods and teaching aids based on multiple intelligences, different learning styles and different rates of learning of students. In addition, in creating teaching aids, they had financial difficulties and could not provide enough teaching aids for each student or group.

Furthermore, most teachers mentioned difficulties moderately encountered during implementation of new curriculum in terms of teaching-learning process. When they faced problems due to the activities considered, they complained that some activities took too long and thus not enough time was devoted for the activities. Besides, crowded classrooms were one of their most challenging difficulties faced during the instructional process.

Teachers had also challenges in assessing the achievement of students in each lesson. The reason was because there were too many students in class and teachers needed more time to

evaluate each student. They had problems because evaluation forms were too many and took long and as well did not provide feedback. They also argued that performance tests, activities and portfolios were not preferred to be used due to overloaded course schedule.

Therefore, it can be stated that primary teachers had challenges in implementing new curriculum because of lack of school infrastructure; crowded classroom; insufficient time; large teacher-student ratio; lack of adequate teacher training for new curriculum. In order to implement the curriculum successfully and to be more effective in the further studies, some suggestions and recommendations will be presented in the next section.

Suggestions

Based on the results of this study, the followings are suggested to resolve the problems primary teachers encountered during the implementation of new curriculum.

1. Curriculum activities should be planned in a way that they do not take too long and are appropriate for students' level of development.
2. Content-overloaded curriculum should be weakened through examples and practice questions.
3. In order to provide teachers and students with sufficient space in their classrooms, class sizes should be lowered.
4. Materials in schools should be of high quality and quantity so that students easily access, use and learn through these materials.
5. Teachers should create required instructional materials with the aim of successfully implementing the activities according to Teacher's Guide.
6. Teachers should utilize group work activities in order to effectively implement the activities according to Teacher's Guide. This will help teachers teach according to their students' needs and interests as well as students exhibit and store their products of learning.
7. Teachers' tiring workload due to lots of formalities to be completed should be reduced.
8. Appropriate teacher-student ratio and adequate teacher training for new curriculum should be provided as much as possible.

Moreover, the following several recommendations for further research may be presented.

1. The study was a small-scale study and was used small size of the sample population. Thus, it did not cover all primary teachers from all Basic Education Schools in Myanmar. A large sample size should be used to increase the statistical power of the result.
2. The data in the study were collected through a questionnaire. Instead, classroom teachers should be interviewed or observed in their natural settings, in the learning environment and the data should be triangulated by this way.
3. The comparative study with private primary teachers should be conducted to describe the possible solutions to the problems encountered in public primary schools are overcome in private ones.
4. Further study should be conducted to investigate the attitudes of other people, who are also potentially key factors such as curriculum developers, administrators, students, and even parents since they are in charge with creating school culture.
5. Detailed needs analysis should be concluded to find out what teachers need in order to implement the curriculum successfully.

Conclusion

The findings of this study indicated that the participant teachers had a positive attitude and they participated actively in the implementing new curriculum. There was also a significant correlation between attitudes of primary teachers and their implementation towards new curriculum and the direction of correlation was positive. Therefore, this study covered the purpose of the study and the research questions. Moreover, the data demonstrated that new curriculum had positive effects such as reducing the workload of the teacher in the lesson planning, getting more interested in the students, while there also emerged negative reflections such as difficulty in applying the lesson due to the activities, excessive paperwork, lack of material and the inability to implement the program due to the crowded classes. To sum up, it was hoped that the results of the study could provide useful information for the authorities, curriculum designers, administrators and teachers who hold important tasks during the implementation of the renewed curricula in order to implement the curriculum effectively and successfully in the future.

Acknowledgements

We would like to express our profound gratitude and sincerest 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) who gave us permission to undertake this research. We are deeply grateful and honorable thanks to Dr. Soe Than (Retired Professor and Head of Department, Department of Curriculum and Methodology, Sagaing University of Education, for his sharing invaluable knowledge, books and precious guidance to conduct the research.

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THE EFFECTIVENESS OF DIFFERENTIATED INSTRUCTION ON HIGHER-ORDER AND LOWER_ORDER THINKING SKILLS OF MIDDLE SCHOOL STUDENTS IN MATHEMATICS

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Abstract

The purpose of this study is to investigate the impact of differentiated instruction on higher-order and lower-order thinking skills of middle school students in mathematics. Both quantitative and qualitative research methods were conducted to obtain the required data. The design adopted for quantitative study was one of the quasi-experimental designs, non-equivalent control group design. The subjects were (30) Grade Six students from BEHS (Tamarkone) in Wundwin Township, (67) Grade Six students from BEMS (1) in Wundwin Township, (140) Grade Six students from BEHS (1) in Thazi Township and (59) Grade Six students from BEHS (Khetmauk) in Thazi Township. The instruments used in the study were pretest, learning style inventory, posttest and interview questions. Experimental groups were taught with differentiated instruction, while the control groups were taught the same concept using formal method. Students' higher-order thinking skills and lower-order thinking skills on posttest were compared using one-way ANCOVA. The results showed that there were significant differences between middle school students who receive differentiated instruction and those who do not receive it in performing higher-order thinking level questions and lower-order thinking level questions in all selected schools. The interview findings pointed out that the teachers who taught the experimental groups had positive attitudes towards differentiated instructional design. Therefore, it can be concluded that differentiated instruction is a very suitable and valuable instructional design for teaching of mathematics.

Keywords: Differentiated Instruction, Mastery Learning Style, Understanding Learning Style, Interpersonal Learning Style, Self-expressive Learning Style, Higher-order Thinking Skills, Lower-order Thinking Skills.

Introduction

Gregory and Chapman (2002, cited in Dixon, Yssel, Connell & Hardin, 2014) expressed that it is important in education to change and renew. Factors that contribute to the ever-changing classroom landscape include common core state standards, standards-based classrooms, high expectations and accountability for all students, multicultural diversity, recognition of different learning styles and multiple intelligences, and rapid societal and technological changes. Therefore, teachers should consider new instructional design for the students of different learning abilities.

Statement of the Problem

The schools in Myanmar, all students have the opportunities to learn the same content in nearly the same way. The students may try to learn the content in their own ways according to their learning styles. Therefore, a major issue in the classroom mathematics teaching is whether the specific learning differences of each student are being met. Differentiated instruction can help teachers to promote academic achievement in students.

Purpose of the Study

The main purpose of this study is to investigate the impact of differentiated instruction on higher-order and lower-order thinking skills of middle school students in mathematics. The specific objectives are as follows.

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1. To develop a differentiated instructional design for middle school students.
2. To explore the effectiveness of differentiated instructional design on middle school students' higher-order thinking skills and lower-order thinking skills in mathematics.
3. To find out the teachers' attitudes for implementing differentiated instruction in the mathematics classroom.
4. To make suggestions and recommendations for the improvement of mathematics teaching.

Research Questions

This study aims to answer the following research questions.

1. Is there a significant difference in the higher-order thinking skills between middle school students who receive differentiated instruction and those who do not receive it?
2. Is there a significant difference in the lower-order thinking skills between middle school students who receive differentiated instruction and those who do not receive it?
3. What are the attitudes of teachers towards using differentiated instruction in mathematics classroom?

Scope of the Study

The present study is geographically restricted to two townships in Meiktila District: B.E.H.S (Tamarkone) and B.E.M.S (1) in Wundwin Township, and B.E.M.S (Khetmauk) and B.E.H.S(1) in Thazi Township. B.E.M.S (1) Wundwin and B.E.H.S(1) Thazi are regarded as urban areas, and B.E.H.S (Tamarkone) and B.E.M.S (Khetmauk) are regarded as rural areas according to Township Education Office's criteria. Participants in this study are Grade Six students who are learning mathematics with reformed curriculum and junior teachers from the selected schools in the (2021-2022) Academic Year in which junior teachers' teaching and learning activities are linked with differentiated instruction. In this study, chapter one to four in Grade Six Mathematics textbook Volume (I) and chapter one to two in Grade Six Mathematics textbook Volume (II) were selected to use in the experiment.

Definitions of Key Terms

The key terms used in this study are presented as follows:

Differentiated Instruction. Differentiated Instruction is described as student-centered and can be used to reach and engage students based on their diverse interests, strengths, weaknesses and how they learn best (Tomlinson, 2001, cited in Amadio, 2014).

Mastery Learning Style. The mastery learning style describes learning that focuses on remembering basic facts and details (Dodge, 2005, cited Thomas & Brunsting, 2010).

Understanding Learning Style. Understanding learning style describes learning that develops reasoning skills and an understanding of concepts, patterns, and proofs for ideas (Dodge, 2005, cited Thomas & Brunsting, 2010).

Interpersonal Learning Style. The interpersonal learning style describes learning from approaches that emphasize cooperative learning, real-life contexts, and connections to everyday life (Dodge, 2005, cited Thomas & Brunsting, 2010).

Self-expressive Learning Style. The self-expressive learning style describes learning that produces original work using creative application and synthesis of old skills and information (Dodge, 2005, cited Thomas & Brunsting, 2010).

Higher-order Thinking Skills. Higher-order thinking skills include analysis, synthesis and evaluation (Qasrawi & Anderlrahman, 2020).

Lower-order Thinking Skills. Lower-order thinking skills include knowledge, comprehension and application (Qasrawi & Anderlrahman, 2020).

Significance of the Study

Htoo Thant (2018) said that Myanmar government has continued changes and improvement from the by-heart learning with good marks and high grades to the system which is leading towards learning about twenty first century skills such as communication, collaboration, creativity and problem solving, critical thinking, and citizenship in education sector. In Myanmar, KG+12 system had been introduced.

Glasgow, McNary and Hicks (2006, cited in McLean, 2010) said that with the curriculum changes, teachers cannot recognize the multitude of differences in individual students within a given classroom, but often they have failed to integrate these differences into their teaching strategies. This research is expected to give some benefits for teachers and students in teaching-learning process. By using differentiated instruction, every student is expected to be more involved in learning mathematics and feel happier in doing of practical works.

Review of Related Literature

Background Philosophies for Developing Differentiated Instruction

Educational philosophies related to this study are pragmatism, progressivism and constructivism.

Differentiated instruction is rooted in pragmatism. According to pragmatism, knowledge gained through doing, acting and living is useful and it emphasizes the functional knowledge and understanding (Wilson, Kenneth & Bennett, 1994). Thus, it fosters the learners to be creative and constructive by nature and to be an active participant in educational process.

In progressivism, children's interests and feelings are the center of education, instead of past knowledge and value (IDCJ, 2004). Thus, students' practice in instructional procedures through emphasizing their interests and feelings is conducted in implementing differentiated instruction process.

Both Vygotsky's and Piaget's theories are also constructivist, emphasizing that children actively construct knowledge and understanding rather than being passive receptacles (Savery & Duffy, 2001). Therefore, social interaction plays a fundamental role in the proposed design of differentiated instruction.

Background Learning Theories for Developing Differentiated Instruction

Five learning theories are taken into consideration in the proposed differentiated instructional design.

Piaget's theory (1936, cited in McLeod, 2008) of cognitive development explains how a child constructs a mental model of the world. Piaget regarded as cognitive development as a process which occurs due to biological maturation and interaction with the environment. Thus, the proposed design for differentiated instruction is concerned with the developmental aspect of human learning and the way in which content is structured for learning.

The approach of differentiated instruction is held by the socio-cultural learning theory which is based on the work of Russian psychologist Lev Vygotsky (1962, 1978, cited in Burkett, 2013). The socio-cultural learning theory holds that the previous experiences and culture of the learner are critical because these influence the learning process for each individual. Therefore, social interaction is essential to the development of cognition.

Differentiated instruction is grounded Gardner's multiple intelligence theory. The theory is based on the belief that all of the human intelligences should be recognized and nurtured as well as all combinations of the multiple intelligences (Armstrong, 1994, cited in Burkett, 2013). Therefore, teachers should be recognized and nurtured their students according to their multiple intelligences to adapt learning.

Brain-based learning has important implications for the differentiated classroom. The students must be in an environment conducive to learning. Students need to be challenged at appropriate levels in order for learning to occur. The brain needs to create its own understanding of ideas and skills by being presented with the concept to the facts so the learner can see the relationship between these and thus connect new information to prior knowledge (Burkett, 2013). Thus, the three concepts of brain-based learning can be considered in differentiated instruction depending on student levels of readiness, the needs of the teacher, and the nature of the content being taught.

Customized learning is really more focused on how students can be guided to initiate their own projects. It encourages them to willingly seek out knowledge according to their own drive and choice as opposed to how other methods give emphasis to specific cognitive and literary disciplines for the sake of the students' general progress (LLA, 2019). Therefore, the concept of customized learning theory is considered in proposed differentiated instructional design to encourages the students seek out knowledge through their own drive and choice, emotions, ambitions, and draw out their innate abilities to cope with actual life challenges.

Background Teaching Models for Developing Differentiated Instruction

Five teaching models are taken into consideration in the proposed differentiated instructional design.

According to Tomlinson's DI model, students' readiness, interests and learning profiles are important for teachers to recognize when providing instruction as they influence how students make sense of new information. Moreover, teachers must adapt the curricular elements, content, process and products according to students' readiness, interests and learning profiles (Erickson, 2010). Therefore, in developing proposed instructional design for differentiated instruction, the ideas of Tomlinson's model are mainly adopted for proposed design.

Dr. Khin Zaw's multimodal theoretical constructs consists of five main principles or components namely, channel capacity, brain resilience, redundancy, unitizing/symbolizing modes, and diffusing/re-synthesizing mode (Khin Zaw, 2001). The third component of instructional procedures in proposed design includes positive or negative redundancy. Moreover, the third component in the proposed design bases utilizing/symbolizing modes and diffusing/ resynthesizing modes. Therefore, this model is adopted for the major components involved in the proposed instructional design for differentiated instruction.

According to a multi-dimensional data model for learning material, the levels differ in various grades of intellectual and practical mastery of the subject in question. So systems to grade learners into various levels for defining target groups for the deployment of instructions of different difficulty degrees are already well known in the e-Learning community. The model quoted provides a one dimensional classification. More than one criterion is necessary in various degrees of intensity to characterize the specificity optimal to any given learner (Lucke, 2002, cited in Tavangarian, Leybold, Nolting, Roser & Voigt, 2004). Therefore, criteria for four mathematical

learning styles were based the ability to concentrate their learning interests in developing proposed instructional design.

According to To-With-By Model, stage one, or tier one, is “to” that is main lesson. In other words, “to” means the direction of instruction. Stage two, or tier two, is the “with” stage. “With” means the guided instruction. Stage three, or tier three, is the “by” stage. “By” means self-directed learning (Campbell, 2009). Therefore, in developing proposed instructional design for differentiated instruction; the ideas of to-with-by model are mainly adopted for the third component (instructional procedures) of proposed design.

The goal of Thomas and Brunsting (2010) was to make a deep connection between mathematics and learning styles. They identified four distinct styles of mathematics learners such as mastery math students, understanding math students, self-expressive math students and interpersonal math students. Therefore, in developing proposed instructional design for differentiated instruction, the ideas of grouping based on four mathematical learning styles are mainly adopted in the proposed instructional design.

Higher-order and Lower-order Thinking Skills

Higher-order thinking skills include analysis, synthesis and evaluation (Qasrawi & Anderlrahman, 2020). Higher-order thinking skills include critical, logical, reflective, metacognitive and creative thinking. Lesson plans include modeling of thinking skills, examples of applied thinking and adaptations for diverse student needs. Scaffolding that gives students support at the beginning of a lesson and gradually requiring students to operate independently helps students develop higher-order learning skills. Questioning strategies generate higher order thinking skills. Cooperative learning is effective for developing higher order thinking skills through individual accountability. Useful learning strategies include elaboration, organization and metacognition. Presentations are short and coupled with guided practice to teach sub-skills and knowledge. Small group activities such as students’ discussion and cooperative learning are effective in the development of higher order thinking skills. Activities involve challenging tasks, teacher encouragement to stay on task and ongoing feedback about group progress (Kauchak & Eggen, 1998).

Lower order thinking skills include knowledge, comprehension and application (Qasrawi & Anderlrahman, 2020). Lower-order thinking skills involve memorizing, recalling the knowledge one already has and understanding what one knows. Lower-order thinking skills are the simple thinking processes that serve as a basis for more complex process. Higher-order and lower-order thinking skills are interconnected. Higher-order thinking skills cannot be developed and enhanced separately from lower-order thinking skills (Tikhonova & Kudinova, 2015).

In this study, higher-order thinking skills and lower-order thinking skills involves in learning objectives, the lesson plans, pre-assessment, formative assessment and summative assessment.

Proposed Instructional Design for Differentiated Instruction

In proposed differentiated instructional design, there are five main components. Each of them is briefly explained as follows.

Learning objectives. In this component, learning objectives are identified based on Bloom’s Taxonomy of educational objectives and skills in twenty first century.

Pre-assessment. In analyzing pre-assessment component, the instructor assesses the students’ background knowledge.

Whole class instruction (grouping). The instructor assesses background knowledge such as a whole class. In whole class learning, the instructor provides students with opportunities to work collaboratively as a whole class. The students are grouped homogeneous groups based on four mathematical learning styles within one lesson.

Questioning (scaffolding strategy). The instructor uses questions as a scaffolding activity to provide support, assess progress and be adjusted according to student's needs in discussion or interaction.

Collaborative learning (learning activities). The instructor uses a collaborative learning strategy to involve student groups in a whole class activity. Each group brainstorms responses related to the questions. Then, the class discusses and reflects on the whole class effort.

Learning process. Learning process is acquiring new knowledge, understanding, behaviours, skills, values and attitudes.

Small group instruction (grouping). When considering for implementing mathematics activities, the instructor uses small group activities. In small group learning, students are assigned to four groups based on commonalities with regard to their respective learning style (mastery, understanding, interpersonal and self-expressive).

Cooperative learning (scaffolding strategy). The instructor uses cooperative learning to incorporate scaffolding in homogeneous groupings that focus on providing peer and resource supports.

Task rotation (learning activities). The instructor use as task rotation based on their four learning styles. The tasks are based on four different strategies such as mastery strategies, understanding strategies, interpersonal strategies and self-expressive strategies.

Students' Reflection. Student's reflection is to be aware of their own thinking processes and to be able to make transparent to others. It is an assessment why they learned and how they learned and what needs to be done as a result.

Partners/ Individuals (grouping). When considering for implementing students' reflection, the instructor gives two choices for students such as partners or individuals.

Graphic organizers/Think-alouds (scaffolding strategy). In working with partners, the instructor uses graphic organizers to provide multiple formats to help students organize thinking and research. For individual learning experiences, the instructor uses think-alouds to provide opportunities for students to engage in metacognitive activities while being provided with support and guidance.

Discussion breaks/ Learning logs (learning activities). In working with partners, the instructor uses discussion breaks to provide an opportunity for students to discuss ideas, questions and information. In individual learning experiences, the instructor uses learning logs to track and reflect their learning.

Formative Assessment. The instructor can assess students' learning throughout the learning process of the model by formative assessment strategies such as asking questions, observing students' facial expressions and body language, and by listening students' discussion.

Summative Assessment. The students work more independently. After the evaluation process, the instructor examines whether the students achieved the desired learning outcomes or not. If they achieve these outcomes, they are moved to the next content. Unless they achieve these outcomes, feedback is made to provide next lesson preparation.

Method

Both quantitative and qualitative research methods were used in this study .

Research Design

The aim of this study is to investigate the impact of differentiated instruction on students' achievement in mathematics at middle school level. This study was adopted by using the explanatory sequential mixed method (QUAN → qual) design.

Quantitative Research Method

Quantitative research method was used to analyze students' mathematics achievement and higher order thinking skills and lower order thinking skills. The non-equivalent control group design, one of the quasi-experimental designs, was adopted in this study.

Population and Sample .Grade Six students were selected from the selected schools as the subjects. Table 1 shows population and sample of the quantitative study.

Table 1 Population and Sample

Selected Township	Selected School	No. of population	No. of Subject
Wun Dwin	B.E.H.S (Tamarkone)	30	30
	B.E.M.S (1) Wundwin	67	67
Thazi	B.E.H.S(1) Thazi	140	140
	B.E.M.S (Khetmauk)	59	59

Instruments. Pretest, learning style inventory and posttest were used as quantitative research instruments.

Pretest. The pretest question consists of (14) multiple choice items and (5) short questions. Test items were constructed based on Grade Four mathematics textbook. The total score for pretest is (30) marks. Time duration is (45) minutes, (1) period.

Learning style inventory. In this study, the inventory for four learning styles was used by Thomas and Brusting (2010). Each component consisted of (10) items on five-point Likert-type scale from (1) to (5), totally (40) items were included in this inventory.

Posttest. The posttest question consists of (13) multiple choice items and (7) short questions. Test items were constructed based on Grade Six mathematics textbook. The total score for posttest is (30) marks. Time duration is (45) minutes, (1) period.

Learning materials. To construct learning activities for differentiated instruction, four chapters were selected from Grade Six mathematics textbook Volume (I) and two chapters were selected from Grade Six mathematics textbook Volume (II).

Data Analysis. The Statistical Package for Social Science (SPSS) Version 20 was used to analyze the quantitative data. The data were analyzed by using one-way analysis of covariance (One-Way ANCOVA).

Qualitative Research Method

Qualitative research method was used to investigate attitudes of students and teachers.

Population and Sample .Students who participated in the experimental groups and teachers who taught the experimental groups were selected as the subjects.

Instruments. Teacher interview was used.

Interview. The first part of interview question is about the demographic information and the next is about the attitude of teachers towards the proposed differentiated instructional design.

Data Analysis. In this study, coding analysis was used to analyze the qualitative data. Thematic analysis in content analysis was used to establish the existence and frequency of concepts, most often represented by words or phrases in a text.

Pilot Study

Pilot study was conducted with Grade Six students and middle school teachers in B.E.H.S (Branch-Shaw Pin), Meiktila District. The internal consistency (Cronbach's Alpha) of the pretest and posttest were 0.797 and 0.820 respectively. Therefore, these items were suitable to use for experimental study.

Procedure

Before the experimental study, the training for differentiated instruction was given for three days. And then, the sample schools were selected randomly from Wundwin and Thazi Townships. A pretest was administered to both groups to measure the initial levels and then learning style inventory was administered to determine which learning style students have based on four types of mathematics learning styles. Learning styles results in all selected schools can be seen in Table 2.

Table 2 Learning Styles Results in S1, S2, S3 and S4

Learning Style	No. of Participants				Total
	S1	S2	S3	S4	
Mastery Learning Style	3	2	12	10	27
Understanding Learning Style	4	13	17	11	45
Interpersonal Learning Style	6	11	27	7	51
Self-expressive Learning Style	2	8	14	2	26
Total	15	34	70	30	149

Note. S1=B.E.H.S (Tamarkone); S2= B.E.M.S (1), Wundwin;
S3= B.E.H.S (1), Thazi; S4= B.E.M.S (Khetmauk)

The results showed the number of interpersonal learning style learners had at the first position, understanding learning style at the second position, mastery learning style at the third position and self-expressive learning style at the fourth position. Therefore, it can be interpreted that most of the students preferred to participate in interpersonal style learning (See Table 2).

Findings

Quantitative Research Findings of Pretest

Table 3,4,5,6 shows one-way ANCOVA results for pretest scores of Grade Six students in S1, S2, S3 and S4.

Table 3 One-way ANCOVA Results for Pretest Scores of Grade Six Students in S1

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig
Corrected Model	.033 ^a	1	.033	0.002	.960
Intercept	7905.633	1	7905.633	592.922	.000
ID	.033	1	.033	0.002	.960 (ns)
Error	373.333	28	13.333		
Total	8279.000	30			
Corrected Total	373.367	29			

Note. a. R Squared =.000 (Adjusted R Squared= .36),
ns= not significant

The results showed that there were no significant differences between entry behaviours of the experimental groups and the control groups in S1.

Table 4 One-way ANCOVA Results for Pretest Scores of Grade Six Students in S2

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig
Corrected Model	79.718 ^a	1	79.718	8.482	.005
Intercept	19152.195	1	19152.195	2037.771	.000
ID	79.718	1	79.718	8.482	.005**
Error	610.909	65	9.399		
Total	19884.000	67			
Corrected Total	690.627	66			

Note. a. R Squared = .115 (Adjusted R Squared = .102),

** $p < .01$.

The results showed that there were significant differences between entry behaviours of the experimental groups and the control groups in S2.

Table 5 One-way ANCOVA Results for Pretest Scores of Grade Six Students in S3

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig
Corrected Model	1.607 ^a	1	1.607	0.129	.720
Intercept	35107.779	1	35107.779	2817.419	.000
ID	1.607	1	1.607	0.129	.720 (ns)
Error	1719.614	138	12.461		
Total	36829.000	140			
Corrected Total	1721.221	139			

Note. a. R Squared = .001 (Adjusted R Squared = .006),

ns = not significant

The results showed that there were no significant differences between entry behaviours of the experimental groups and the control groups in S3.

Table 6 One-way ANCOVA Results for Pretest Scores of Grade Six Students in S4

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig
Corrected Model	195.771 ^a	1	195.771	33.523	.000
Intercept	16080.516	1	16080.516	2753.566	.000
ID	195.771	1	195.771	33.523	.000***
Error		57	5.840		
Total	16674.000	59			
Corrected Total	528.644	58			

Note. a. R Squared = .370 (Adjusted R Squared = .359),

*** $p < .001$

The results showed that there were significant differences between entry behaviours of the experimental groups and the control groups in S4.

Quantitative Research Findings of Posttest

Table 7 shows one-way ANCOVA results for mathematics achievement on posttest scores of Grade Six students in S1, S2, S3 and S4.

Table 7 One-way ANCOVA Results for Higher-order Thinking Skills on Posttest of Grade Six Students in S1, S2, S3 and S4

School	Source	df	F	MD	Sig. (2-tailed)	Partial Eta Squared	Unadjusted Mean		Adjusted Mean	
							EG	CG	EG	CG
BEHS (Tamarkone)	Pretest	1	0.086		.771	.003				
	Group	1	18.697	2.80	.000***	.409	11.33	8.53	11.33	8.53
	Error	27								
BEMS(1), Wundwin	Pretest	1	0.035		.853	.001				
	Group	1	26.765	2.32	.000***	.295	10.82	8.48	10.81	8.49
	Error	64								
B.E.H.S (1), Thazi	Pretest	1	0.011		.915	.000				
	Group	1	31.064	1.80	.000***	.185	11.03	9.23	11.03	9.23
	Error	137								
B.E.M.S (Khetmau k)	Pretest	1	0.187		.667	.003				
	Group	1	34.687	2.98	.000***	.382	11.57	8.72	11.63	8.65
	Error	56								

Note. EG = Experimental Group, CG = Control Group,

*** $p < .001$.

The results show that the use of proposed instructional design has a significant effect on higher-order thinking skills of posttest in students' mathematics achievement.

Table 8 One-way ANCOVA Results for Lower-order Thinking Skills on Posttest of Grade Six Students in S1, S2, S3 and S4

School	Source	df	F	MD	Sig. (2-tailed)	Partial Eta Squared	Unadjusted Mean		Adjusted Mean	
							EG	CG	EG	CG
BEHS (Tamarkone)	Pretest	1	0.013		.910	.000				
	Group	1	16.281	1.87	.000***	.376	9.40	7.53	9.40	7.53
	Error	27								
BEMS(1), Wundwin	Pretest	1	0.179		.674	.003				
	Group	1	7.133	1.08	.010*	.100	10.21	9.06	10.17	9.09
	Error	64								
B.E.H.S (1), Thazi	Pretest	1	2.037		.156	.015				
	Group	1	15.531	1.13	.000***	.102	10.44	9.30	10.44	9.31
	Error	137								
B.E.M.S (Khetmau k)	Pretest	1	0.047		.830	.001				
	Group	1	13.222	1.6	.001**	.191	22.43	8.90	10.46	8.86
	Error	56								

Note. EG = Experimental Group; CG = Control Group,

*** $p < .001$. ** $p < .01$. * $p < .05$.

The results show that the use of proposed instructional design has a significant effect on lower-ordered thinking skills of posttest in students' mathematics achievement.

Findings of Teachers' Interviews

Four teachers who taught the experimental groups in the selected schools were interviewed. Coding analysis and thematic analysis were used to analyze the qualitative data. There are five themes to analyze the data.

Theme 1 (Teaching Experience): All teachers who taught in the experimental groups had many years of teaching experience and their total teaching services are above 10 years. They all had both primary teacher training and junior teacher training. Three teachers are BA degree holders and the rest of three teachers are BSc degree holders but only one teacher is in line with her mathematics major specialization and teaching.

Theme 2 (Knowledge about Differentiated Instruction): According to their responses, they understand differentiated instruction. They said that there were differences between the new curriculum prescribed by the ministry of education and the proposed instructional design. Teaching aids and learning materials are easy to collect in daily life situations for teachers and effective for students. Classroom setting was prepared for all students to be ease and then the students actively participate in all class learning activities.

Theme 3 (Challenges) : The challenge was that knowledge about differentiated instruction, time allocation, class size, differences between urban and rural students, knowledge about collaborative summarizing.

Theme 4 (Overcoming the Challenges) : They solved those problems by knowledge from training orientation to differentiated instruction, adaptation with time allocation, preparation with classroom setting and peer discussion.

Theme 5 (Advantages) : They propounded that it is a very suitable and valuable design for teaching of mathematics. In general, the proposed differentiated instructional design improved students' mathematics learning.

Summary of Research Findings

Research findings from the selected schools are summarized as follows.

1. There were significant differences between experimental groups and control groups on the achievement of higher-order thinking skills in all four selected schools.
2. There were significant differences between experimental groups and control groups on the achievement of lower-order thinking skills in all four selected schools.
3. Teachers propounded that it is a very suitable and valuable design for teaching of mathematics.

Discussion

Discussion for Research Question (1). In terms of the stastical results, students' performance had significant difference on the achievement of higher-order thinking skills. Therefore, the proposed differentiated instructional design could encourage the improvement of the students' mathematics higher-order thinking skills.

Discussion for Research Question (2). In terms of the stastical results, students' performance had significant difference on the achievement of lower-order thinking skills. Therefore, the proposed differentiated instructional design could encourage the improvement of the students' mathematics lower-order thinking skills.

Discussion for Research Question (3). In teachers' interview, the teachers who taught the experimental groups reported that all prepared learning activities and materials were very useful

and effective for teaching of mathematics. Moreover, findings from teachers' interview proved that proposed instructional design for differentiated instruction has positive effect on higher-order thinking skills and lower-order thinking skills.

Discussion for Contributions. It is important for mathematics teachers to manage learners with different learning styles. So, the role of differentiated instruction and their learning styles are important in teaching and learning situations. It is necessary for teachers to have teaching qualities to adapt the needs of the students.

It is hoped that using instructional design for differentiated instruction in middle school mathematics teaching can develop students' higher-order thinking skills and lower-order thinking skills. It is necessary to carry out more researches on differentiated instruction to investigate its effects or impacts on Myanmar students in different school levels.

Suggestions

Suggestions for Time Allocation. Sufficient time should be given to each learner to thoroughly explore, understand, and use ideas, information, and skills. A teacher should try to give the students adequate time to sort through the information, establish the meaning of it all, develop a mental program for using and remembering what is learned, and apply what is learned to their own personal life. In content areas, sufficient time should be devoted to instruction to allow students to become proficient with the concepts and skills outlined in the teaching-learning paths.

Suggestions for Class Size. According to Organisation for Economic Co-operation and Development (OECD, 2021), at the lower secondary level, average class size in OECD countries is 1:23. The class size should be small for implementing differentiated instruction. The teachers who taught the experimental groups reported that it was difficult to control the class and provide feedback individually. Therefore, it is suggested that teacher-student ratio should be about 1:30 according to Myanmar situation.

Suggestions for e-Learning. E-learning is a solution for individual learning. The levels differ in various grades of intellectual and practical mastery of the subject in question. So systems to grade learners into various levels such as novice level, advanced beginner level, competence level, proficiency level, expertise level for defining target groups for the development of instructions of different difficulty degrees are already well-known in e-learning community (Tavangarian, Leypold, Nolting, Roser & Voigt, 2004). Therefore, it can be suggested that teachers should try to study how to use e-learning to meet students' different needs in 21st century demands and explore different levels in e-learning for target groups to be effective teaching-learning classrooms.

Suggestions for Mathematics Teachers. Learning with mixed abilities creates learning opportunities for sharing knowledge. Mathematics teachers should try to force students to solve mathematics problems in different ways. Teachers should try to write a story for the mathematics questions and draw a picture to help the students' understand the problems. They should try to deliver lessons that develop students' theoretical and applied mathematics skills.

Conclusion

The results of quantitative study and the qualitative study support the objectives of the research study. According to the findings of the research, this proposed instructional design was useful to some extent for mathematics learning.

Regarding the need for further pedagogic studies, it is suggested that a merger of two theoretical constructs: the UDNR multimodal thought process model and German e-learning expert D. Tavangarian's flexible multi-dimensional data model, or the generation of individual content (Rostock University) should be considered. It is believed that the former's symbolizing and resynthesizing modes of capta processing and Re Catter's customized blends of differentiated document generation will, together, prove to be the optimal mathematics learning of all ages.

Finally, it can be concluded that this study also serves as a future reference for researchers in other subject areas. Not only in mathematics but also in other subjects, concepts are the basic building blocks of understanding. Based on these findings, further researches can be conducted on the effectiveness of mathematics through differentiated instruction.

Acknowledgements

Firstly, we would like to offer our respectful gratitude to Dr. Khin Zaw (Retired Rector, YUOE), Dr. Kay Thwe Hlaing, (Rector), Dr. May Myat Thu, Dr. Khin Khin Oo, and Dr. Nyo Nyo Lwin (Pro-Rectors, YUOE), Daw Aye Aye Kywe (Retired Associate Professor, YUOE) who allowed us to carry out this study successfully. Then, we would like to express our thanks to Professor Dr. Khin Mar Khine (Professor and Head of Department, Department of Curriculum and Methodology, YUOE), who lovingly and patiently guided for achieving this study.

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A STUDY OF THE PERCEPTIONS OF PRE-SERVICE TEACHERS TOWARDS MICROTEACHING

Win Hay Mar Oo¹ and Khin Mar Khine²

Abstract

The main purpose of this research is to study the perceptions of pre-service teachers towards microteaching in Education Degree Colleges. For this study, four Education Degree Colleges were selected as the sample from Bago and Yangon regions by using simple random sampling method. All the participants were (303) Second Year, First Semester pre-service teachers within the (2022-2023) academic year. A questionnaire survey was used to collect the required data. This study includes five dimensions for the perceptions of pre-service teachers towards microteaching. It consists of (25) items. Using SPSS (22) version, descriptive analysis was employed to calculate the mean and standard deviation for the quantitative data. Moreover, the independent samples *t* test was used to examine whether the mean differences between the two groups (male and female) in the perceptions of pre-service teachers towards microteaching were statistically significant or not. The results showed that most of the pre-service teachers possessed moderate level of perceptions towards microteaching. Findings also indicated that the perception of personal feelings was the weakest and the perception of teaching practice competence and awareness was the strongest in the perceptions of pre-service teachers towards microteaching. According to research findings, there was no significant difference between the two groups (male and female) in the perceptions of pre-service teachers towards microteaching. Therefore, this study can be hoped to support to some extent improving the positive perceptions of pre-service teachers towards microteaching in Myanmar.

Keywords: Teaching, Microteaching, Perception, Teaching Practice, Training Technique

Introduction

Education is the instrument for individual, societal, national, and international growth and development (Ajibola, 2013). Teacher education in the twenty-first century must be dynamic and future-oriented. The issues of teacher education reforms are multifaceted ranging from macro-policy problems to micro-level challenges pertaining to the design of practices (Tan, Liu, & Low, 2017). Microteaching training is carried out at the pre-service level because preservice teachers have gotten their material on the lecture bench which will be practiced in the microteaching class. In microteaching, pre-service teachers find opportunities to develop skills such as preparing lesson plans, choosing lesson objectives, attracting students' attention, speaking in front of groups, asking questions, managing time effectively, and assessing techniques (Dewi, 2020). In order to develop the above-mentioned skills, the perceptions of pre-service teachers towards microteaching may be considered for the teacher education sector. Therefore, this study investigates the perceptions of pre-service teachers towards microteaching in Education Degree Colleges.

Purpose of the Study

The main purpose of this study is to study the perceptions of pre-service teachers towards microteaching in Education Degree Colleges.

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The specific objectives are as follows:

- To investigate the perceptions of pre-service teachers towards microteaching in the selected Education Degree Colleges
- To compare the mean differences between the two groups (male and female) in the perceptions of pre-service teachers towards microteaching in the selected Education Degree Colleges
- To make suggestions for improving the perceptions of pre-service teachers towards microteaching in Education Degree Colleges

Research Questions

This study is set out to answer the following basic research questions.

- To what extent do pre-service teachers have perceptions towards microteaching in the selected Education Degree Colleges?
- Is there a significant difference between the two groups (male and female) in the perceptions of pre-service teachers towards microteaching in the selected Education Degree Colleges?

Scope of the Study

This study is geographically restricted to Education Degree Colleges in Bago and Yangon Regions of lower Myanmar. Pyay Education Degree College (Pyay EDC), Taungoo Education Degree College (Taungoo EDC), Yankin Education Degree College (Yankin EDC), and Hlegu Education Degree College (Hlegu EDC) were selected as samples for this study. Participants in this study were the Second Year, First Semester pre-service teachers from the selected Education Degree Colleges within the (2022-2023) academic year. This study included five dimensions for the perceptions of pre-service teachers towards microteaching namely teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life.

Definition of Key Terms

Teaching: Teaching is a set of events, outside the learners which are designed to support internal process of learning (Sequeira, 2018).

Microteaching: Microteaching can be defined as a teaching technique especially used in teachers' pre-service education to train them systematically by allowing them to experiment with main teacher behaviors (Solanki & Patel, 2017).

Perception: Perception is the set of processes by which we recognize, organize, and make stimuli in our environment (Barry, 1998).

Teaching Practice: Teaching practice is an integral part of teacher education because it allows student teachers to apply the theories into practice (Mannathoko, 2013).

Training Technique: Training technique is the skills that are acquired by student teachers during training (Ajibola, 2013).

Statement of the Problem

It is rare that pre-service teachers in Myanmar comprehend that microteaching provides many opportunities for prospective teachers to design their teaching styles before they are involved in teaching in the classroom as a teacher. Microteaching will be prepared to apply teaching that is geared towards giving teachers confidence, support, and feedback by allowing

them to seek a short-term relationship between friends and associates regarding what they decide to do with their students (Azmi, 2019).

According to Khan, Tahira, and Rafique (2021), microteaching allows pre-service teachers to teach short lessons and exemplify certain skills. Microteaching helps pre-service teachers develop their observational skills, improve their ability to use time efficiently, exploit different kinds of teaching supports, build self-confidence, reduce the degree of shyness and fear, and learn how to introduce different stages of the lesson. This is due to the fact that pre-service teachers need to focus on microteaching in order to develop their orientation, exploration, modeling teaching skills, and elaboration of skills training activities.

Thus, this study is expected to provide some valuable information about the crucial role of microteaching in Education Degree Colleges. The results of the study are very useful for pre-service teachers to find a way to improve their teaching practice using microteaching and to get a good perception of pre-service teachers towards microteaching at colleges in Myanmar. Therefore, it is essential to study the perceptions of pre-service teachers towards microteaching in teaching practice classes.

Review of Related Literature

Theoretical Framework of Microteaching

According to Darby (2003, as cited in Ajibola, 2013), microteaching is based on three sets of learning theories: behaviorism, cognitivism, and constructivism. Therefore, the theoretical framework of this study is based on behaviorism, cognitivism, and constructivism.

Behaviorism

Behaviorism is a theory of animal and human learning that focuses on the behavior of the learner and the change in behavior that occurs when learning takes place. Learning in the context of behaviorism can be defined as the acquisition of a new behavior or the modification of behavior as a result of teaching, training, or tutoring. Learning is demonstrated by the behavior of the learner in the actions or reactions to further stimulus. Behaviorism is also a philosophy, theory, and pedagogy. They are underpinned by the principles of stimulus-response, and all behavior is explained without the need to consider internal mental states or consciousness. However, those internal states such as belief, motivation, and satisfaction can be represented by patterns of behavior (Wollard, 2010).

Cognitivism

According to Mayer (1992), the cognitive theory includes internal factors: learner characteristics (which can lead to individual differences in the process of learning), learning process (which manipulates information), and learning outcomes (which contain newly constructed knowledge). Mayer (1992) defined learning as response acquisition, learning as knowledge acquisition, and learning as knowledge construction. The cognitive information-processing theory emphasizes that children manipulate information, monitor it, and strategize about it. Central to this approach is the process of memory and thinking.

Constructivism

Constructivism is a psychological and philosophical perspective contending that individuals form or construct much of what they learn and understand (Bruning, Schraw, Norby, & Ronning, 2004, as cited in Schunk, 2012). In recent years, constructivism increasingly has

been applied to learning and teaching. The history of learning theory reveals a shift away from environmental influences and toward human factors as explanations for learning. Constructivism eventually must be evaluated not on whether its premises are true or false (Schunk, 2012).

The Nature of Microteaching

The term “Microteaching” is an important component of modern-age teacher training programs. Microteaching is very effective and successful in grooming confidence and improving skills. Moreover, it helps to understand the learning style limits and learning and practicing constructive feedback. It facilitates the complex classroom environment into a simplified environment. A small group of students provides the trainees with an environment for practice-based teaching which facilitates trainees to build confidence by improving their skills, which leads them to instill self-evaluative skills (Khan, Tahira, & Rafique, 2021).

Microteaching not only improves confidence but is also helpful in improving teaching performance during the class through polishing the skills of in-class management. During the microteaching process, observation, listening, and practicing provide the opportunity to learn every skill at its best. The learning process of microteaching is improved through applications, which can be applied practically. It improves skills like thinking critically, questioning, solving problems, and thoughtful thinking (Higgins & Nicholl, 2003).

Procedures Used in Microteaching

Microteaching has a long history as a teacher-training strategy. An approach that is sometimes based on a sequence of plan, teach, and critique and has three essential features:

1. The student teacher teaches a microlesson of 5 to 10 minutes.
2. The lesson has a very specific and narrow focus.
3. It is immediately followed by a critique of the student teacher’s performance.

This may be followed by a new cycle of re-plan, re-teach, and re-critique. The stages that are normally involved in microteaching can be summarized as follows:

The briefing: The supervisor presents the skill to be practiced and explains how this can be accomplished such as conducting a group activity.

The planning: The student teachers plan their microlesson, incorporating the skills they have been assigned to practice. They should also prepare a description of the objectives for their lesson, to provide a context for the lesson for the observers.

The teaching: The student teacher now teaches his or her microlesson, either to peers or to actual students. The lesson is often videotaped. The observers take notes.

The critique: The lesson is discussed, analyzed, and evaluated. The student teacher generally starts by explaining what he or she was trying to do and whether the lesson went according to the way it was planned. The supervisor will comment on the strengths and weaknesses of the microlesson and suggest ways in which it could be improved.

The re-teach: The microlesson is taught again. During this phase, the student teacher tries to incorporate the feedback that was given during the first teaching (Richard & Farrell, n.d.).

Benefits of Microteaching

Microteaching is a platform for beginner teachers to improve teaching competencies. Here are a few microteaching benefits.

1. The elasticity of practice: Microteaching helps in developing various skills in trainees as well as the current teaching staff. It helps in improving the handling skills of the teachers. It gives better opportunities due to small-scale teaching. Moreover, it broadens the knowledge of various techniques of teaching.
2. Confidence booster: Microteaching is a personality enhancer too. Due to several microteaching activities and practices, microteaching effectively increases the confidence level of the teachers.
3. Budget-oriented: Unlike other various programs and seminars that are very costly, the microteaching program is budget-oriented. Teachers can practice within the real class or at any other place.
4. More learning and less damage: The microteaching program is conducted with no more than 3-4 students at a time. This makes it possible to acquire better teaching experience. In addition, it lessens the chances of mistakes.
5. Improves attitude: A positive attitude contributes to better results. Thus, one of the objectives of this program is to guide the trainees to attain a positive attitude toward any criticism. As a result, negative feedback also motivates the trainees to strive for betterment.
6. Promotes systematic lesson planning: Lesson planning is one of the skills that a teacher needs to master. A microteaching program, within a given content, helps the trainee to prepare systematic lesson plans.
7. Instant feedback: Feedback is the best way to improve. Microteaching enables the teachers to gain instant feedback from the supervisors. Instant feedback gives more potential for rectifying mistakes.
8. Mastering skills: This program helps in mastering types of microteaching skills and strategies like lecturing, questioning, probing, and initiating discussions. Further, it helps in improving a separate teaching style (Santika, 2020).

Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching

For assessing the perceptions of pre-service teachers towards microteaching, items are divided into five dimensions. They are as follows:

- Teaching practice competence and awareness (Gogoi, 2019)
- Preparation and management (Gogoi, 2019)
- Personal feelings (Gogoi, 2019)
- Teaching practice (Azmi, 2019)
- Effectiveness of microteaching in their professional life (Khan et al., 2021)

Microteaching has been described as “providing positive learning experiences” and has benefits such as having preservice teachers exercise their skills in a warm, non-threatening learning environment (Azmi, 2019).

Method

Research Design

In this study, descriptive research design was used to investigate the perceptions of pre-service teachers towards microteaching in teaching practice classes which are needed to apply in the real classroom environment.

Procedure

This research was to investigate the perceptions of pre-service teachers towards microteaching in teaching practice. The research problem was formulated for the study. The literature related to the study was explored through reading books, the previous research, and also from the sources of internet. Then, the research design was selected. For this study, four Education Degree Colleges were selected as the sample from Bago and Yangon regions by using simple random sampling method. They are Pyay EDC, Taungoo EDC, Yankin EDC and Hlegu EDC. All the participants were (303) Second Year, First Semester pre-service teachers within the (2022-2023) academic year.

A questionnaire concerning the perceptions of pre-service teachers towards microteaching was constructed for this study. Then, a pilot study was conducted in November 2022 with (32) pre-service teachers from Thingangyun EDC to establish the validity and reliability of the questionnaire. After pilot testing, the weaknesses of the questionnaire were modified. In December 2022, the main study was conducted.

Instrument

The main data gathering tool for the study was a questionnaire which was concerned with five dimensions for the perceptions of pre-service teachers towards microteaching in teaching practice classes. Questionnaire was prepared based on five-point Likert scales ranging from (1) strongly disagree to (5) strongly agree. For this instrument, questionnaires based on Gogoi (2019), Azmi (2019), and Khan et al. (2021) were modified and administered. It consisted of (25) items with five dimensions. The five dimensions were teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life. Each dimension contained (5) items. For the pilot study, participants were (32) pre-service teachers from Thingangyun EDC. The internal consistency for Cronbach's Alpha of questionnaire was (0.83).

Population and Sample Size

All participants are Second Year, First Semester pre-service teachers from Education Degree Colleges within the (2022-2023) academic year in Bago and Yangon Regions. Simple random sampling technique was used for this study. Pyay EDC, Taungoo EDC, Yankin EDC and Hlegu EDC were selected as the sample colleges. The numbers of the participants were (303) representatively. Table 1 shows the sample size in the selected Education Degree Colleges.

Table 1 Sample Size

No.	Region	Education Degree College	No. of Participants
1	Bago (West)	Pyay EDC	70
2	Bago (East)	Taungoo EDC	91
3	Yangon	Yankin EDC	73
4	Yangon	Hlegu EDC	69
Total			303

Data Analysis

Quantitative data analysis techniques were used for this study. Data collected were analyzed quantitatively using descriptive statistics and inferential statistics. In order to examine the perceptions of pre-service teachers towards microteaching, descriptive statistics (mean, standard deviation, frequency, and percentage) were used. To compare the mean differences between two groups (male and female) of pre-service teachers, the independent samples *t* test was used.

Findings

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching

In order to find out the comparison of the mean scores of the perceptions of pre-service teachers towards microteaching about teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life, the mean and standard deviation were described in Table 2.

Table 2 Mean Scores of Five Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching

Perceptions Towards Microteaching	No. of Pre-Service Teacher	Mean	Std. Deviation	Minimum	Maximum
TPCA	303	21.53	2.35	11	25
PM	303	20.75	2.28	14	25
PF	303	18.03	2.31	12	25
TP	303	20.61	2.05	14	25
MPL	303	21.12	2.01	15	25
Total	303	102.04	8.24	74	124

Note. TPCA = Teaching Practice Competence and Awareness

PM = Preparation and Management

PF = Personal Feelings

TP = Teaching Practice

MPL = Effectiveness of Microteaching in their Professional Life

The results showed the comparison of mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching. They indicated that the mean score of the perceptions of pre-service teachers towards microteaching about personal feelings was the lowest and the mean score of the perceptions of pre-service teachers towards microteaching about teaching practice competence and awareness was the highest.

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching in Pyay Education Degree College

For the perceptions of the total (70) pre-service teachers towards microteaching about five dimensions in Pyay EDC, the mean scores and standard deviation were described in Table 3.

Table 3 Mean Scores of Five Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching in Pyay Education Degree College

Education Degree College	Perceptions Towards Microteaching	No. of Pre-Service Teacher	Mean	Std. Deviation	Minimum	Maximum
Pyay EDC	TPCA	70	21.90	2.26	15	25
	PM	70	20.86	2.32	15	25
	PF	70	18.26	2.08	13	23
	TP	70	20.63	2.03	16	25
	MPL	70	21.24	1.81	17	24
	Total	70	102.89	7.04	86	116

The results showed the comparison of mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching in Pyay EDC. They indicated that the mean score of the perceptions of pre-service teachers towards microteaching about personal feelings (PF) was the lowest and the mean score of the perceptions of pre-service teachers towards microteaching about teaching practice competence and awareness (TPCA) was the highest.

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching in Taungoo Education Degree College

For the perceptions of the total (91) pre-service teachers towards microteaching about five dimensions in Taungoo EDC, the mean scores and standard deviation were described in Table 4.

Table 4 Mean Scores of Five Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching in Taungoo Education Degree College

Education Degree College	Perceptions Towards Microteaching	No. of Pre-Service Teacher	Mean	Std. Deviation	Minimum	Maximum
Taungoo EDC	TPCA	91	20.90	2.33	11	25
	PM	91	20.44	2.14	16	25
	PF	91	17.80	2.30	13	23
	TP	91	20.15	1.80	14	25
	MPL	91	20.56	1.75	15	25
	Total	91	99.86	7.70	74	121

The results showed the mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching in Taungoo EDC. According to the results, pre-service teachers are weak in perceptions of personal feelings (PF). They are strong in perceptions of teaching practice competence and awareness (TPCA).

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching in Yankin Education Degree College

For the perceptions of the total (73) pre-service teachers towards microteaching about five dimensions in Yankin EDC, the mean scores and standard deviation were described in Table 5.

Table 5 Mean Scores of Five Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching in Yankin Education Degree College

Education Degree College	Perceptions Towards Microteaching	No. of Pre-Service Teacher	Mean	Std. Deviation	Minimum	Maximum
Yankin EDC	TPCA	73	21.62	2.21	15	25
	PM	73	20.95	2.58	14	25
	PF	73	18.32	2.47	13	25
	TP	73	20.79	2.10	16	25
	MPL	73	21.48	1.99	16	25
	Total	73	103.15	8.81	87	124

The results showed the comparison of mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching in Yankin EDC. They indicated that the mean score of the perceptions of pre-service teachers towards microteaching about personal feelings (PF) was the lowest and the mean score of the perceptions of pre-service teachers towards microteaching about teaching practice competence and awareness (TPCA) was the highest.

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching in Hlegu Education Degree College

For the perceptions of the total (69) pre-service teachers towards microteaching about five dimensions in Hlegu EDC, the mean scores and standard deviation were described in Table 6.

Table 6 Mean Scores of Five Dimensions of the Perceptions of Pre-Service Teachers Towards Microteaching in Hlegu Education Degree College

Education Degree College	Perceptions Towards Microteaching	No. of Pre-Service Teacher	Mean	Std. Deviation	Minimum	Maximum
Hlegu EDC	TPCA	69	21.91	2.50	15	25
	PM	69	20.84	2.08	16	25
	PF	69	17.78	2.36	12	24
	TP	69	20.99	2.27	14	25
	MPL	69	21.35	2.41	15	25
	Total	69	102.87	9.02	76	119

The results showed the mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching in Hlegu EDC. According to the results, pre-service teachers are weak in the perceptions of personal feelings (PF). They are strong in the perceptions of teaching practice competence and awareness (TPCA).

Findings of the Levels of the Perceptions of Pre-Service Teachers Towards Microteaching

A descriptive statistics (percentage) was used to examine the percentage of pre-service teachers who have low, moderate, and high levels of perceptions of microteaching.

Table 7 Levels of the Perceptions of Pre-Service Teachers Towards Microteaching

Perceptions Towards Microteaching	Score	No. of Pre-Service Teacher	Percentage (%)
Low	$x < 93.802$	43	14 %
Moderate	$93.802 \leq x \leq 110.278$	212	70 %
High	$x > 110.278$	48	16 %
Total		303	100%

The results showed the percentage of levels of the perceptions of pre-service teachers towards microteaching. According to the results, most of the pre-service teachers possessed a moderate level of perceptions towards microteaching.

Findings of the Mean Scores of the Perceptions of Pre-Service Teachers Towards Microteaching between Two Groups

In order to examine whether the mean differences between two groups (male and female) of pre-service teachers were statistically significant or not, the independent samples *t* test was used.

Table 8 The Result of Independent Samples *t* test for the Perceptions of Pre-Service Teachers Towards Microteaching between Two Groups

Gender	N	Mean	Std. Deviation	Mean Difference	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Male	136	101.5	8.29	-0.97	-1.02	301	0.64 (ns)
Female	167	102.47	8.20				

Note. ns = not significant

The results indicated that there was no significant difference between the two groups (male and female) in the perceptions of pre-service teachers towards microteaching.

Discussion

In the comparison of the mean scores of five dimensions of the perceptions of pre-service teachers towards microteaching in four selected EDCs, the mean score of the perceptions of pre-service teachers towards microteaching about personal feelings was the lowest. It indicates that pre-service teachers felt a little embarrassed while microteaching and may be allowed to have greater exposure to microteaching in order to face teaching challenges confidently. The mean score of the perceptions of pre-service teachers towards microteaching about the teaching practice competence and awareness was the highest. The reason is that microteaching helped them to develop an awareness of their teaching competence, and offered them real opportunities to discover their teaching strength and strategies. These findings are consistent with the ideas of Gogoi (2019) who stated that microteaching experiences assisted them in developing their teaching competence and made them aware of their pedagogical skills, to enhance both managerial and preparation skills and most of the pre-service teachers asserted that they did not find microteaching classes boring or time-consuming.

According to the levels of the perceptions of pre-service teachers towards microteaching, the results showed that most of the pre-service teachers possessed moderate levels of perceptions towards microteaching. Pre-service teachers had not only the strongest perceptions but also average perceptions of microteaching. In order to get a high level of perception of microteaching, pre-service teachers must be provided opportunities to practice their teaching that enable them to discover their potential abilities and bring these into classroom teaching situations. Pre-service teachers believe that microteaching gives them the opportunity to enhance their practical teaching experience. Thus, microteaching has positive merits in planning skills, personality, teaching practices, and teaching competences.

In accordance with the results of independent samples *t* test, there was no significant difference between the two groups (male and female) of the perceptions of pre-service teachers towards microteaching. This finding is relevant to the ideas of Chukwunyere, Chigozie, and Chibuike (2017) who stated that gender has no significant impact on student teachers' ability to benefit from and acquire a repertoire of teaching skills from microteaching practice. Therefore, gender was found to have no influence on the ability of the pre-service teachers to benefit from microteaching and use the appropriate teaching skills in practice.

Suggestions

According to the results of the study, the following suggestions were provided for pre-service teachers to improve their perceptions towards microteaching.

1. Pre-service teachers should study thoroughly during microteaching classes because it gives many advantages for them, especially in improving their teaching competencies.
2. Pre-service teachers should benefit the skills from microteaching courses which are related to designing lesson plans, managing classrooms, creating active teaching-learning processes, designing appropriate teaching-learning materials, answering students' questions, and evaluating students' responses.
3. Pre-service teachers should always be encouraged and advised when they perform their teaching in the microteaching class because feedback is really needed to raise their awareness of the areas they need to improve and boost their motivation to conduct teaching effectively.
4. Pre-service teachers should understand and prepare the appropriate lesson plans, after that they should observe the teaching practices to be able to overcome the inconsistency problem between lesson plans and their performance in the microteaching class.
5. Teacher educators should be provided with more trainings or workshops related to microteaching in order to prepare their pre-service teachers before entering the actual classes and to build the capacity of pre-service teachers' teaching competencies.
6. Teacher educators should pay attention more to the perceptions of preservice teachers towards microteaching on their pedagogical and professional competence because pedagogical and professional competence in microteaching have an important role in improving teaching practice.
7. Teacher educators should prepare their pre-service teachers to have good qualifications as future teachers.

Recommendations

It is hoped that this study will make a number of contributions to the improvement of the perceptions of pre-service teachers towards microteaching, especially in teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life in Myanmar.

Based on the findings of this study, there are some recommendations for further research. This study is only a survey within a short duration and it does not represent other Education Degree Colleges in Upper Myanmar. No study is perfect and so further study is quite necessary. There are (25) Education Degree Colleges in Myanmar. In this study, the sample Education Degree Colleges were selected from Bago and Yangon Regions. Therefore, further studies should be carried out for other States and Regions.

Participants in this study were Second Year, First Semester pre-service teachers from the selected Education Degree Colleges. Moreover, if Third Year and Fourth Year pre-service teachers are analyzed for the study, the findings of the perceptions of pre-service teachers towards microteaching will be more valid. In addition, future studies should be conducted with a larger sample size from different Education Degree Colleges to be more generalized, reliable, and valid. Moreover, this study was based only on the perceptions of pre-service teachers towards microteaching. There are many previous researches on the perceptions of teacher educators towards microteaching in other countries and thus, in Myanmar, and it also needs to study the perceptions of teacher educators towards microteaching.

Conclusion

The major purpose of this research is to investigate the perceptions of pre-service teachers towards microteaching in teaching practice classes. In this study, four Education Degree Colleges from Bago and Yangon regions were selected as the sample by using simple random sampling method. These four selected Education Degree Colleges are Pyay EDC, Taungoo EDC, Yankin EDC, and Hlegu EDC. All the participants were Second Year, First Semester pre-service teachers from the selected Education Degree Colleges. This study included five dimensions for the perceptions of pre-service teachers towards microteaching namely teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life.

Based on the research findings, it can be concluded that pre-service teachers have thorough knowledge of microteaching in terms of teaching practice competence and awareness, preparation and management, personal feelings, teaching practice, and effectiveness of microteaching in their professional life. According to Khan et al., (2021), microteaching is a training technique to train pre-service teachers so that they can learn and upgrade their skills. Microteaching should be used in the majority of pre-service teachers' training programs to prove that it has some effects in improving the instructional skills of the teachers. Thus, pre-service teachers should have a good perception of microteaching in Education Degree Colleges. Therefore, this study can be hoped to support to some extent for improving the positive perceptions of pre-service teachers towards microteaching in Myanmar.

Acknowledgements

We would like to express 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) who allowed us to do this study.

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A STUDY OF GRADE SEVEN STUDENTS' BASIC SCIENCE PROCESS SKILLS, ATTITUDE TOWARDS SCIENCE, AND SCIENCE ACHIEVEMENT

Thet Su Lwin¹ and Wai Wai Oo²

Abstract

The main aim of the study was to investigate the relationship between the level of students' basic science process skills and science achievement and to investigate the relationship between students' attitude towards science and science achievement. Survey research design, one of the quantitative research designs, was used in this study. And, this study was restricted to two Basic Education High Schools in Sagaing Township. The participants were (228) Grade Seven Students from No (1) Basic Education High School and Shwe Min Wun Practicing High School. These schools were selected by using simple random sampling method. In the collection of data, Basic Science Process Skills Test, Science Achievement Test and questionnaires for Attitude towards Science were employed. The quantitative data were analyzed by using descriptive statistics (means, standard deviations, frequency and percentage). And then, Pearson Product Moment correlation was used to examine the relationship between the level of students' basic science process skills and their science achievement and the relationship between students' attitude towards science and their science achievement. The results revealed that most of Grade Seven students were competent in communicating skill among the six skills. The results also showed that many students were interested in science activity. Moreover, the results stated that most of the students were strong in understanding level among six levels. It was found that there is significant and moderate positive relationship between the level of Grade Seven students' basic science process skills and their science achievement. It was also found that there is significant and weak positive relationship between Grade Seven students' attitude towards science and their science achievement. It can be concluded that the more the students are good at basic science process skills, the higher they achieve in science achievement.

Keywords: attitude, science process skills, basic science process skills, science achievement

Introduction

Students are naturally curious, which makes science an ideal subject for them to learn. Science allows students to explore their world and discover new things. It is also an active subject, containing activities such as hands-on labs and experiments. This makes science well-suited to active younger children. Science is an important part of the foundation of education for all children. Therefore, basic education system that will develop productive and responsible citizens equipped with the essential competencies, skills and values for both life-long learning and employment.

Development of basic science process skills is important as well as development of proper scientific attitude and values. Science education aims to train students to think like scientists and emphasis would be expected on the development of attitude that good scientists are able to display. One of the purposes of teaching is inculcation of desirable attitudes and values (Pacia, 2014). Process skills and attitude towards science are important elements that may influence students' achievement. Science process skills are significant in improving students' cognitive development and facilitating students' active participation during the teaching and learning process. Attitude towards science is positively correlated with science achievement (Papanastasiou & Zembylas, 2004).

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Developing mastery in basic science process skills and positive attitude towards science is aiming for quality students' achievement. The students' performance (academic achievement) according to Mustaq and Khan (2012) plays an important role in producing great leader and manpower for the country responsible for the country's economic and social development. Therefore, this study is to identify the relationship between the level of the students' basic science process skills and their science achievement and the relationship between students' attitude towards science and their science achievement.

Purpose of the Study

The main purpose of the study is to investigate a study of grade seven students' basic science process skills, attitude towards science, and science achievement. The specific objectives of the study are as follows:

- To find out the level of the students' basic science process skills in terms of observing, communicating, classifying, measuring, inferring and predicting
- To investigate the attitude of students towards science in terms of teaching strategy, academic value, science activity and classroom environment
- To explore the science achievement of students in terms of cognitive process dimensions: remembering, understanding, applying, analyzing, evaluating and creating
- To examine the relationship between the level of the students' basic science process skills and science achievement
- To determine the relationship between students' attitude towards science and science achievement
- To give suggestions and recommendations based on the findings

Research Questions

The research questions of this study are as follows:

1. To what level do the students' basic science process skills differ in terms of observing, communicating, classifying, measuring, inferring and predicting?
2. What are the differences in attitudes of students towards science in terms of teaching strategy, academic value, science activity and classroom environment?
3. To what level do the science achievement of students differ in terms of cognitive process dimensions: remembering, understanding, applying, analyzing, evaluating and creating?
4. To what extent is there a relationship between the level of the students' basic science process skills and science achievement?
5. To what extent is there a relationship between students' attitude towards science and science achievement?

Definition of Key Terms

Attitude

Attitude is defined as a psychological tendency to evaluate an entity, and which is composed of emotional, cognitive, and behavioral components (Newbill, 2005).

Science process skills

Science process skills refer to skills or abilities that must be owned by the scientists on the process of scientific discovery (Chebii, 2011).

Basic science process skills

Basic science process skills include observing, communicating, classifying, measuring, inferring and predicting (Chebii, 2011).

Science achievement

Science achievement has been defined as a level of proficiency attained in scientific work or as formally acquired knowledge in science, which is often represented by percentage of marks obtained by students in examinations (Kohli, 1975, cited in Mehdipour & Balaramulu, 2013).

Scope

This study is geographically restricted to two Basic Education High Schools in Sagaing Township. Research participants are (228) Grade Seven students from No (1) Basic Education High School and Shwe Min Wun Practicing High School within 2022-2023 Academic Year.

Review of Related Literature**Importance of Science**

Education is characterized by a number of features that contrast greatly with education of, say, 50 years ago. First, learning is not understood in the way it was earlier. Today considerations of learning are not restricted to a selected type of methodologies but employ a plethora of methods, strategies, and approaches. Secondly, learning contexts today often encompass a diversified group of people, of different age, gender, social and professional backgrounds, and participating in education- schooling or training-for a very wide range of reasons. And a dramatically growing field of education is online learning, offering courses to endlessly diversified audiences located in very distant countries. The field of learning science is nowadays characterized by diversity in terms of learners, learning environments, and learning methods. As a consequence of these multiple diversities, there is a growing demand for interdisciplinary and advanced research on education in order to foster the processes of acquiring knowledge in different settings and for different audiences, as well as to enhance the potential of educational institutions in a world that has no effective geographic boundaries (Lederman, Khalick & Schwartz, 2015).

Science is now an accepted, indeed often a core, part of the school curriculum around the world. However, no matter how much time is put aside for teaching science, there always has to be a severe selection of material as there is much more potential science content than could realistically be fitted within a pupil's school career. In selecting curriculum, we should always keep our purposes in mind for teaching science. There are a number of good reasons that might be suggested for teaching science. In particular it is worth considering the following arguments:

- It is important to teach science because of the need for future scientists, engineers, technologists, and others who will need a strong science background for their work.
- It is important to teach science as it is an important aspect of modern culture and everyone should appreciate this aspect of culture.

- It is important to teach science because a knowledge of science is needed for citizenship in modern technological societies (Taber, 2017).

Science Process Skills and Science Achievement

Science process skills are a set of skills commonly used by scientists and others for conducting scientific inquiry. These process skills are classified into two as basic and integrated skills. Basic science processing involves observing, question raising, measuring, communicating, classifying, predicting and inferring. Integrated science process skills require controlling variables, defining terms operationally, formulating hypotheses, interpreting data, and formulating models. The basic and integrated skills together improve the thinking and reasoning abilities. Academic achievement of pupils refers to the knowledge attained and skills developed in school subjects. So, academic achievement in science means the achievement of students in the science subjects in relation to their knowledge, attaining ability or degree of competence in school tasks usually measured by standardized tests and expressed in grades or units based on pupil's performance (Suman, 2020).

Science Process Skills are essential for teaching science content knowledge and scientific inquiry because teachers who have a poor understanding of the science process skills are less likely to have a positive attitude towards them and are, therefore, less likely to teach them to their students (Cain, 2002 cited in Raj & Devi, 2014). Science Process Skills instruction also promotes positive attitudes toward science among students; thus, the avoidance of teaching the process skills can be detrimental (Bilgin, 2006 cited in Raj & Devi, 2014).

The development of teaching that students acquire knowledge, skills and scientific attitude and higher achievement can be arranged for students to participate in most activities and take action on their own. Teachers are those who have a critical role in promoting learning and development activities for the students to learn science process skills and have fun in learning science to achieve the goals set course (Ngiamjit, 2016).

Both basic and integrated scientific skills are important in any scientific investigation such as conducting projects and carrying out experiments. Appropriate selections of science process skills can be taught and studied in the early years of primary school. The young students can be given the opportunity to observe, handle things and explore the environment (Ango, 2002 cited in Chinyere et al., 2020).

Attitude towards Science and Science Achievement

Many research studies confirm the positive correlations between students' achievement in science subjects and positive attitudes toward science. Students who have positive attitudes show increased attention to classroom instruction and participate more in science activities (Osborne, Simon & Collins, 2003 cited in Said, Adam & Hannieh, 2018). The fact that science teaching is most commonly associated with a laboratory, which is part of the physical environment, may favor the positive impact of physical environment on students' attitude and achievement. Therefore, researchers mostly report positive correlations between school environment and students' achievement.

Several studies showed that students' attitude have a relationship with teaching method and academic performance. Litke's (1995 cited in Luntungan, 2012) study showed that students have

various attitudes that are closely related to teaching methods. Sadi and Cakiroglu's (2011 cited in Luntungan, 2012) study also found that the method used seemed to affect students' attitude toward the class, and this may be the most influenced factor in learning. A study by Akkuzu and Akcay (2011 cited in Luntungan, 2012) showed a relationship between students' attitude and their academic performance. They suggested that students' positive attraction toward certain kinds of teaching may help increase their academic performance. Eastman, Iyer, and Eastman (2011 cited in Luntungan, 2012) suggested that when students have a positive attitude toward something, they will do the task well. Students' attitude towards science is an important factor that is associated with achievement in science. Parker and Gerber (2000 cited in Ali & Awan, 2013) explained that attitude towards science are very important for the achievement in science because the attitudes and achievement lead to the selection of careers by the students.

Research Method

Research Design

This study aims to investigate the effect of basic science process skills and attitude towards science on grade seven students' science achievement. The design used in this study is survey research design which is one of the quantitative research designs. In this study, data were mainly collected through a quantitative method.

Subjects

The samples of the study were (228) Grade Seven students from No (1) Basic Education High School and Shwe Min Wun Practicing High School. The schools were selected by using simple random sampling method. The sample size for two high schools was presented in the table 1.

Table 1 The Sample Basic Education High School and Sample Size

Name of Basic Education High School	Sample Size
No (1) Basic Education High School	127
Shwe Min Wun Practicing High School	101
Total	228

Instruments

This section describes the instruments used in the current study. The main instruments of the study are Basic Science Process Skills Test, questionnaires for Attitude towards Science and Science Achievement Test. Basic Science Process Skills Test and questionnaires for Attitude towards Science were based on Maranan, (2017) : "Basic Process Skills and Attitude toward Science: Inputs to an Enhanced Students' Cognitive Performance". Basic Science Process Skills Test was developed in terms of observing, communicating, classifying, measuring, inferring and predicting levels and included (30) items. Questionnaires for Attitude towards Science were developed under four dimensions: (1) Teaching Strategy, (2) Academic Value, (3) Science Activity and (4) Classroom Environment. Moreover, this questionnaire for attitude towards science was developed: strongly disagree, disagree, undecided, agree and strongly agree on a five-point Likert scale. There were (20) items and two open-ended questions in questionnaire for attitude towards science. Science Achievement Test was structured with (30) items according to cognitive process dimensions such as remembering, understanding, applying, analyzing, evaluating and creating.

Science Achievement Test was based upon Chapter 5 and 6 of Grade Seven Science Textbook (New Curriculum).

Procedure

Firstly, in order to get the required data, the instruments were constructed under the guidance of the supervisor. After preparing the tests and questionnaire, an expert review was conducted by two expert teachers who have special knowledge from the Department of Curriculum and Methodology, Sagaing University of Education. After that, tests and questionnaire were modified. And then, pilot testing was conducted with thirty grade seven students at No (3) Basic Education High School. By computing the results of basic science process skills test from pilot testing, four items were removed from (30) items of basic process skills test to be reliable. For the internal consistency reliability, Cronbach's alpha coefficient for questionnaire and Kuder-Richardson coefficient for two tests were used. The reliability coefficient of questionnaire was 0.852. The reliability coefficients of basic science process skill test and achievement test are 0.613 and 0.641. According to Taber (2016), the reliability value 0.8 or greater is a good level and the reliability value 0.6 or greater is acceptable level. Therefore, the questionnaire and tests were used in the main study. And then, the permission of principals was requested to distribute the instruments to all participants of two Basic Education High Schools and administered with the help of grade seven students of the respective Basic Education High School in October 2022. After two weeks, all the instruments were returned, and then the data were entered into a computer data file and were analyzed by using the Statistical Package for the Social Science (SPSS 25).

Data Analysis

The quantitative data was analyzed by using descriptive statistics (means and standard deviation) to examine attitude towards science. Descriptive statistics (means, percentage and frequency) were used to assess students' level of basic science process skills and science achievement. In order to examine the relationship between the level of the students' basic science process skills and their science achievement and the relationship between students' attitude towards science and their science achievement, Pearson product moment correlation was used.

Research Findings

Descriptive Statistics of Level of Students' Basic Science Process Skills

To examine the level of students' Basic Science Process Skills, descriptive statistics were used. Table 2 showed the mean of Basic Science Process Skills on each dimension.

Table 2 Mean Scores of Basic Science Process Skills of Grade Seven Students

Basic Science Process Skill	N	Mean	SD
Observing	228	3.47	0.75
Communicating	228	4.98	0.15
Classifying	228	3.98	0.95
Measuring	228	3.83	1.19
Inferring	228	1.77	0.46
Predicting	228	3.23	0.97

According to the results, the mean of communicating skill was the highest (4.98) and inferring skill has the lowest mean (1.77). The level of means for each dimension was illustrated in Figure 1.

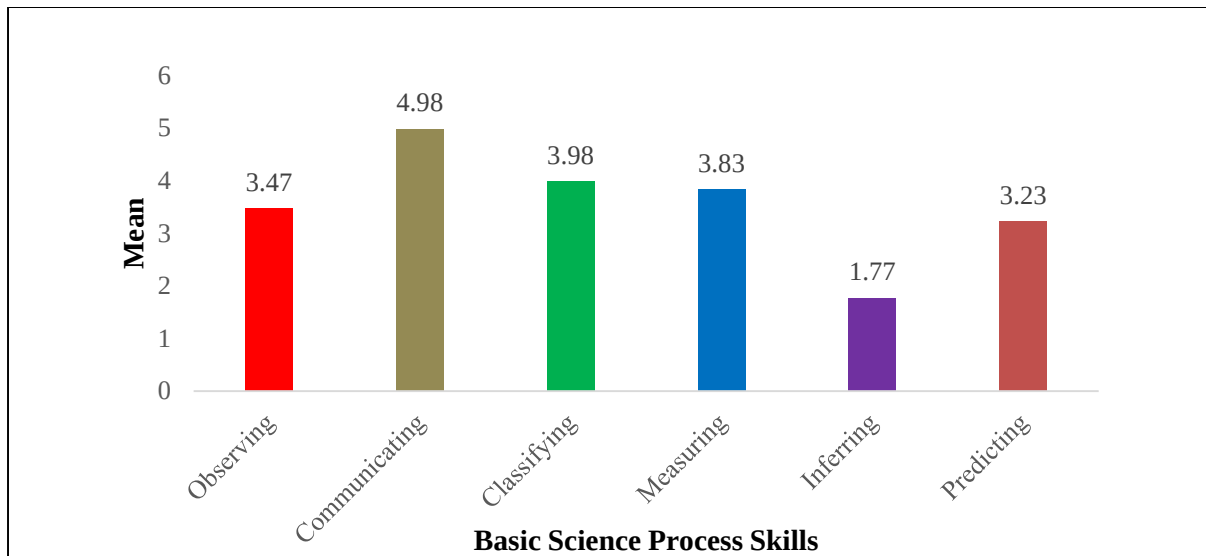


Figure 1. Mean comparison on each dimension of basic science process skills.

According to Figure 1, it was found that the mean of communicating skill had the highest mean among six basic science process skills.

Table 3 *Analysis of Level of Students' Basic Science Process Skills*

Score	Obs		Com		Class		Meas		Infer		Pred		
	f	%	f	%	f	%	f	%	f	%	f	%	
5					86	37.7	83	36.4			22	9.6	M
4	136	59.6	5	2.2	63	27.6	65	28.5			68	29.8	NM
3	68	29.8	223	97.8	71	31.1	53	23.2			83	36.4	MTM
2	20	8.8			5	2.2	16	7.0	180	78.9	50	21.9	MTM
1	3	1.3			3	1.3	7	3.1	44	19.3	5	2.2	LM
0	1	0.4					4	1.8	4	1.8			NM
Total	228	100	228	100	228	100	228	100	228	100	228	100	

Note. 5 = Mastered (M); 4 = Near Mastery (NM); 3 = Moving Towards Mastery (MTM); 2 = Moving Towards Mastery (MTM); 1 = Low Mastery (LM); 0 = No Mastery (NM); Obs = Observing; Com = Communicating; Class = Classifying; Meas = Measuring; Infe = Inferring; Pred = Predicting.

According to Table 3, about 80 students were mastered in classifying and measuring skills. In predicting skill, 22 students were mastered. About 60 students were near mastery in classifying, measuring and predicting skills and 136 students were also near mastery in observing skill. 223 students were moving toward mastery in communicating skill. Then, 88 students in observing skill, 76 students in classifying skill, 69 students in measuring skill and 133 students in predicting skill were moving toward mastery. A few students were low mastery in all skills except communicating skill and also are no mastery in observing, measuring and inferring skills. Table 4 showed the means and standard deviation of the attitude of students towards science.

Descriptive Statistics of the Attitude of Students towards Science

To examine the attitude of students towards science, descriptive statistics were used. Table 4 showed the mean and standard deviation of attitude towards science on each dimension.

Table 4 Mean Scores of the Attitude of Students towards Science

Attitude towards science	N	Mean	SD	Minimum	Maximum
Teaching Strategy	228	20.00	3.13	9	25
Academic Value	228	20.15	2.75	11	25
Science Activity	228	20.40	2.96	8	25
Classroom Environment	228	16.84	4.13	5	25

According to Table 4, the mean score of students' attitude towards science was the highest in science activity (20.40) and it was followed by the mean scores of students' attitude towards science in academic value (20.15), teaching strategy (20.00) and classroom environment (16.84). The comparison of the mean for each dimension was presented in Figure 2.

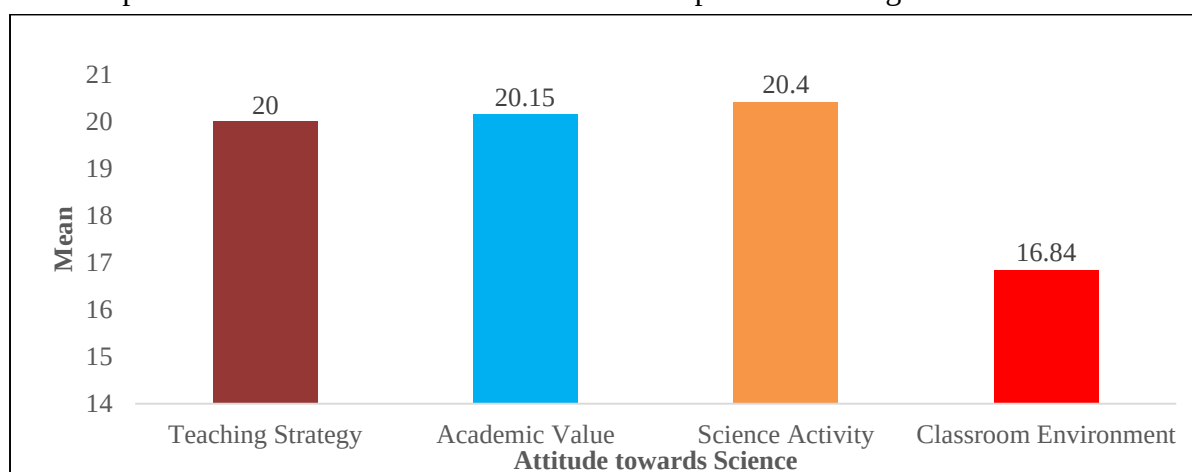


Figure 2. Mean comparison of the attitude of students towards science.

According to Figure 2, mean comparison of the attitude of students towards science can be seen clearly.

Descriptive Statistics of the Level of Students' Achievement in Science

To examine the level of students' achievement in science, descriptive statistics were used. Table 5 showed the mean of cognitive process dimensions on each dimension.

Table 5 Mean Scores of Cognitive Process Dimensions of Grade Seven Students

Cognitive Process Dimension	N	Mean	SD
Remembering	228	4.65	0.68
Understanding	228	4.72	0.68
Applying	228	4.16	1.32
Analyzing	228	3.73	1.35
Evaluating	228	4.07	1.09
Creating	228	3.41	1.61

According to the results, the mean of understanding was the highest (4.72) and creating has the lowest mean (3.41). The level of means for each dimension was illustrated in Figure 3.

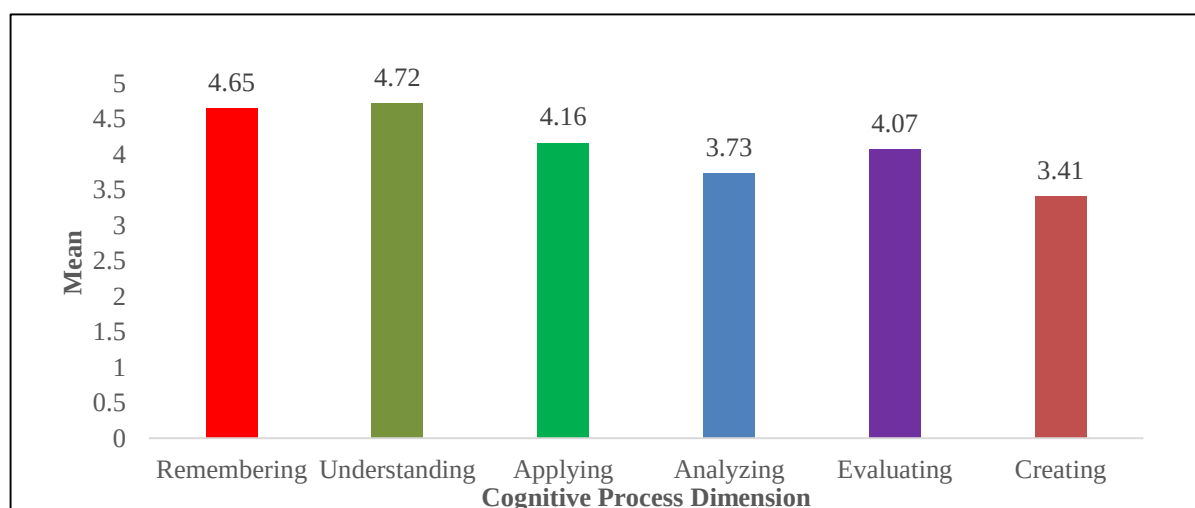


Figure 3. Mean comparison on each dimension of cognitive process dimensions.

According to Figure 3, the mean of understanding had the highest mean among six cognitive process dimensions.

Table 6 Analysis of Level of Students' Achievement in Science

	Rem		Und		App		Ana		Eva		Cre		
Score	f	%	f	%	f	%	f	%	f	%	f	%	
5	169	74.1	191	83.8	152	66.7	83	36.4	110	48.2	89	39.0	O
4	44	19.3	13	5.7			64	28.1	51	22.4	35	15.4	VS
3	9	3.9	21	9.2	56	24.6	45	19.7	44	19.3	31	13.6	S
2	6	2.6	3	1.3	9	3.9	19	8.3	19	8.3	40	17.5	FS
1					2	0.9	6	2.6	3	1.3	19	8.3	DNME
0					9	3.9	11	4.8	1	0.4	14	6.1	DNME
Total	228	100	228	100	228	100	228	100	228	100	228	100	

Note. 5 = Outstanding (O); 4 = Very Satisfactory (VS); 3 = Satisfactory (S); 2 = Fairly Satisfactory (FS); 1 = Did not meet expectations (DNME); Rem = Remembering; Und = Understanding; App = Applying; Ana = Analyzing; Eva = Evaluating; Cre = Creating.

According to Table 6, it can be seen the number of students in line with their scores in each level. In remembering level, 169 students were outstanding, 44 students were very satisfactory, 9 students are satisfactory and 6 students were fairly satisfactory. In understanding level, 191 students were outstanding, 13 students were very satisfactory, 21 students were satisfactory and 3 students were fairly satisfactory. In applying level, 152 students were outstanding, 56 students were satisfactory, 9 students were fairly satisfactory and 11 students did not meet expectations. In analyzing level, 83 students were outstanding, 64 students were very satisfactory, 45 students were satisfactory, 19 students were fairly satisfactory and 17 students did not meet expectations. In evaluating level, 110 students were outstanding, 51 students were very satisfactory, 44 students were satisfactory, 19 students were fairly satisfactory and 4 students did not meet expectations. In creating level, 89 students were outstanding, 35 students were very satisfactory, 31 students were satisfactory, 40 students were fairly satisfactory and 33 students did not meet expectations.

Analysis of the Relationship between the Level of the Students' Basic Science Process Skills and Science Achievement

The Pearson-product moment correlation was utilized to find out the relationship between the level of the students' basic science process skills and science achievement. The results of Pearson-product moment correlation between the level of the students' basic science process skills and science achievement were presented in Table 7 in detail.

Table 7 Correlation between the Level of the Students' Basic Science Process Skills and Science Achievement

Basic Science Process Skills	Cognitive Process Dimensions					
	Rem	Und	App	Ana	Eva	Cre
Observing	.160*	.069	.196**	.266**	.124	.194**
Communicating	.099	-.062	-.005	-.052	.009	.038
Classifying	.208**	.115	.167*	.271**	.324**	.375**
Measuring	.099	.147*	.266**	.409**	.273**	.291**
Inferring	.081	-.064	.131*	.112	.109	.108
Predicting	.108	.037	.098	.195**	.110	.173**

Note. Rem = Remembering; Und = Understanding; App = Applying; Ana = Analyzing; Eva = Evaluating; Cre = Creating.

* $p < .05$. ** $p < .01$.

Table 7 revealed that the relationships of each dimension of basic process skills and each dimension of cognitive process dimensions were presented. Among them, there was a significant relationship and moderate correlation between measuring skill and analyzing dimension ($r = .409$, $p < .01$) at (.01) level. Moreover, there was a significant relationship and moderate correlation between classifying skill and creating dimension ($r = .375$, $p < .01$) at .01 level.

Table 8 The Relationship between the Level of the Students' Basic Science Process Skills and Science Achievement

Scale	Students' Basic Science Process Skills	Students' Science Achievement
Students' Basic Process Skills	1	.462**
Students' Science Achievement	.462**	1

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

According to Table 8, it was found that students' basic science process skills were significantly and positively related to students' science achievement ($r = .462$) at (.01) level. According to Mills and Gay (2016), the strength of correlation was moderate. It can be said that the better students are clever in basic science process skills, the more they achieve in science.

Analysis of the Relationship between Students' Attitude towards Science and Science Achievement

The Pearson-product moment correlation was utilized to find out the relationship between students' attitude towards science and science achievement. The results of Pearson-product moment correlation between students' attitude towards science and science achievement were presented in Table 9 in detail.

Table 9 Correlation between Students' Attitude towards Science and Science Achievement

Variables	Teaching Strategy	Academic Value	Science Activity	Classroom Environment
Remembering	.219**	.084	.279**	-.057
Understanding	.031	-.020	.063	-.006
Applying	.169*	.156*	.200**	-.102
Analyzing	.182**	.144*	.185**	-.185**
Evaluating	.297**	.144*	.270**	-.079
Creating	.366**	.279**	.337**	-.112

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

Table 9 revealed that the relationships of each variable of students' science achievement and each dimension of students' attitude towards science were presented. Among them, there was a significant relationship and moderate correlation between creating and teaching strategy ($r = .366$, $p < .01$) at .01 level.

Table 10 The Relationship between Students' Attitude towards Science and Science Achievement

Scale	Students' Attitude towards Science	Students' Science Achievement
Students' Attitude towards Science	1	.211**
Students' Science Achievement	.211**	1

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

It was found that students' attitude towards science was slightly related to students' science achievement ($r = .211$) at (.01) level. According to Mills and Gay (2016), the strength of correlation was weak.

Discussion and Suggestions

Discussion

In this section, the research findings of the study are described as follows:

1. To what level do the students' basic science process skills differ in terms of observing, communicating, classifying, measuring, inferring and predicting?

According to the findings, the biggest percentage of students were "moving towards mastery" in terms of communicating. The result may imply that using maps, graphical representations and diagrams which can help students to improve this skill. Most of the students were "near mastery" in terms of observing. Observing as fundamental science process skills is essential to the development of the other science process skills and the result may imply that students' mastery in observing greatly affects their mastery in other process skills. One-third of students were "mastered" in classifying skill. The result may imply that the students were competent in using different basic units in science so as that number of students were "mastered" in measuring skill. The result may imply that the students completely understood the different measuring instrument and solving simple conversion of units.

2. What are the differences in attitudes of students towards science in terms of teaching strategy, academic value, science activity and classroom environment?

Findings revealed that students have “positive attitude” in science in terms of teaching strategy. Students perceived their teacher as a person who is helpful, uses various instructional materials and makes science easy and funny. Majority of the students had “positive attitude” towards science in terms of academic value. The data may imply that the students know the importance of science. They also know that science is an important role in their everyday lives. They value science as a subject they work hard to implement their dreams. The data may imply that students had “positive attitude” in science in terms of science activity. Students are interested in science activities and enjoy and learn more when working in groups. Students had “positive attitude” towards science in terms of classroom environment. Their classrooms are enough to use laboratory classroom and those rooms have fairly useful laboratory instruments.

3. To what level do students’ science achievement differ in terms of cognitive process dimensions: remembering, understanding, applying, analyzing, evaluating and creating?

Over a half of students were “outstanding” in remembering. Many students may be good in memorizing. Almost 200 students were also “outstanding” in understanding. They pay attention to their teacher whenever she teaches them. One-third of students were outstanding in terms of applying. In analyzing, evaluating and creating level, over 80 students were also outstanding. Students who “did not meet expectations” were very few. As a result, there is a need to help that students improve in each dimension.

4. To what extent is there a relationship between the level of the students’ basic science process skills and science achievement?

It was found that there was a significant relationship between the level of the students’ basic process skills and science achievement. It can be said that the more they are clever in basic science process skills, the more they achieve in science.

5. To what extent is there a relationship between students’ attitude towards science and science achievement?

It was found that there was a low correlation between students’ attitude towards science and science achievement. It can also be said that there was a slight significance between students’ attitude towards science and science achievement.

Suggestions

From this study, it was found that there was a positive significant relationship between students’ basic science process skills and science achievement. This is consistent with the findings of (Suman, 2020) in which there is significant high positive correlation between basic process skills and achievement in science of the secondary school students. It has been proved that students’ basic process skills have an important influence on their science achievement. The more students’ competence in basic process skills, the more achievement in science. Science should be taught through experimentation and hands on activities so as to train the students in scientific enquiry and process skills of science. Students should be encouraged to design low-cost innovative apparatus and experiments to have a deeper understanding of scientific laws and principles. Teaching of science should not be confined within the four walls of classroom and laboratory. Rather they should be motivated to observe their surroundings and the natural phenomenon for developing the scientific attitude and basic process skills of science. Policy makers, curriculum developers and textbook writers and other stakeholders involved in science education should

modify the school science curriculum and textbooks so as to give more emphasis on the practical aspects of science. According to Raj (2014), science teachers should contribute to narrowing the gap between classroom science and its application to daily life by emphasizing the contributions that laboratory activities could make in raising the learners' various intellectual and procedural skill that are likely to be useful in their future careers. Through constant motivation and encouragement during the teaching-learning activities in science the students can re-conceptualize their perceptions about science learning and they will be more involved in the activities. Innovative and creative instructional styles may aid in facilitating a fun filled and enjoyable science environment. Student-centered strategies should be applied by science teachers or instructors to improve the achievement of students by emphasizing basic process skills and by giving them group activities that need collaboration effort.

This study revealed that there was low correlation and slightly significant relationship between students' attitude towards science and science achievement. In class activities, the importance should be given to learning-teaching status in order to prove students to learn the subject completely, and giving more time to individual activities would help students to improve positive attitudes towards learning the science. Students should be provided a chance to see and visit the science and natural museums. Therefore, students will be interested in these activities and will improve positive attitudes. In order to improve positive attitudes towards science, aims concerning the perception and senses should be incorporated in the curriculum and tried to be transformed to behavior. The studies examining the students' attitude and science achievement should be implemented to other groups with different ages, classes and places. Studies determining the teacher's attitude towards students can be recommended. Moreover, school support in the areas of building for science related activities like laboratories and e-classroom is needed.

Conclusion

The main purpose of the study was to investigate a study of grade seven students' basic science process skills, attitude towards science, and science achievement. Teachers should help their students to improve the skills which need to be clever. The students had homogeneity of positive attitude in all the items in the survey of attitude towards science. Most students have outstanding achievement in science. It was found that there was a positive significant relationship and moderate correlation between students' basic process skills and their science achievement. It was found that there was slightly significant and low correlation between students' attitude towards science and their science achievement. In conclusion, basic process skills are the skills that increase the permanence of learning. Learning attitude is concerned with learners' learning experiences, beliefs, values as well as a learner's educational background. The attitude of learning has great effect on the learning process and learning outcomes which determines a learner's success or failure to a great extent. Therefore, more attention should be paid to the problem of the students' attitude toward learning. Basic process skills are essential for all students' science achievement. Moreover, high positive attitude towards science of students plays an important role to improve in science achievement. Therefore, basic science process skills and attitude towards science are things that help students to achieve in science. By having competence in science, the students will be good citizens who can contribute to the public regarding with their science knowledge.

Acknowledgements

We would like to express our honorable appreciation 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) who gave us permission to carry out the study. We would like to express our great thanks to Dr. Soe Than (Retired Professor, Department of Curriculum and Methodology, Sagaing University of Education) for giving us expert encouragement and supervision. Moreover, we would like to be grateful to our teachers, 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 validation, advice and guidance for the study.

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AN INVESTIGATION INTO STUDENTS' PERCEPTIONS OF TEACHER INTERACTION WITH STUDENTS IN THE MIDDLE SCHOOL SCIENCE CLASSROOMS

Lin Htet San¹ and Khin Mar Khine²

Abstract

The main purpose of this study is to investigate the students' perceptions of teacher interaction with students in the middle school science classrooms. In this study, the descriptive research design was used. The six Basic Education High Schools were selected from Taungoo Township by using simple random sampling method. The participants were 302 Grade Six students from the selected schools. The questionnaire was used as an instrument in this study. In the data analysis, the data were analyzed by using descriptive statistics (percentage) to compare the mean differences on the students' perceptions of teacher interaction in four scales of the questionnaire. Moreover, the data were analyzed by using independent samples *t*-test to compare the differences between male and female in students' perceptions of teacher interaction. In the first part, the results of this study showed that most of the students in Basic Education High School perceived a moderate level in perceptions of teacher interaction. In the second part, the results of this study showed that there were no significant differences between male and female on students' perceptions of teacher interaction in science classroom. Therefore, the research findings proved that the students had positive attitudes towards teacher interaction in the science classroom. In addition, this study is expected to enhance the students' positive perceptions of teacher interaction in all schools in Myanmar.

Keywords: Perception, Teacher Interaction, Interpersonal Behavior, Leadership, Teaching Behavior

Introduction

Teaching offers a bright and rewarding career for those who can meet the intellectual and social challenges of the job. Therefore, the task of teaching the young is simply too important and complex to be handled entirely by parents or through the informal structures of earlier eras. Hence, the modern society needs schools staffed with expert teachers to provide instruction and to care for children when parents work. In society, teachers are given professional status. As professionals, they are expected to use best practice to help students learn essential skills and attitudes. It is no longer sufficient for teachers to be warm and loving toward children, nor it is sufficient for them to employ teaching practices based solely on intuition, personal preference, or conventional wisdom (Arends, 2012).

The way teachers talk and communicate with students affects greatly the behavior of students and interaction in the classroom. And then, good communication generates a climate conducive to quality learning as students are willing to cooperate and demonstrate positive discipline. However, when teachers find their students are being boisterous, destructive and even revengeful, they may become frustrated and annoyed. Thus, the teachers should not only invite students to talk and share but also need to be good listeners. Furthermore, they have to show acceptance of students' strong emotions and feelings and be patient in listening to them, and need to trust that their students can solve their own problems. Therefore, establishing and maintaining good teacher-pupil relationships is crucial for student cooperation and effective teaching and learning (Ming-tak & Wai-shing, 2008).

Background of the Study

Education provides individuals with the opportunity to improve their lives, become successful members of their communities and actively contribute to national socio-economic

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development. In Myanmar society, education is traditionally valued as a key determinant for social mobility and it is widely recognized as a critical building block for nation building, national unity and sustainable development (Ministry of Education, 2016). In the basic education sub-sector, teachers will play a key role in the successful roll-out of the new curriculum, as well as adoption of new interactive pedagogy and application of a new assessment system.

Therefore, the teachers need to plan how they will treat students fairly and with respect. To do so, the teachers must make a plan for teaching students to make wise choices and training them that all of their decisions carry consequences. Moreover, the teachers also need to consider where they might need to make changes to their actual instructional practices in order to prevent behavioral issues that might occur. And then, the teachers should encourage children in areas of both strengths and weaknesses and find ways to recognize each child as special. Furthermore, they should avoid the natural tendency to compare one child with another. As every teacher knows, students often enter a classroom with a multitude of problems that can get in the way of learning. Moreover, they may also be experiencing anxiety about something going on at home, a situation with the peer group, a future test in another class, or other concerns. Therefore, the teacher should plan strategies that do not result in anxiety. Rather than the typical practice of calling a name, asking a question, and expecting the answer, a few more successful strategies should be used such as allowance for sufficient think time; allocated time for sorting notes or cards related to the questions beforehand; or permitting partners to think of the answer together before calling on students to answer the question. In sum up, the teachers should offer procedures for students to seek help during activities (Walters & Frei, 2007).

Purpose of the Study

The main purpose of this study is to investigate students' perceptions of teacher interaction with students in the middle school science classrooms. The specific objectives are as follows:

1. To investigate students' perceptions of teacher interaction with students in the middle school science classrooms through comparison of mean differences in four scales of the questionnaire
2. To examine the differences between male and female on students' perceptions of teacher interaction with students in the middle school science classrooms
3. To suggest ways for developing the middle school students' perceptions of teacher interaction

Research Questions

1. Are there any significant differences in the students' perceptions of teacher interaction with students through comparison of mean differences in four scales of the questionnaire?
2. Are there any significant differences between male and female on the students' perceptions of teacher interaction with students in the middle school science classrooms?

Scope of the Study

1. This study is geographically restricted to Taungoo Township in Bago Region (East).
2. Sample schools are selected by using random sampling method.
3. Participants of this study are 302 Grade Six students from the selected schools in the academic year (2022-2023).

Definition of Key Terms

Perception: Perception is defined as the process of information extraction to determine how humans interpret their surroundings (Forgus & Melamed, 1976).

Teacher interaction: Teacher interaction is defined as the good interaction between teachers and students that will create positive relationships in the classroom and contribute to effective learning (Ahmad, Shaharim & Abdullah, 2016).

Interpersonal Behavior: The interpersonal behavior is defined as a prerequisite for engaging students in learning activities and a crucial element in the teaching-learning process (Telli, den Brok & Cakiroglu, 2017).

Leadership: Teacher leadership is defined as the teachers extend their influence beyond their own classrooms while continuing to teach students, and the motivation for assuming leadership varies (Arends & Kilcher, 2010).

Teaching behavior: Teaching behavior is instructionally supportive (e.g., providing opportunities for students to respond, to choose, or to receive positive feedback) promotes academic achievement (Curby, Rudasill, Edwards, & Perez-Edgar, 2011).

Significance of the Study

The teacher-student relationship, in all educational systems, is a key feature of an effective instructional environment that has extensively studied from many perspectives. Thus, the students' perception of their teacher's behavior and of their relationship with the teacher are important not only for their school achievement but also for a larger perspective. Moreover, the studies on teacher-student relationship, as they are perceived by the students during the school years showed that learning experience related changes impact the students' perceptions of their teachers (Negovan, Raciuc & Vlad, 2010).

Furthermore, the communication in the classroom can be defined as the interchange of thoughts, feelings and information between the teacher and the pupils. Through good communication, the teacher motivates, guides and encourages student learning and without such interaction, good relationships cannot be established and maintained nor can the teacher meet pupils' needs. Thus, the good teachers must be able to communicate with students, colleagues, administrators, parents and many others. Moreover, teaching is not simply the delivering of knowledge, but requires a blending of competent teaching techniques and communication skills that motivate and encourage students to learn and through their effective use of communication skills teachers convey respect, care and concern for students. Therefore, the good teachers are good managers of communication (Ming-tak & Wai-shing, 2008).

Review of Related Literature

Theoretical Framework: Teacher interaction with students in the classroom depends on the interpersonal behavior of the teacher. The theories and systematic procedures used for the interpersonal behavior might be called a dynamic behaviorism (Leary, 1957). In the conceptualization of the interpersonal perspective on teaching, some concepts of the so-called systems approach to communication are important (Watzlawick, Beavin, & Jackson, 1967). Therefore, the theoretical framework for this study is based on behaviorism and communication theory.

Behaviorism: Behaviorism is a theory of animal and human learning that focuses upon the behavior of the learner and the change in behavior that occurs when learning takes place. Learning in the context of behaviorism can be defined as the acquisition of a new behavior or the modification of behavior as a result of teaching, training or tutoring. Behaviorism is supported by empirical data obtained through careful and controlled observation and measurement of observable behavior under laboratory conditions or within defined social environments such as the classroom, workplace, community hall and home. Behaviorism asserts that from conception the mind is influenced by the environment and experiences, and that the environment, experiences and actions of other people influence a person's motivation and behavior (Woollard, 2010).

Communication Theory: Interpersonal communication (IPC) is one of the most popular teaching subjects and research areas in communication studies. IPC is important to study for a number of reasons. First, people create meaning through communication - learn through communication with others and, more importantly, the communication with others influences how can think about and feel about. Second, IPC is important for practical reasons - need to be able to talk to people in order to get things done and make positive impressions. Third, IPC is important physically - people who have good interpersonal relationships are physically and mentally healthier. Fourth, humans are social animals, and IPC helps to fulfill the social needs - understanding the IPC process will provide insight into how relationships can be more successful and satisfying. Finally, IPC research is important because how people think they communicate in relationships and how they actually communicate in relationships are very different (Littlejohn & Foss, 2009).

Leary model of interpersonal behavior: Behavior which is related overtly, consciously, ethically, or symbolically to another human being is interpersonal. The interpersonal behavior refers to private perceptions, conscious reports, symbolic and unwitting expressions, as well as to overt actions. Leary (1957) believed that the way humans communicate is indicative of their personality. The Leary model of interpersonal behavior (1957) provided the measurement framework for the study. It basically states that people communicate according to two dimensions - Dominance-Submission and Cooperation-Opposition. Leary concluded that a person's interpersonal behavior could be described with two dimensions, which he named Proximity and Influence. The Proximity dimension could be indicated on a continuum that has cooperative behavior at one end and oppositional behavior at the other. The Influence dimension could be indicated on a continuum that has dominant behavior at one end and submissive behavior at the other. Adapting the Leary Model to the context of education, Wubbels, Creton and Hooymayers (1985) used the two dimensions, which they called Influence (Dominance-Submission) and Proximity (Opposition-Cooperation) to structure the perception of eight behavior segments: leadership, helpful/friendly behavior, understanding behavior, giving students freedom, uncertain, dissatisfied, admonishing, and strict behavior.

Interpersonal Teacher Behavior: Interpersonal behavior and communication style have long been thought of as important components of teacher effectiveness. Interpersonal communication can mean the ability to relate to people in written as well as verbal communication. This type of communication can occur in both a one-on-one and a group setting. Gestures such as eye contact, body movement, and hand gestures are also part of interpersonal communication. When students meet a teacher in a new class, they will be relatively open to any impression the teacher can make.

After the first lesson, the students will have tentative ideas about the pattern of relationship with this particular teacher. After a few lessons, tentative ideas about the teacher will have stabilized and students can tell what kind of teacher someone "is". It is essential that students perceive teachers as confident, in charge, and fair. For this to happen, the teacher must establish himself/herself as an appropriate authority figure and role model (den Brok, Brekelmans & Wubbels, 2004).

Teacher-Student Interactions: Good interaction between teachers and students will create positive relationships in the classroom and contribute to effective learning. In fact, effective teachers can assess changes in students' behavior and understand the needs of students in the classroom. Moreover, the teachers can shape the classroom environment to be comfortable and therefore improve the ability of students to learn. Conducive classroom environment emphasizes cooperation and openness between teachers and students. Therefore, in learning and teaching especially science subjects, students should be allowed to interact with teachers, classmates and surroundings. Interaction with the environment during learning process will stimulate all students' senses and encourage students to learn in a creative and innovative way. Communication is crucial for good teacher-pupil relationships. Communication in the classroom can be defined as the interchange of thoughts, feelings and information between the teacher and the pupils. Through good communication, the teacher motivates, guides and encourages student learning; and without such interaction, good relationships cannot be established and maintained nor can the teacher meets pupils' needs. The way teachers talk and communicate with students affects greatly the behavior of students and interaction in the classroom. Good communication generates a climate conducive to quality learning as students are willing to cooperate and demonstrate positive discipline. Establishing and maintaining good teacher-pupil relationships is crucial for student cooperation and effective teaching and learning (Ming-tak & Wai-shing, 2008). Therefore, the teacher-student interpersonal behavior is a crucial element in the teaching learning process in any country. The teachers' behavior such as compliments and punishment have a strong impact on students' learning.

The Validity and Development of the Questionnaire on Teacher Interaction (QTI): Wubbles, Creton and Hooymayers, (1985) developed a model to map interpersonal teacher behavior extrapolated from the work of Leary (1957). This model has been used in Netherlands in the development of an instrument, the Questionnaire on Teacher Interaction (QTI). The original version of the QTI in Dutch language consisted of 77 items. After extensive analysis, the 77-item Dutch version was reduced to a 64-item version. Later an Australian version of the QTI containing 48 items was developed (Fisher, Henderson, & Fraser, 1995). The behavior aspects measured by QTI are Leadership, Helping/Friendly, Understanding, Student Responsibility/Freedom, Uncertain, Dissatisfied, Admonishing and Strict. Fisher, Rickards, Goh and Wong (1997, cited in Koul & Fisher, 2004) carried out a study by using QTI which was involving 720 students in Singapore and 705 students in Australia. Khine and Fisher (2001, cited in Koul & Fisher, 2004) administered the QTI to 1188 students from 54 science classes in Brunei. This study provided further validation data on QTI and indicated that this tool is a valid and reliable instrument to be used in this context (Koul & Fisher, 2004). In this study, only the four of the eight scales are used to investigate teacher-student interactions. The four scales used in this study are leadership, helping/friendly, understanding and strict. The specific meaning for each of the four scales describes as follows:

- (i) Leadership - the extent to which teacher provides leadership to class and holds student attention.
- (ii) Understanding – the extent to which teacher shows understanding, concerning and caring to student.
- (iii) Helping/Friendly – the extent to which teacher is friendly and helpful towards student.
- (iv) Strict – the extent to which teacher is strict with and demanding student.

Research Method

The main purpose of the study is to investigate the students' perceptions of teacher interaction with students in the middle school science classrooms. This section is concerned with research design and procedure, population and sample size, instrument and data analysis.

Research Design and Procedure

The research design for this study was a descriptive design and sought to investigate the students' perceptions of teacher interaction with students in the middle school science classrooms. In this study, data were collected through a questionnaire. After the research design was selected, the instrument was used to investigate students' perceptions of teacher interaction. All of the items in Questionnaire on Teacher Interaction (QTI) developed by Fisher, Henderson and Fraser (1995) were adapted to Myanmar nature. After preparing the items for each category, expert teachers' review was conducted for questionnaire validity. A review for instrument was undertaken by eight experienced teacher educators from Department of Curriculum and Methodology, Yangon University of Education. And then, the pilot testing was conducted and the internal consistency (Cronbach's alpha) of Questionnaire on Teacher Interaction (QTI) is (0.79). Therefore, the main study was conducted in November, 2022.

Population and Sample Size

The samples for this study were chosen from six Basic Education High Schools in Taungoo Township. Though there are three districts in Bago Region (East), one district was randomly selected for this study. In Taungoo District, there are five townships. And then, one township was randomly selected from Taungoo District (see Table 1).

Table 1. Selected Township in Taungoo District

District	Township	Selected Township
Taungoo District	Taungoo Yedashe Oaktwin Htantabin Phyu	Taungoo

The sample schools for this study were selected by using the random sampling technique. The number of students selected were (302). Participants in this study are all Grade Six students. Table 2 shows the sample size of the selected schools.

Table 2. Sample Size

No.	Township	School	Number of participants
1	Taungoo	BEHS 1	39
2	Taungoo	BEHS 2	68
3	Taungoo	BEHS 3	35
4	Taungoo	BEHS 4	80
5	Taungoo	BEHS 5	37
6	Taungoo	BEHS 7	43
Total			302

Note: BEHS = Basic Education High School

Research Instrument

The instrument, the Questionnaire on Teacher Interaction (QTI) developed by Fisher, Henderson and Fraser (1995) was used for this study. In the questionnaire, closed-ended questions were used to avoid personal bias. The closed-ended questions were prepared based on five-point Likert scales ranging from (1) strongly disagree to (5) strongly agree. For this study, the questionnaire involved (24) items with four dimensions.

Data Analysis

The data were analyzed by using the Statistical Package for Social Sciences (SPSS). The mean, standard deviation and percentage were calculated to know the level of students' perceptions of teacher interaction. To compare the mean differences between the two groups (male and female) of Grade Six students, inferential statistics (independent samples *t*-test) was used.

Findings

This section is concerned with the findings based on the quantitative study. It includes two parts. The first part is the findings of students' perceptions of teacher interaction with students by comparing the mean differences and the second part is the findings of students' perceptions of teacher interaction with students between male and female students.

Findings of Students' Perceptions for the Comparison of Means in Each Scale

In order to examine the percentage of the low, moderate, and high level for the students' perceptions of teacher interaction with students in the middle school science classrooms, a descriptive statistics (percentage) was used. The percentage level of all participants' responses in leadership scale was presented in Table 3.

Table 3. Percentage of Levels for Students' Perceptions in Leadership

Level of students' perceptions	Score	No. of participants	Percentage (%)
Low	$x < 23.98$	40	13%
Moderate	$23.98 \leq x \leq 29.14$	230	76%
High	$x > 29.14$	32	11%
Total		302	100%

The result in Table 3 showed that most of the middle school students in Basic Education High School perceived a moderate level in science teachers' leadership scale. Thus, it can be interpreted that most of the students have the positive attitudes toward their science teachers' leadership. Table 4 shows the findings of the students' perceptions in understanding scale.

Table 4. Percentage of Levels for Students' Perceptions in Understanding

Level of students' perceptions	Score	No. of participants	Percentage (%)
Low	$x < 21.98$	30	10%
Moderate	$21.98 \leq x \leq 28.20$	238	79%
High	$x > 28.20$	34	11%
Total		302	100%

According to the above result, most of the middle school students in Basic Education High School perceived a moderate level in science teachers' understanding scale. The findings of the students' perceptions of teacher interaction in helping/friendly scale were presented in Table 5.

Table 5. Percentage of Levels for Students' Perceptions in Helping/Friendly

Level of students' perceptions	Score	No. of participants	Percentage (%)
Low	$x < 18.83$	35	12%
Moderate	$18.83 \leq x \leq 26.59$	223	74%
High	$x > 26.59$	44	14%
Total		302	100%

According to Table 5, most of the middle school students in Basic Education High Schools perceived a moderate level in science teachers' helping/friendly scale. Therefore, it can be interpreted that the science teachers are warm, helpful and friendly to the students. The findings of the students' perceptions of teacher interaction in strict scale were presented in Table 6.

Table 6. Percentage of Levels for Students' Perceptions in Strict

Level of students' perceptions	Score	No. of participants	Percentage (%)
Low	$x < 18.72$	41	14%
Moderate	$18.72 \leq x \leq 26.78$	205	68%
High	$x > 26.78$	56	18%
Total		302	100%

According to the above results, most of the middle school students in Basic Education High School perceived a moderate level in science teachers' strict scale.

Findings of Students' Perceptions for the Comparison of Means in Four Scales

In order to find out the students' perceptions of teacher interaction with students in the middle school science classrooms, the questionnaire was used with four scales. According to the results, the findings of the students' perceptions of teacher interaction were presented in Table 7.

Table 7. Means of Students' Perceptions of Teacher Interaction in the Selected Basic Education High Schools

Dimensions	No. of participants	Mean	Std. Deviation	Minimum	Maximum
Leadership	302	26.56	2.57	15	30
Understanding	302	25.09	3.10	10	30
Helping/Friendly	302	22.71	3.88	6	30
Strict	302	22.75	4.03	6	30

The mean comparison of students' perceptions on the four scales of teacher interaction was illustrated in Figure 1.

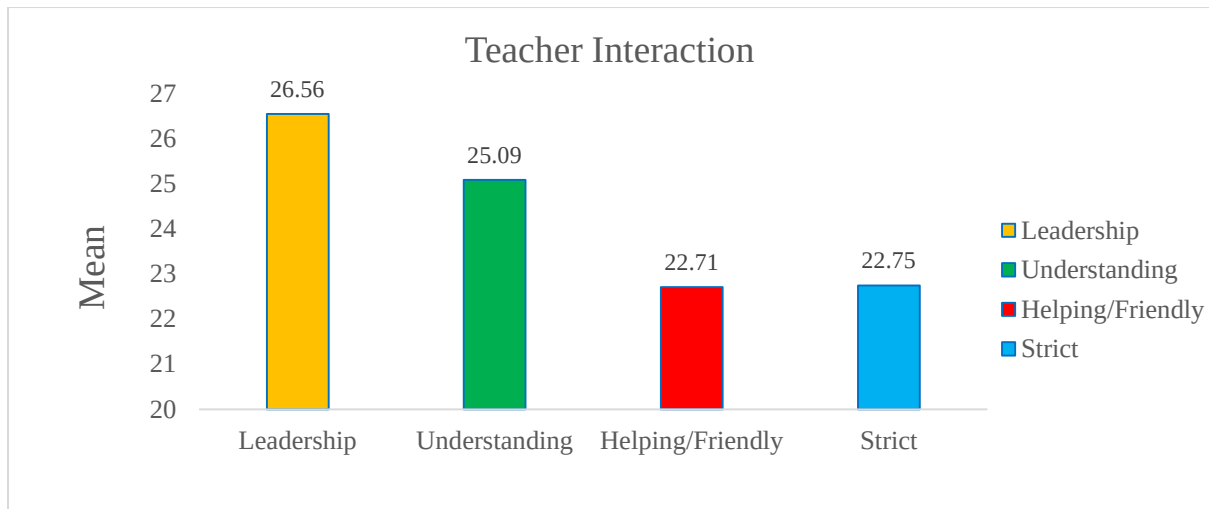


Figure 1. The Comparison of the Means of the Students' Perceptions on the Four Scales of Teacher Interaction

According to the results, the percentage of the low, moderate, and high level for the students' perceptions of their classroom environment was presented in Table 8.

Table 8. Percentage of Levels for Students' Perceptions of Teacher Interaction

Level of Students' Perceptions	Score	No. of Students	Percentage (%)
Low	$x < 94.63$	43	14%
Moderate	$94.63 \leq x \leq 108.75$	217	72%
High	$x > 108.75$	42	14%
Total		302	100%

Figure 2 shows the percentage of students' perceptions of teacher interaction.

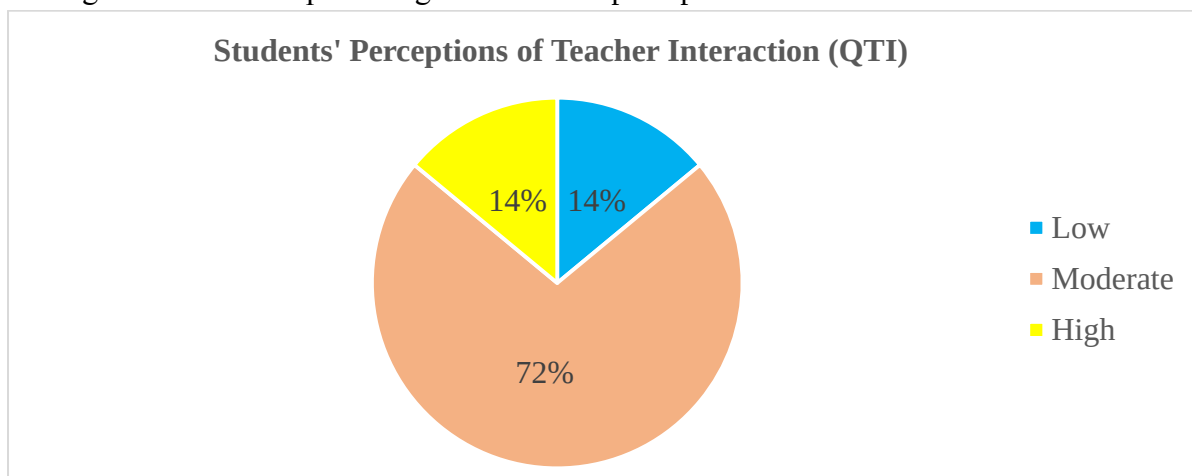


Figure 2. Students' Perceptions of Teacher Interaction

According to the above results, most of the students in Basic Education High School perceived a moderate level in perceptions of teacher interaction. According to Table 7, the highest mean and the lowest mean were (26.56) and (22.71) respectively. It can be interpreted that the mean of students' perceptions of the science teachers' leadership is the highest and that of helping/friendly is the lowest. Thus, the science teachers should help the students as much as possible. Moreover, the science teachers should treat the students with friendly mind.

Findings of Students' Perceptions of Teacher Interaction between Male and Female Students

By using independent samples *t*-test, the data were analyzed to compare the differences between male and female in students' perceptions of teacher interaction (See Table 9).

Table 9. Results of the Differences between Male and Female Students

Gender	N	Mean	Std. Deviation	Mean Difference	<i>t</i>	<i>df</i>	Sig. (2-tailed)
Male	163	97.15	11.384	.08	.07	300	.943 (ns)
Female	139	97.06	8.675				

Note: ns = not significant

According to the results, there was no significant difference between male and female for the students' perceptions of teacher interaction in the middle school science classroom and it was shown in Figure 3.

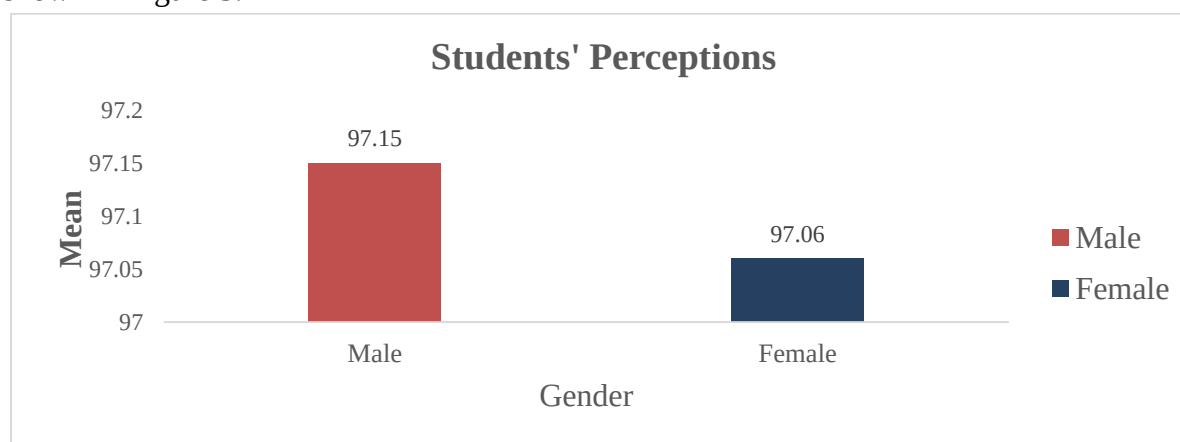


Figure 3. Comparison of Mean Scores on the Differences between Male and Female Students

Discussion

In this study, the comparison of the mean differences in four scales of the students' perceptions of teacher interaction can be investigated. According to the findings, the highest and the lowest mean scores were (26.56) and (22.71) respectively. The high mean scores proposed that the positive perceptions of teacher interaction. Thus, the students' perceptions were mostly positive in teachers' leadership and understanding. The mean scores for these two scales are (26.56), and (25.09) respectively. According to the results, it can be interpreted that the students' perceptions of teacher interaction were positive. Thus, this study recommended that the students' perceptions of teacher interaction can be determined by using the four scales to know their positive perceptions of teacher interaction in the middle school science classroom. This result is not in line with the study of Khine (2005) who studied the students' perceptions of teacher interaction in Singapore. According to his result, the students did not perceive positive interaction with their teachers and the students perceived their teachers to be in general authoritative in the classroom.

Moreover, this result is in line with the study of Henderson, Fisher and Fraser (1994) who studied the students' perceptions of teacher interaction. In their study, the students positively perceived science teachers' leadership, understanding and helping/friendly. Therefore, this study pointed out that the students' positive perceptions of teacher interaction can be determined by using the four scales in the questionnaire.

The data were analyzed by using independent samples *t*-test to compare the differences between male and female in students' perceptions of teacher interaction. According to the results,

there was no significant difference between male and female for the students' perceptions of teacher interaction. Therefore, it can be interpreted that the students' perceptions of teacher interaction between male and female were the same and thus their classroom learning may be fair, happy and friendly.

This result is not in line with the study of Negovan, Raciú and Vlad (2010) who studied the students' perceptions of teacher interaction in Turkey. In their study, there were significant differences in the comparison of male and female students. According to their results, the female students perceived more positively than the male students in the perceptions of teacher interaction.

Suggestions

The science teachers should possess positive relationships with their students and they should understand the students' behaviors in the classroom. Moreover, the science teachers should have good leadership to guide and get attention of their students. Furthermore, the science teachers should understand the needs of the students in the classroom in order to contribute the effective learning. And then, the good communication between science teachers and students should be created to motivate and encourage the students' science learning. The most important factor is that science teachers should have good behaviors because the teacher was an ideal person for the students. In addition, the science teachers should possess friendly and helpful mind to get belief from their students as a good leader. Moreover, the science teachers should have friendly interaction with students to create the positive classroom environment in the teaching-learning process.

It can be suggested for the students that they should have positive interaction and communication with their science teachers. In order to have good interaction and communication between teachers and students, the students should possess positive view of their science teachers. And then, communication in the classroom can be defined as the interchange of thoughts, feelings and information between the teachers and the pupils (Ming-tak & Wai-shing, 2008). Therefore, the students should believe their science teachers as good leaders and should follow under the guidance of their teachers. Moreover, this study can suggest that the students should perceive positive attitudes on leadership, understanding, helping/friendly and strict behaviors of their science teachers in order to develop their positive perceptions on teacher interaction.

Recommendations

Based on the findings of this study, the following recommendations are made for the development of students' perceptions of teacher interaction with students.

1. This study was carried out for middle school students in learning science.
2. This study helped the students to perceive the positive perceptions of teacher interaction in the science classrooms and assisted them to have the good communication and positive attitudes towards their science teachers.
3. This study was conducted with science teachers and students in the middle school classrooms, but the other subjects and the other school levels should be selected.
4. In this study, sample schools were randomly selected from Taungoo Township. Further research should be conducted for the rest states and regions.
5. This study was conducted by using only questionnaire due to time limitation.
6. Further research should be conducted by using observation and interview with students to know the students' perceptions of teacher interaction thoroughly.
7. Further research should be carried out for the development of students' achievement related to the students' perceptions of teacher interaction.

Conclusion

The main purpose of this study is to investigate the students' perceptions of teacher interaction with students in the middle school science classrooms. In this study, a descriptive research design was used. The questionnaire was used to investigate the students' perceptions of their classroom learning environment. For quantitative data collection, simple random sampling method was used for selecting the schools. The selected schools were from Taungoo Township and the data were collected from 302 students in these schools. In this study, the comparison of the mean differences in four scales of the questionnaire was conducted. And then, the comparison between male and female students was conducted by using independent samples *t*-test. According to the results, there was no significant difference between male and female in the students' perceptions of teacher interaction.

From the results of comparing mean differences in four scales, it was found that the students perceived positive perceptions of teacher interaction in the middle school science classroom. The friendly interaction between teachers and students will create positive relationships in the classroom and contribute to effective learning. Therefore, the teachers can shape the classroom environment to be comfortable and improve the ability of students to learn. Moreover, the interaction with teachers and environment during the learning process will stimulate all students' sense and encourage students to learn in a creative and innovative way. In addition, the teachers' attitude, pedagogy, planning, preparation, and management are going to affect how the students respond in the classroom. Thus, it is essential that students should perceive teachers as the confident, and fair teacher. By the results of this study, it is proposed that the students' positive perceptions of teacher interaction can be determined by four scales of the questionnaire. Therefore, the students' positive perceptions of teacher interaction can allow them to feel safe and good feeling in their classroom and can develop their effective learning. In conclusion, this study is expected to enhance the students' positive perceptions of teacher interaction in all schools in Myanmar.

Acknowledgements

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), and Dr. Nyo Nyo Lwin (Pro-Rector, Yangon University of Education) for the administrative support and permission for this study.

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THE EFFECTIVENESS OF SCIENCE PROCESS SKILLS MODEL IN THE TEACHING OF HIGH SCHOOL CHEMISTRY

Chit Su Wai¹ and Kyi Swe²

Abstract

The major purpose of this research is to investigate the effectiveness of the science process skills model in the teaching of high school Chemistry. The research design adopted in this study was an explanatory sequential (QUAN → qual) design, one of the mixed methods research designs. The research design for the quantitative study is a single-group pretest/posttest design, one of the quasi-experimental designs. The participants were Grade 10 students selected from BEHS, Hlegu, No. (4) BEHS Thanlyin, BEHS, Pyalo, and No. (1) BEHS Thayet. For this study, Grade 10 students were selected as experimental group from each school by random sampling method. Before the treatment period, the experimental group was administered a science process skills test before the instruction using the science process skills model. Then, the experimental group was treated with the science process skills model. After that, all students in the experimental groups were administered to a science process skills test. As data analysis, the nonindependent samples *t* test was used for the quantitative research study. Data collected from observation checklists were analyzed by content analysis for the qualitative research study. One hundred and seven students from the experimental groups were administered the science process skills tests and were observed. The results indicated that there were significant differences in the science process skills tests scores of experimental groups before and after using science process skills model. Qualitative data indicated that the use of science process skills model tends to facilitate effective teaching-learning implementation. Research findings proved that the science process skills model had a positive impact on acquisition of science process skills and teaching Chemistry at the high school level.

Keywords: Science, Chemistry, Basic science process skills, Integrated science process skills, Science process skills model

Introduction

Education cultivates individuals to be mature and capable of supervising their futures and taking the right decisions. The main responsibility of education is to ensure the formation of rational receptors of cognitive actions, otherwise known as logical cognitive structures (Khin Zaw, 2001). Especially, learning should include the acquisition of core academic content and higher-order thinking skills.

Science process skills enable students to experience hands-on engagement with science materials when solving problems using practical approaches. Science process skills arouse analytic thinking. Analytic thinking activity is the ability to analyze, assess, evaluate, compare, and contrast abstract concepts. In order to develop children's thinking skills and creativity, science process skills play an important role by providing students to produce scientific knowledge as well as learn the nature of science by doing and experiencing.

One of the science subjects, Chemistry comprises of scientific thinking skills. Thus, the pedagogy for Chemistry should be innovative. The importance of the present study is to examine the effectiveness of science process skills model in the teaching of Chemistry. This study emphasizes processing sequentially, and in multiple modes. Especially, this study develops students in adaptive and productive thinking. It can motivate students' achievement and acquisition of science process skills in teaching high school Chemistry.

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Purpose of the Study

The main purpose of this study is to investigate the effectiveness of science process skills model in Chemistry teaching at the high school level. The specific objectives are as follows:

- To investigate the effectiveness of the science process skills model in high school Chemistry teaching
- To explore the science process skills of students who are taught by the science process skills model
- To study the attitudes of teachers and students relating to the science process skills model
- To make suggestions based on the data obtained for improving the teaching of Chemistry at the high school level

Research Questions

- What are the effects of the science process skills model in the teaching of high school Chemistry?
- Are there significant differences in the science process skills (basic science process skills and integrated science process skills) test scores of experimental groups before and after the instruction using the science process skills model?
- What are the attitudes of teachers and students towards using the science process skills model?

Scope of the Study

The scope of the study is as follows:

- This study is geographically restricted to Yangon Region and Magway Region.
- This study is limited to the selected chapter of Chapter 3: The Electronic Structures of Atoms and Periodic Table, Chapter 4: The Quantities of Substances: Chemical Calculations, Chapter 5: Non-metals: Oxygen, Carbon, and Halogens, and Chapter 6: Acids, Bases, and Salts from Grade 10 Chemistry textbook and is conducted in four sample schools in Yangon Region and Magway Region.
- Participants in this study are (107) Grade 10 students and four teachers from the selected schools within the school year (2020-2021).

Definitions of Key Terms

Science: Science is the study of knowing about the universe through data collected by observation and controlled experimentation (Carin & Sund, 1989).

Chemistry: Chemistry may be defined as the branch of science which is concerned with the study of the composition, properties, and structure of matter and the ways in which substances can change from one form to another or react with one another (Ray, 2007).

Basic Science Process Skills: Basic Science process skills contain skills including observation, classifying, measuring, and calculation, using space/time relationships, communicating, inferring, and predicting (Dahsah, Seetee, & Lamainil, 2017).

Integrated Science Process Skills: Integrated science process skills contain skills including formulating hypotheses, defining operationally, identifying, and controlling variables, experimenting, interpreting data, and making inferences (Martin et al., 2005).

Science Process Skills Model (Operational Definition): The science process skills model is a teaching model with the integration of both basic science process skills and integrated science process skills to shape the effective teaching-learning process.

Review of Related Literature

Philosophical Foundations

Pragmatism, progressivism, cognitivism, and constructivism are deeply taken into philosophical consideration.

Pragmatism emphasizes practical activity. As pragmatism is all about taking action and achieving results, pragmatists view children as active, competent, and capable individuals. The child can seek out and find solutions to the problems that trouble them in their lessons. Problem solving and practical works provide personal experiences. Man is a social being and he gets more and more knowledge through personal experiences.

Progressivists believe that education is fundamental for individuality, progress, and change. According to the progressivist perspective, individuals have responsibility for learning. Finding solutions for problems in the classroom like those students will encounter in their daily lives is the step for their progression. Learning through discussions and group work develops social qualities. Interacting with each other can learn from different points of view. Thus, students should involve in the education process through action and go to the product. Problem solving and thinking critically provide students to be able to ready for the real world and a lot of daily conflicts.

Cognitivism focuses on the mind, and more specifically on mental processes. The mental processes include thinking, knowing, memory, and problem-solving. Knowledge is approached as schema constructions, and learning can be viewed as a change in the learner's schemata or the accumulation of experience from pre-learning. Thus, cognitivism is related to schema theory.

Constructivism sees learning as a dynamic and social process in which learners actively construct meaning the concept from their experiences in connection with their prior knowledge. Students learn best when engaged in learning experiences rather than passively receiving information. Learning is inherently a social process. Learning is embedded within a social context as students and teachers work together to build knowledge. The external world is interpreted within the context of the private world. The essential component of constructivism is an active, free, and striving belief in the meaning of life.

Psychological Foundations

Gagne's theory of learning, Piaget's cognitive development theory, Vygotsky's sociocultural learning theory, Kolb's experiential learning theory, and Bandura's social learning theory are deeply taken into consideration as psychological foundations in the examination of the effectiveness of science process skills model in the teaching of high school Chemistry.

According to Gagne, learning a new capability requires prior learning of capabilities. Knowledge acquisition is based on prior learning capabilities. Gagne's five categories of human

performance can explain the students' understanding. When Gagne's events of instruction occur, internal learning processes take place. Gagne's nine events of instruction include gaining attention, informing learners of objectives, stimulating recall of prior learning, presenting the content, providing learning guidance, eliciting performance (practice), providing feedback, assessing performance, and enhancement of retention and transferring the job.

According to Piaget's cognitive development theory, knowledge is not merely transmitted verbally but must be constructed and reconstructed by the learner. Piaget asserted that for a child to know and construct knowledge of the world, the child must act on objects and it is this action that provides knowledge of those objects (Sigel & Cocking, 1977). The intellectual growth of Piaget involves three fundamental processes: assimilation, accommodation, and equilibration.

According to Vygotsky's sociocultural theory, learning is an essentially social process and after the child's immediate social interactions, learning became internalized and there was a shift to the individual level. The zone of proximal development (ZPD) proposes that learning should be compatible with the child's level of development, and interaction should orient instruction towards the ZPD if it is to avoid lagging behind the development of the child (Palincsar, 1998, cited in Yilmaz, 2011).

Kolb provides "a comprehensive theory which offers the foundation for an approach to education and learning as a lifelong process and which is soundly based in intellectual traditions of philosophy and cognitive and social psychology" (ZuberSkerritt, 1992a, cited in Healey & Jenkins, 2000). Kolb's experiential learning theory presents a cyclic model of learning, consisting of four stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

According to Bandura (1977, cited in Mangal, 2012), the aspects of social learning theory are: learning is a cognitive process that takes place in a social context; learning can occur by observing behavior; learning involves observation, extraction of information from observation is influenced by the type of model as well as a series of cognitive and behavioral processes, including attention, retention, reproduction, and motivation.

Science Process Skills

Today, the trend in teaching science moves from a 'product' approach to a 'process' approach. Science processes form an important part of science education. Thus, teaching science is not merely pouring down knowledge into the intellects of the students. A new approach capable of triggering the processes of thinking, analyzing, and inferring in the student's mind is needed. The scientific process happens naturally in human minds. The science process is beneficial in any circumstances that necessitate critical thinking. Science process skills deal with and cover the activities of materials interaction processes as well as the synthesis of acquired information (Flores, 2004). Science process skills deal with the activities of processes and manipulation of information.

Science can be classified into two dimensions – the process and the product dimensions. The process of science involves the methods of the approach employed and activities engaged in by scientists. These include observation, classification, measurement, inferring, communication, predicting, controlling variables, formulating models, formulation of hypotheses, and manipulating experiments. Science process skills are central to the acquisition of scientific knowledge which is useful in solving problems in society (Abungu, Okere & Wachanga, 2014). According to the

American Association for the Advancement of Science (AAAS, 2010), there are two types of science process skills – basic and integrated. The basic science process skills are simple and integrated science process skills are complex.

Basic process skills are interdependent, implying that more than one of these skills may be displayed and applied in any single activity (Funk et al., 1979, cited in Rambuda & Fraser, 2004). The basic science process skills include observing, inferring, measuring, communicating, classifying, and predicting (Burchfield & Gifford, 1995). The integrated process skills include controlling variables, defining operationally, formulating a hypothesis, interpreting data, and experimenting. Science Process skills are unlimited. They are interrelated and interdependent with each other. Integrated process skills can be achieved only after the attainment of basic process skills.

Description of Science Process Skills Model

The science process skills model consists of three instructional phases. They are (1) pre active phase, (2) interactive phase, and (3) post active phase. Each phase is based on Glaser's basic teaching model, Gerlach and Ely model, Talyzina's cognitivo-cybernetic model, Ned Flander's interaction analysis model, Stolurow's and Davis's computer-based model, and Dr. Khin Zaw's multimodal model.

There are many steps under three phases.

Phase (I) Pre active Phase

- (1) Orientation of content with intended learning outcomes,
- (2) Assembling appropriate instructional resources and selecting instructional strategies, and
- (3) Engaging prior knowledge. The three steps are connected in a linear process flow.

Phase (II) Interactive Phase

- (1) Observing
- (2) Introduction to Chemistry Concept/ Defining Operationally
- (3) Communicating
- (4) Classifying/ Controlling Variables
- (5) Predicting/ Formulating Hypothesis
- (6) Measuring or Focusing Main Concept or Experiencing
- (7) Inferring/ Interpreting Data

Phase (III) Post active Phase

- (1) Assessment and
- (2) Feedback

The science process skills model can be described in Figure 1.

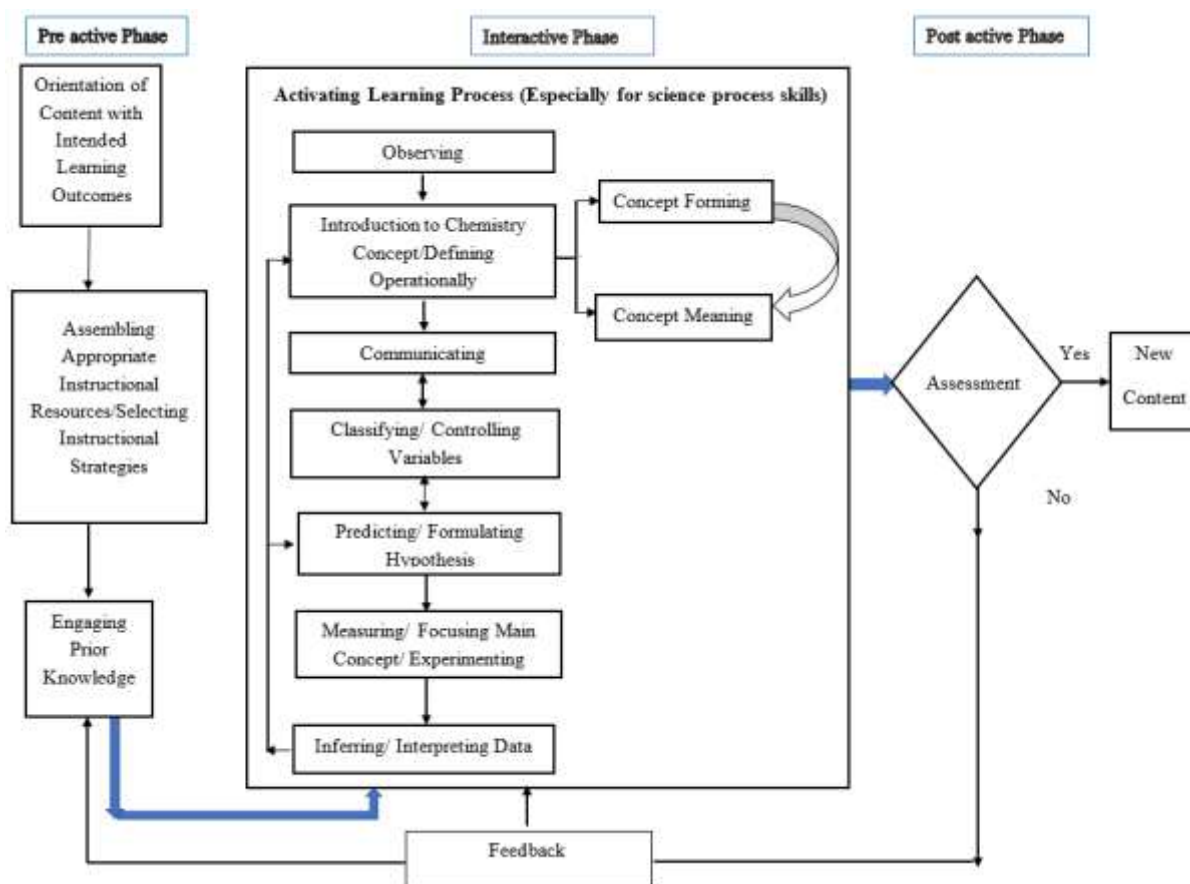


Figure 1 Science Process Skills Model

Method

The research design for this study was an explanatory sequential (QUAN → qual) research design, one of the mixed methods designs. Therefore, quantitative, and qualitative methodologies were used in this study. For the quantitative research methodology, the adopted design was a single-group pretest/posttest design, one of the quasi-experimental designs. The two measures: pretest (before) and posttest (after) can be compared and any differences in the measures are assumed to be the result of the treatment (Jackson, 2012). All participants in this study were Grade 10 students and this study was conducted in Yangon Region and Magway Region. The intact groups were randomly selected and assigned as experimental group and control group. The experimental group received instruction on the science process skills model. Before the treatment period, the experimental group was administered a science process skills test before the instruction using the science process skills model. Then, the experimental groups were taught with the science process skills model. Then, all the students in the experimental groups were administered science process skills after the instruction using the science process skills model. The nonindependent samples *t* test was used to determine whether there are significant differences in the science process skills test scores of experimental groups before and after instruction using the science process skills model. The participants for qualitative research were selected by the purposive sampling method. Thus, all students and one high school teacher from each experimental group were selected as participants for the qualitative research methodology. The data collected from observation checklists were analyzed by content analysis.

Instruments

The instruments used for this study were science process skills test and observation checklists. The instruments were constructed according to the advice and guidance of the supervisor. In order to get validation, the instruments were distributed to nine experts. A pilot study was conducted with (30) Grade 10 students at Basic Education High School, InnTaing in Hlegu Township. The science process skills test was constructed to examine whether there are significant differences between students' science process skills before and after instruction using the science process skills model. It is based on "Developing Science Process Skills Test" (Tezcan & Meric, 2013). The science process skills test includes two parts: basic process skills and integrated process skills. There are 22 items of basic process skills and 18 items of integrated process skills in the science process skills test. The allocated time for the science process skills test was (45) minutes and the given marks were (40) marks. The test items were multiple choice items. The observation checklist was developed to study teachers' and students' activities during treatment through the science process skills model. It is based on the Classroom Observation Schedule (Chebii, Wachanga & Kiboss, 2012). Four rating scale (from 1= not observed to 4= excellent) was used in the observation checklist. In order to get a reliable observation, observation was recorded with a Video Cassette Recorder (VCR) or audiocassette recorder to play back later with the permission of teachers. The total observations are 27 for a total of 48 lesson plans. The interobserver or interrater reliability coefficient for each observation had the lowest value of .78 and the highest value of above .90.

Findings

For quantitative research findings, data were recorded and analyzed systematically. According to the selected quantitative research design, the data obtained from the science process skills test were recorded systematically and analyzed by using the nonindependent samples *t* test to determine whether there are significant differences in the science process skills (basic science process skills and integrated science process skills) test scores of experimental groups before and after the instruction using the science process skills model.

Table 1 *t* Values for Science Process Skills Test Scores of Grade 10 Students in School 1

Paired Sample	N	M	MD	<i>t</i>	<i>df</i>	<i>p</i>	Partial Eta Squared
BSPS (Before)	22	8.59	-6.73	-12.86	21	.000***	.89
BSPS(After)	22	15.32					
ISPS(Before)	22	8.09	-3.96	-8.72	21	.000***	.78
ISPS(After)	22	12.05					
SPS(Before)	22	16.68	-10.36	-17.03	21	.000***	.93
SPS(After)	22	27.37					

Note. BSPS = Basic Science Process Skills; ISPS = Integrated Science Process Skills;

SPS = Science Process Skills.

****p* < .001.

The results showed that there were significant differences between science process skills (basic science process skills and integrated science process skills) test scores before and after using the science process skills model. Moreover, according to the partial eta squared, the effect size on the science process skills test was a large effect in School 1. It can be interpreted that the use of science process skills model has a significant effect on the acquisition of science process skills of Grade 10 students in School 1 (see Table 1).

Table 2 *t* Values for Science Process Skills Test Scores of Grade 10 Students in School 2

Paired Sample	N	M	MD	<i>t</i>	<i>df</i>	<i>p</i>	Partial Eta squared
BSPS (Before)	29	9.45	-7.24	-13.81	28	.000***	.87
BSPS(After)	29	16.69					
ISPS(Before)	29	7.79	-5.14	-15.66	28	.000***	.90
ISPS(After)	29	12.93					
SPS(Before)	29	17.24	-13.31	-27.36	28	.000***	.86
SPS(After)	29	29.62					

Note. BSPS = Basic Science Process Skills; ISPS = Integrated Science Process Skills;
SPS = Science Process Skills.

*** $p < .001$.

u, The results showed that there were significant differences between science process skills (basic science process skills and integrated science process skills) test scores before and after using the science process skills model. Moreover, according to the partial eta squared, the effect size on the science process skills test was a large effect in School 2. It can be interpreted that the use of science process skills model has a significant effect on the acquisition of science process skills of Grade 10 students in School 2 (see Table 2).

Table 3 *t* Values for Science Process Skills Test Scores of Grade 10 Students in School 3

Paired Sample	N	M	MD	<i>t</i>	<i>df</i>	<i>p</i>	Partial Eta Squared
BSPS (Before)	28	9.68	-7.46	-18.22	27	.000***	.92
BSPS(After)	28	17.14					
ISPS(Before)	28	7.52	-6.13	-21.64	27	.000***	.99
ISPS(After)	28	13.65					
SPS(Before)	28	17.20	-13.48	-22.13	27	.000***	.95
SPS(After)	28	30.79					

Note. BSPS = Basic Science Process Skills; ISPS = Integrated Science Process Skills;
SPS = Science Process Skills.

*** $p < .001$.

The results showed that there were significant differences between science process skills (basic science process skills and integrated science process skills) test scores before and after using the science process skills model. Moreover, according to the partial eta squared, the effect size on

the science process skills test was a large effect in School 3. It can be interpreted that the use of science process skills model has a significant effect on the acquisition of science process skills of Grade 10 students in School 3 (see Table 3).

Table 4 *t* Values for Science Process Skills Test Scores of Grade 10 Students in School 4

Paired Sample	N	M	MD	<i>t</i>	<i>df</i>	<i>p</i>	Partial Eta Squared
BSPS (Before)	28	8.54	-8.67	-29.80	27	.000***	.97
BSPS(After)	28	17.21					
ISPS(Before)	28	7.04	-6.57	-16.30	27	.000***	.90
ISPS(After)	28	13.61					
SPS(Before)	28	15.58	-15.33	-28.14	27	.000***	.97
SPS(After)	28	30.82					

Note. BSPS = Basic Science Process Skills; ISPS = Integrated Science Process Skills;
SPS = Science Process Skills.

*** $p < .001$.

The results showed that there were significant differences between science process skills (basic science process skills and integrated science process skills) test scores before and after using the science process skills model. Moreover, according to the partial eta squared, the effect size on the science process skills test was a large effect in School 4. It can be interpreted that the use of science process skills model has a significant effect on the acquisition of science process skills of Grade 10 students in School 4 (see Table 4).

For qualitative research findings, the data collected from observation checklists on teachers' and students' activities were analyzed by content analysis.

Table 5 Data Coding for Observation on Teachers' Activities in S1, S2, S3, and S4

Teacher's Activity	S1	S2	S3	S4
Engaging prior knowledge	4	3	4	3
Reinforcing students for responses	4	2	3	2
Grouping	4	2	4	2
Distributing things to observe	4	4	4	2
Encouraging students to make an observation	4	3	2	3
Encouraging communication within groups	3	2	3	3
Encouraging classifying lessons with previous knowledge	3	4	4	3
Asking predicting questions	4	4	4	2
Demonstrating the main concept	4	4	4	4
Asking students to infer results	2	3	3	3
Reflecting results for students	2	3	3	2
Assessing with worksheets	4	4	4	4

Note. S1 = BEHS, Hlegu, S2 = BEHS (4), Thanlyin, S3 = BEHS, Pyalo,
S4 = BEHS (1), Thayet.

1 = 0% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, 4 = 76% to 100%

In school 1, it was weakly observed in asking students to infer results and reflecting results for students. But, other activities were strongly observed from above 50% to 100%. In school 2, it was weakly observed in reinforcing students for responses, making the class into groups and encouraging communication within groups. It was strongly observed in other activities up to 100%. In school 3, there was no activity under 50% and all the teacher's activities were strongly observed from 50% to 100%. In school 4, it was weakly observed in reinforcing students for responses, grouping, distributing things to observe, asking predicting questions and reflecting results. It can be interpreted that using science process skills model has a significant effect on the teachers' instruction (see Table 5).

Table 6 Data Coding for Observation on Students' Activities in S1, S2, S3, and S4

Students' Activity	S1	S2	S3	S4
Responding to questions relating to previous knowledge	4	3	4	2
Following Instructions	4	4	4	4
Making observation	4	4	4	2
Observing pictures and flashcards relating to the lessons	4	4	4	4
Defining the meaning of the concept and exploring the concept	3	2	3	2
Discussion with other students	3	4	4	4
Classifying the observed facts with the prior knowledge	4	4	4	2
Making predictions	4	4	4	4
Focusing on the main concept	3	1	4	4
Inferring the relationships and predictions among the lesson contents	3	3	3	2
Repeating experiments and measurement after the teacher	2	2	4	4
Answering worksheets	4	4	4	4

Note. S1 = BEHS, Hlegu, S2 = BEHS (4), Thanlyin, S3 = BEHS, Pyalo,

S4 = BEHS (1), Thayet.

1 = 0% to 25%, 2 = 26% to 50%, 3 = 51% to 75%, 4 = 76% to 100%

In school 1, repeating experiments and measurement after the teacher was weakly observed only. In school 2, it was weakly observed in defining the meaning of the concept and exploring the concept and repeating experiments and measurement. The weakest activity in school 2 is focusing on the main concept. In school 3, there was no weak observation on students' activities. In school 4, it was strongly observed in following instructions, observing teaching aids, good discussions, making predictions, focusing on the main concept, repeating experiments and measurement after the teacher, and answering worksheets. The rest activities were weakly observed in school 4. It can be interpreted that the use of science process skills model has a significant effect on the students' learning activities (see Table 6).

Discussion

These results support the research question of whether there were significant differences in the science process skills (basic science process skills and integrated science process skills) test

scores of experimental groups before and after the instruction using the science process skills model. The study is also in agreement with the studies of Osman and Verbrianto (2013). They found that there were significant differences in science process skills and achievement between the experimental groups and the conventional group.

According to the observation checklists, the results of the qualitative study pointed out that the teachers implemented the science process skills model successfully and the students followed the instruction. Observation data are analyzed by content analysis. According to the results of the observation of teachers' activities, teachers from four selected schools implemented the science process skills model. In school 4, grouping students, distributing things to observe, reinforcing students for responses, and asking predicting questions were observed for under 50% of the total observation. The classroom setting in school 4 is arranged with the rules of Covid-19. Thus, it was observed that making groups for students was about 50%. In school 2, encouraging communication within groups was weakly observed and it was not the same in school 4. Most of the students in school 2 are fast learners and so they observe the distributed things and communicate within groups. So, the teacher does not need to encourage students to communicate with each other within groups.

Teachers' reflecting results for students were weakly found in school 1 and school 4. This is because the teacher did not have enough time to cover the content of one lesson plan within the limited time. So, the teacher may miss this teaching step. The teacher encouraged students to make observations on the distributed materials for the first time the use of the science process skills model in school 3. In selected four schools, the teacher demonstrated the main concept and assessed students with the worksheets with full percentages.

According to the results of observation of students' activities, students from selected schools followed instructions, observed pictures, and flashcards relating to the lessons, and participated in predicting and answering worksheets successfully. In school 2, the students' focus on the main concept is the weakest. The students from school 2 are active learners and they followed the teachers' instructions and they want to study all the contents which the teacher had taught. Thus, they did not focus on the main concept of the lesson's contents. The result is consistent with Chebii (2011). From his studies, the result indicates that students' and teachers' activities during instruction in the experimental groups had higher mean frequencies in the classroom observation schedules.

Suggestions

With respect to the research findings, the following suggestions should be considered for the use of the science process skills model to be more effective in teaching Chemistry.

Suggestions for Teachers: the teacher should give enough time to think when the teacher integrates the new knowledge with the prior knowledge. The teacher should use the teaching resources such as visual materials which can change students' concrete thinking to abstract thinking. The teacher should arrange an easy way to help language barriers for students. Then, the teacher should understand the science process skills that are related to thinking skills. Finally, the teacher should be good in time management.

Suggestion for Students: The students should study well whenever one lesson has been learned in order to be able to discuss actively with group members in activities. Participating in activities can motivate students' attention and interests and development in learning.

Suggestions for School Administrators: The school administrators should understand the nature of the whole education. As cyberage people, the current function in education should be performed as homeostasis to reach ultimate the aim of education.

Recommendations

Some recommendations for further study are as follows:

- In this study, sample schools were randomly selected from Yangon Region and Magway Region. Thus, further research studies should be carried out in the rest of the States and Regions by using different participants for replication.
- In this study, the content areas were limited to Grade 10 Chemistry textbook. So, further study should be carried out for the other content areas at the high school level.
- In this study, the science process skills model was used for the high school level. Further research should be carried out for various school levels such as primary school level and middle school level.

Conclusion

This study indicated that the implementation of the science process skills model in the teaching of high school Chemistry enhances students' science process skills acquisition. Thus, it can be regarded that the science process skills model has a positive impact on achievement and acquisition of science process skills.

The science process skills model helps students improve the acquisition of science process skills in their daily lives. This model helps students to observe everything around them, apply opportunities such as communicating with other students and predicting something, and decide the results. Concrete rather than an abstract idea can form the lesson concept and get more memorization about it. The science process skills model can give concrete ideas rather than abstract ideas.

The present study on science process skills enhances the achievement in high school Chemistry teaching. Process skills can arouse the students' interest, eagerness, and enthusiasm to learn the Chemistry concept. Learning by doing is the role of the education in the 21st century. Inconsistent nowadays, the students should be active learners and the teachers should be the facilitators for constructing and exploring the knowledge. The students engage the concept with 21st-century skills through the process skills. Particularly, science process skills can help students learn the concepts in science subjects. If students use science process skills in learning Chemistry, they can become independent learners. As teaching is not delivering only knowledge, teachers should provide learners skills to construct concepts and ideas. Meanwhile, it is concluded that the use of the science process skills model in the teaching of Chemistry is pedagogically effective for both teachers and students.

Acknowledgements

We would like to express our respectful gratitude to Dr. Kay Thwe Hlaing, Rector, and Dr. May Myat Thu, Dr. Khin Khin Oo, and Dr. Nyo Nyo Lwin, Pro-Rectors, Yangon University of Education who allowed us to do this research. Then, we would like to express our respectful gratitude to Dr. Khin Mar Khine, Professor and Head, Curriculum and Methodology Department, Yangon University of Education for her invaluable guidance, support, and suggestions throughout the study.

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THE RELATIONSHIP BETWEEN SELF-DIRECTED LEARNING SKILLS OF STUDENT TEACHERS IN SAGAING UNIVERSITY OF EDUCATION AND THEIR LIFELONG LEARNING TENDENCY

Aye Nyein Nyein Htay¹ and Wai Wai Oo²

Abstract

This study aimed to investigate the relationship between self-directed learning skills of student teachers in Sagaing University of Education and their lifelong learning tendency. The research design used in the study was correlational research design, one of the quantitative research designs. The participants in the study were first year and fourth year students in Sagaing University of Education. Data were collected by using two instruments, questionnaires for self-directed learning skills and lifelong learning tendency. There were 40 items for self-directed learning skills questionnaire and 27 items for questionnaire towards lifelong learning tendency. The quantitative data were analyzed by using descriptive statistics, independent samples *t* test to compare differences between gender and year of study, and Pearson product-moment correlation to examine the relationship between self-directed learning skills of student teachers and their lifelong learning tendency. The results revealed that self-directed learning skills of student teachers and their lifelong learning tendency were at the high level and they were significantly different in terms of gender. However, there was found no significant differences based on year of study. The findings also showed that there was a moderate positive correlation between self-directed learning skills of student teachers and their lifelong learning tendency. Therefore, it can be said that student teachers had self-directed learning skills and these skills were related to lifelong learning.

Keywords: self-directed learning, self-directed learning skills, lifelong learning, tendency, student teachers

Introduction

The 21st century can be rightly regarded as a century of transformation, economic and cultural globalization and rapid technological development. It is vital to form a society which can adapt to the changes occurring in the environment by always acquiring and updating knowledge and skills necessary for everyday life and beyond. People are not able to lead their lives without continuing to learn or updating their knowledge to adapt with the changing world. The world is changing in such a frantic pace that if people do not continue to grow and develop; they will soon be left behind. Teachers and students must cope with the constantly changing era and therefore need skills to effectively cope in the 21st century.

Learning is a complex process. It has been variously described as accumulation of knowledge, improvement in an activity, solving a problem and adjustment to changing situations. Learning generally defined as the process by which behavior is developed or altered through practice or experience. New skills, changes in old responses, attitudes, rote memory, and highly complex concepts all represent learning (Khin Zaw, 2001). Learning is all about change, and change drives learning. For the learners, change is the process of recognizing gaps, setting goals, establishing a learning plan, and maintaining motivation for carrying out the plan to achieve the goals (London, 2011). Learning how to learn is among the fundamental skills of lifelong learning. Lifelong learning covers various skills known as twenty first century skills and self-directed learning skills are part of these skills.

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Self-directed learning in its largest sense refers to individuals' ability to taking initiative to identify their own learning needs, their ability to determine their learning goals, their ability to define the sources they need in order to learn, their ability to choose and use appropriate learning strategies and evaluate learning outcomes with or without help from an outsider (Knowles, 1975). In order to achieve it, individuals take responsibility for their own learning and embrace individual autonomy and preferences. Moreover, one of the most important, fundamental goals of education may be to create the conditions that lead to intrinsic motivation and a lifetime of self-directed learning (Lewis, 1995).

Purpose

The main purpose of this study was to investigate the relationship between self-directed learning skills of student teachers in Sagaing University of Education and their lifelong learning tendency. The specific objectives were as follows:

1. To investigate self-directed learning skills of student teachers
2. To find out student teachers' lifelong learning tendency
3. To explore the relationship between self-directed learning skills of student teachers and their lifelong learning tendency
4. To make suggestions and recommendation based on the results of the study

Research Questions

The related research questions were described as follows:

- At which level are self-directed learning skills of student teachers?
- Does the level of student teachers' self-directed learning skills differ by gender?
- Does the level of student teachers' self-directed learning skills differ year of study?
- What is the level of lifelong learning tendency of student teachers?
- How does student teachers' lifelong learning tendency differ by gender?
- How does student teachers' lifelong learning tendency differ by year of study?
- To what extent is there a significant relationship between self-directed learning skills of student teachers and their lifelong learning tendency?

Definition of Key Terms

The key terms of the study were described as follows:

Self-directed learning is a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes (Knowles, 1975).

Self-directed learning skill is the ability to manage learning tasks without having them directed by others. It is the skill necessary for effective lifelong learning and is of many skills students are expected to develop (Weimer, 2010).

Lifelong learning is the continuing development of knowledge and skills that people experience after formal education and throughout their lives (Encarta, 2008).

Tendency is an inclination towards a particular characteristic or type of behavior (Hornby, 2015).

Student teachers are the individuals who are being trained to become teachers (Sessanga & Musisi, 2019).

Scope of the Study

This study was restricted to student teachers in Sagaing University of Education. The participants in this study were first year (second semester) and fourth year (first semester) student teachers in Sagaing University of Education during the 2022-2023 Academic Year.

Review of Related Literature

Self-Directed Learning

Education can allow individuals to transcend boundaries of space, identity, and culture by empowering learners with the ability to pursue self-directed, lifelong learning. Valuable new meanings and understandings can be created by the interaction between self-motivated, self-directed learners, communities, and a wide range of organizations (Rogers, 2004). Self-directed learning is an approach to education where learners take responsibility for their own learning; as such, students who are actively involved in and take control of their own learning process can be referred to as self-directed students. Empowered with motivation, metacognition, self-regulation and knowledge of the learning process, self-directed learners are well equipped for lifelong learning (Mentz, Beer & Bailey, 2019). According to Knowles (1975), SDL as a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes. Individuals must have self-directed learning skills in order to be successful in the lifelong learning process. Learning how to learn is seen as one of the most fundamental skills of lifelong learning, which is an essential skill in the 21st century. They are skills necessary for effective lifelong learning and are of many skills students are expected to develop.

Responsibility for learning: The way students perceive personal responsibility and its impact on learning is an area that deserves special attention. Personal responsibility can be defined as peoples' skill of taking individual accountability for their decisions and actions, together with the outcomes they create and their impacts on others (Linley & Maltby, 2009, as cited in Ayish & Deveci, 2019).

Self-motivation: Motivation plays a significant role in the initiation and maintenance of effort toward learning and the achievement of cognitive goals. Motivation reflects perceived value and anticipated success of learning goals at the time learning is initiated and mediates between context (control) and cognition (responsibility) during the learning process.

Self-control: Students learn to express self-control by searching for, and making a commitment to, core personal interests and aspirations. Students develop these attributes as they become skilled in managing their own time and effort and the resources they need to conduct their work (Garrison, 1997).

Self-plan: The emphasis in SDL is on the development of skills and processes that lead to productive activity. Students learn to achieve course outcomes, think independently, and plan and execute their own activities.

Self-management: Self-management is concerned with task control issues. The term self-management is used here to indicate an aspect of external control specific to the management of learning activities, which are intimately linked with goal setting and metacognitive strategies.

Self-evaluation: Similarly, students learn to evaluate their own progress. They assess both the quality of their work and the process that they designed to conduct it. In SDL, assessment is an essential means of learning and learning how to learn (Gibbons, 2002).

Lifelong Learning

Lifelong learning is a concept that is significant for people's both private and professional lives. Education today has gained a status that cannot be limited to particular time periods in human lifespan, and even the most developed countries have begun a quest for constantly developing educational system and increasing the quality of education. To update knowledge, people become aware on the importance of ongoing learning. The essence of lifelong learning is meanwhile deeper and more beneficial for everyone. According to Longworth (2005), lifelong learning is about continuously acquiring new knowledge, skills and understanding. The tendency for lifelong learning is essential for education and the continuous development of the quality of life.

Motivation: The concept of motivation aims to build a bridge between external and internal motivation. The outer conditions must support and strengthen the individual's motivation (Elsborg & Pedersen, 2013). Furthermore, there are limited empirical studies on lifelong learning and motivation, as well as how motivation contributes to lifelong learning (Ng, 2016).

Persistence: Persistence is a learner-centered concept, focusing on how, the learner is supported throughout the learning journey, both during formal study and during periods of self-directed learning. Persistence is continuation of effort and striving in the face of difficulty, opposition, or failure: it is a key characteristic of successful people across professional and academic disciplines.

Self-regulation: Not only does motivation affect how individuals perform, it also shapes their identity into lifelong learning and is another key component of self-regulated learning. Self-regulated learners demonstrate initiative to advance their skill levels and have a commitment to learning as a lifelong learning process (Zimmerman, 1989).

Curiosity: Most teachers understand that curiosity supercharges learning. Curious people have an ongoing, intrinsic interest in both their inner experience and the world around them. Curiosity is also the engine of intellectual achievement and those who are more interested in a topic will learn faster and prime the brain better for learning.

Research Method

This section presented research method including the design of study, population and sample size, research instruments, data collection procedure, and data analysis.

Research Design

This study aimed to investigate the relationship between self-directed learning skills of student teachers and their lifelong learning tendency. The research design used in the study was correlational research design which is one of the quantitative research designs and it involved the collection of information from a sample of individuals by asking them to respond to the survey questions. The sampling technique in this study was cluster sampling method.

Population and Sample Size

The target population for this study was the student teachers in Sagaing University of Education. The participants in the study were first year (second semester) and fourth year (first semester) student teachers. The number of the participants was shown in Table 1.

Table 1 Participants of the Study

Academic Year	No. of Participants		
	Male	Female	Total
B.Ed. First Year	151	164	315
B.Ed. Fourth Year	59	91	150
Total	210	255	465

Research Instruments

The instruments used in the study were questionnaires for self-directed learning skills and lifelong learning tendency. Questionnaire for self-directed learning skills was constructed on the basis of the questionnaires designed by Ayyildiz and Tarhan (2015) and Garrison (1997). It consisted of total of (40) Likert-type items for eight dimensions. There were five items for each dimension. Items in the questionnaire were scored by using a five point rating scale (Never = 1, Rarely = 2, Sometimes = 3, Often = 4, Always = 5).

Lifelong learning tendency scale designed by Coskun and Demirel (2012) and Pesen and Epcacan (2017) was developed in order to learn the lifelong learning tendency of student teachers. The questionnaire included five points Likert-type items for four sub-dimensions. There were 27 items in the instrument and the items were developed on five point Likert scale: Strongly disagree = 1, Disagree = 2, Uncertain = 3, Agree = 4, Strongly agree = 5.

Procedure

First of all, the relevant data and information was collected from the library and internet sources. And the instrument was constructed under the guidance of the supervisor for investigating self-directed learning skills of student teachers and their lifelong learning tendency. To get validation, the questionnaires were distributed to the experienced teachers in Department of Curriculum and Methodology. Then pilot testing was conducted with (50) student teachers in University for the Development and National Races of the Union in the second week of November. According to the findings of the pilot test, the Cronbach's alpha value of the questionnaire for self-directed learning skills was .899 and for lifelong learning tendency was .867. After getting the validity and reliability of the instrument, the questionnaires were distributed to the target student teachers in Sagaing University of Education. When the questionnaires were returned, the collected data were statistically analyzed and interpreted.

Data Analysis

After collecting the required data, quantitative data analysis was performed by using the Statistical Package for Social Science (SPSS) version (22). Descriptive statistics was to examine self-directed learning skills of student teachers and their lifelong learning tendency. And independent samples *t* test was used to compare student teachers' self-directed learning skills and lifelong learning tendency in terms of gender and year of study. Moreover, Pearson product-

movement correlation was used to explore the relationship between student teachers' self-directed learning skills and their lifelong learning tendency.

Research Findings

This was concerned with research findings based on the data taken from the questionnaires used to gather information regarding to the self-directed learning skills of student teachers and their lifelong learning tendency.

Findings for Self-directed Learning Skills of Student Teachers

This study was intended to investigate self-directed learning skills of student teachers. Descriptive statistics was used to determine the level of student teachers' self-directed learning skills. The findings of the study were shown in Table 2.

Table 2 Descriptive Statistics of Self-directed Learning Skills of Student Teachers for each Dimension

Dimension	Minimum	Maximum	<i>M</i>	<i>SD</i>
Learning responsibility	2	5	3.94	0.55
Motivation and self-confidence	1	5	3.94	0.65
Ability to plan learning	1	5	3.66	0.57
Ability to use learning opportunities	1	5	3.68	0.65
Ability to manage information	1	5	3.38	0.54
Ability to apply learning strategies	1	5	4.15	0.61
Assessment of learning process	1	5	3.52	0.75
Evaluation of learning success	1	5	3.86	0.63
Total	2	5	3.77	0.45

According to Table 2, the mean of students' ability to apply learning strategies was the highest and the mean of students' ability to manage information was the lowest. According to mean scores interpretation described by Landell (1997, cited in Woo et al., 2018), self-directed learning skill levels for most of the dimensions were at the high level. However, the ability to plan learning, ability to manage information and assessment of learning process were at the moderate level. Generally, self-directed learning skills of student teachers were at the high level.

Comparison of Self-directed Learning Skills of Student Teachers in terms of Gender

In order to know whether there was any difference in the self-directed learning skills of student teachers in term of gender, the independent samples *t* test was used and the findings were shown in Table 3.

Table 3 The Results of *t* test for Self-directed Learning Skills of Student Teachers in terms of Gender

	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Self-Directed Learning	Male	210	148.77	19.59	-2.01	463	.046*
	Female	255	152.16	16.33			

Note. **p* < .05.

According to Table 3, a significant difference existed between gender and self-directed learning skills ($p < .05$) in favor of female students. Therefore, it can be interpreted that the self-directed learning skills of female students was higher than that of male students. It can clearly be seen in Figure 1.

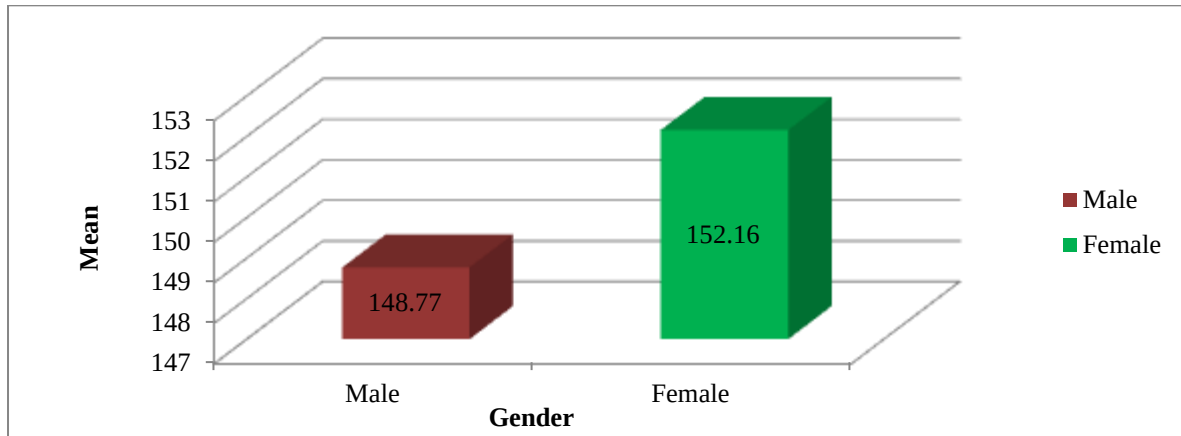


Figure 1. Mean comparison of self-directed learning skills of student teachers in terms of gender.

Comparison of Self-directed Learning Skills of Student Teachers in terms of Year of Study

The participants in the first year and the fourth year in SUOE were selected for this study. The independent samples t test computed to determine whether there was a significant difference between them was shown in Table 4.

Table 4 The Results of t test for Self-directed Learning Skills of Student Teachers in terms of Year of Study

	Year of Study	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Self-Directed Learning	First Year	315	150.54	18.85	-0.15	463	.879 (ns)
	Fourth Year	150	150.81	15.91			

Note. ns = not significant.

The results showed that first year students' self-directed learning skills mean score was 150.54; while that of fourth year students was 150.81. Therefore, the analysis revealed that year of study did not cause a difference in self-directed learning skills. It was illustrated in Figure 2.

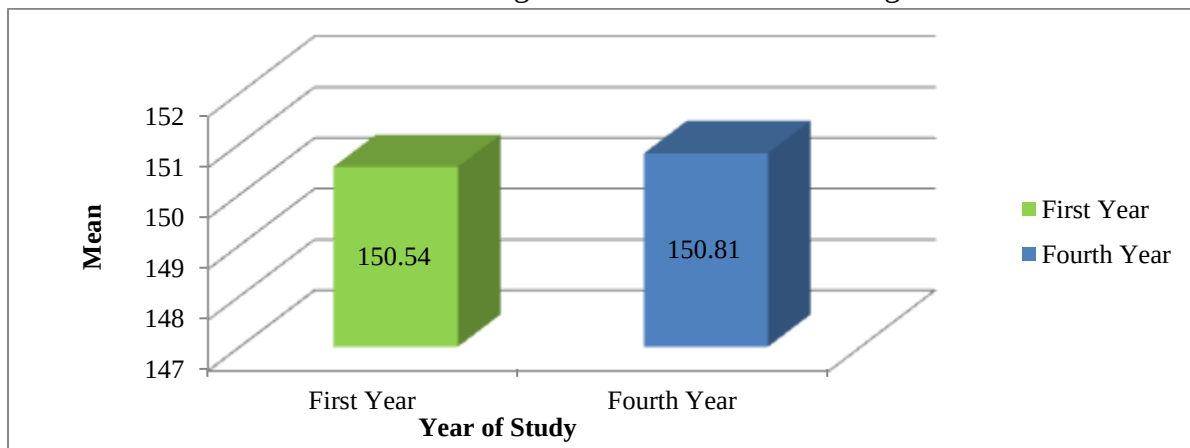


Figure 2. Mean comparison of self-directed learning skills of student teachers in terms of year of study.

Findings for Student Teachers' Lifelong Learning Tendency

This study was intended to investigate lifelong learning tendency of student teachers. The findings in the study were organized according to the subcomponents of the study and described in Table 5.

Table 5 Descriptive Statistics of Student Teachers' Lifelong Learning Tendency for each Dimension

Dimension	Minimum	Maximum	<i>M</i>	<i>SD</i>
Motivation	2	5	3.96	0.51
Persistence	2	5	3.60	0.60
Self-regulation	2	5	3.50	0.58
Curiosity	2	5	3.69	0.55
Total	2	5	3.69	0.41

Generally, when the tendency level for the whole scale was examined, it was seen that students' lifelong learning tendency level seemed to be at a high level. According to mean scores interpretation described by Landell (1997, as cited in Woo et al., 2018), for motivation and curiosity dimensions, the tendency level was high but for persistence and self-regulation dimensions, the tendency level was at the moderate level. Among them, motivation dimension was the highest and self-regulation dimension was the lowest.

Comparison of Student Teachers' Lifelong Learning Tendency in terms of Gender

Another aim of the study was to determine whether students' lifelong learning tendency differs according to various variables. The independent sample *t* test was utilized and the result was shown in Table 6.

Table 6 The Results of *t* test for Student Teachers' Lifelong Learning Tendency in terms of Gender

	Gender	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Lifelong Learning	Male	210	97.93	11.74	-2.84	463	.005**
	Female	255	100.86	10.48			

Note. ***p* < .01.

When the results were analyzed, it can easily be seen that there was a statistically significant difference among students about their lifelong learning tendency in terms of gender. The girls outnumbered the boys and this might reveal that the girls have more tendencies about lifelong learning than the boys. This data was shown in Figure 3.

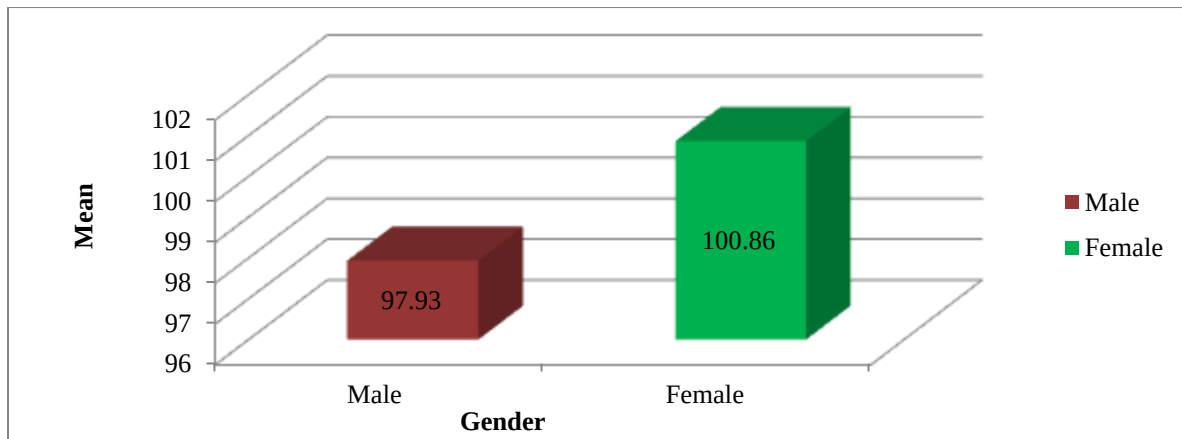


Figure 3. Mean comparison of student teachers' lifelong learning tendency in terms of gender.

Comparison of Student Teachers' Lifelong Learning Tendency in terms of Year of Study

The results of independent samples *t* test performed to determine whether the levels of lifelong learning tendency differ significantly according to year of study were presented in Table 7.

Table 7 The Results of *t* test for Student Teachers' Lifelong Learning Tendency in terms of Year of Study

	Year of Study	<i>n</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Lifelong Learning	First Year	315	99.32	11.48	-0.59	463	.553 (ns)
	Fourth Year	150	99.98	10.44			

Note. ns = not significant.

In accordance with the results of the *t* test, lifelong learning tendency level of the participants seemed to get higher as the students' grade level increased but there was not a statistically significant difference according to the grade levels of them. It can clearly be seen in Figure 4.

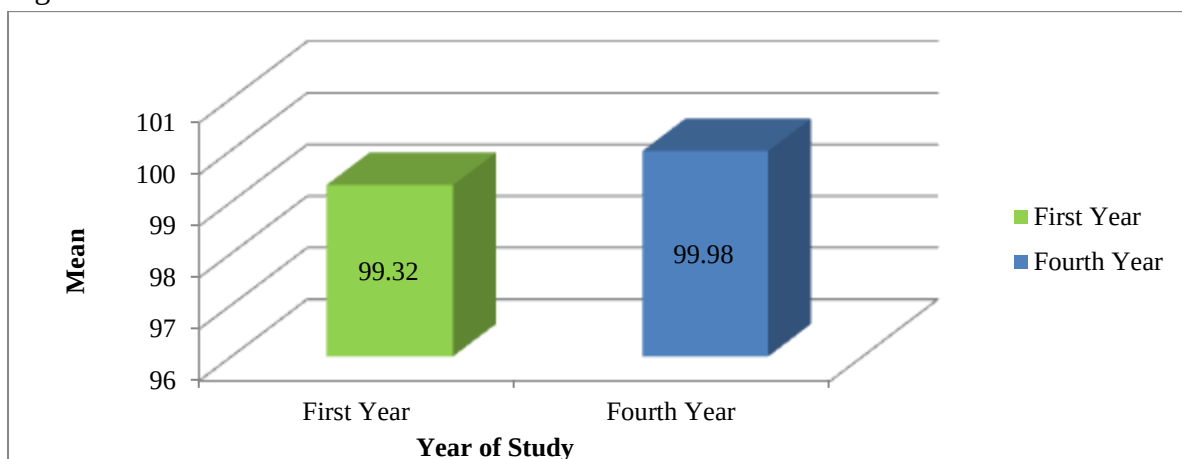


Figure 4. Mean comparison of student teachers' lifelong learning tendency in terms of year of study.

Findings for the Relationship between Self-directed Learning Skills of Student Teachers and their Lifelong Learning Tendency

In order to study the relationship between student teachers' self-directed learning skills and lifelong learning tendency, the Pearson's product moment correlation was used and the findings were shown in Table 8.

Table 8 Pearson Product Movement Correlation between Self-directed Learning Skills of Student Teachers and their Lifelong Learning Tendency

		Self-directed Learning	Lifelong Learning
Self-directed Learning	Pearson Correlation	1	.627**
	Sig (2-tailed)		.000
	N	465	465
Lifelong Learning	Pearson Correlation	.627**	1
	Sig (2-tailed)	.000	
	N	465	465

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

It was found that there was a significant relationship between student teachers' self-directed learning skills and their lifelong learning tendency. According to Mills & Gay (2016), it can be interpreted that it was a moderate positive relationship ($p < .01$; $r = .627$). Therefore, the student teachers who are ready for self-directed learning will tend to have a higher level of lifelong learning.

Discussion and Suggestions

Discussion

The aims of this study were to examine student teachers' self-directed learning skills and their lifelong learning tendency and reveal how these skills and tendency vary based on gender and year of study. In addition, this study also examined the relationship between student teachers' self-directed learning skills and their lifelong learning tendency.

Research Question 1: At which level are self-directed learning skills of student teachers?

The results showed that the level of self-directed learning skill obtained from the sub-dimensions of the scale, namely ability to apply learning strategies, motivation and self-confidence, learning responsibility, evaluation of learning success and ability to use learning opportunities were at the high level. However, ability to manage information, assessment of learning process and ability to plan learning sub-dimensions were at the moderate level. Generally, the level of student teachers' self-directed learning skills was at the high level. According to Tekkol and Demirel (2018), students' self-directed learning skills arithmetic means were also above the median of the scale.

Research Question 2: Does the level of student teachers' self-directed learning skills differ by gender?

Analysis of self-directed learning skills with respect to gender showed that a significant difference existed between female and male students' self-directed learning skills. The results showed that female students had significantly higher self-directed learning skills than male students. However, it was found that the boys were better in the ability in managing information than the girls. Saban (2008, as cited in Tekkol & Demirel, 2018) studied teacher candidates and showed that female students have higher cognitive awareness and motivation levels than male students. Demirtas and Ozer (2007, as cited in Tekkol & Demirel, 2018) found that female have more effective time management and hold responsibility for their own learning. Therefore, it can be attributed to the differences between female and male students regarding issues that may be considered indicators of self-directed learning: using learning strategies, motivation for learning, time management and planning.

Research Question 3: Does the level of student teachers' self-directed learning skills differ by year of study?

The study also explored whether students' self-directed learning skills varied based on year of study. First and fourth year students' self-directed learning skills scores were very close. The analyses showed no significant difference between students' self-directed learning skills according to year of study. However, it was found that fourth years students have more abilities in planning learning, using learning opportunities, managing information and assessing learning process than first year students in analyzing sub-dimensions of self-directed learning skills. The reason behind self-directed learning did not depend on year of study may be due to the fact that self-directed learning is not completely dependent on formal education, but individuals' own characteristics (Tekkol & Demirel, 2018). Gibbons and Phillips (1982) argued that self-directed learning occurs outside of formal education institutions. Therefore, the intrinsic motivation to learn may become a self-generating force for developing self-directed learning skills and encouragement needs to be increased. Moreover, it can be said that self-directed learning is a skill that can be developed informally.

Research Question 4: What is the level of lifelong learning tendency of student teachers?

In this study, it was aimed to investigate lifelong learning tendency of student teachers. Based on the findings, when the total mean score obtained from the scale was examined, it was seen that students' lifelong learning tendency level was at a high level. According to the mean scores of sub-dimensions, the tendency level for motivation and curiosity dimensions were at the high level and persistence and self-regulation dimensions were at the moderate level. Karakus (2013, as cited in Pesen & Epcacan, 2017) found out in their studies that lifelong learning proficiencies, tendencies and perceptions of the participants were at a high level.

Research Question 5: How does student teachers' lifelong learning tendency differ by gender?

The results of the study showed that there was a statistically significant difference in all subcomponents and lifelong learning tendency level of the students in terms of gender. A significant difference was obtained in favor of female students. It was also seen that lifelong learning tendency of female students was higher than male students on all dimensions: motivation, persistence, self-regulation and curiosity. Based on this, female students were found to be more enthusiastic and motivated to learn than male students. Similarly, Coskun (2009, as cited in Pesen & Epcacan, 2017) stated that females' lifelong learning competencies are more positive than males. Therefore, it can be interpreted that female students are more willing to learn new knowledge and skills, are more open to innovations, try to learn in a best way, create opportunities to learn and make more efforts in the lifelong learning process compared to male students.

Research Question 6: How does student teachers' lifelong learning tendency differ by year of study?

When the lifelong learning tendency of student teachers was examined according to year of study, there was no statistically significant difference in the lifelong learning tendency. Therefore, it can be interpreted that year of study did not depend on their tendencies towards lifelong learning. The results also showed that when lifelong learning tendency levels were analyzed with its subcomponents according to grade levels of the students, fourth year students had more curiosity, persistence and regulating learning than first year students. However, first year students had higher mean scores in motivation dimension. Pesen and Epcacan (2017) studies also showed that there was not such a difference among the students according to grade variables. Therefore, all the

student teachers had the tendency toward lifelong learning because they knew that lifelong learning is very essential for their life-improvement and plays a key role in fulfilling their learning needs and in keeping abreast with the changes in the world.

Research Question 7: To what extent is there a significant relationship between self-directed learning skills of student teachers and their lifelong learning tendency?

The study finally examined the relationship between university students' self-directed learning skills and their lifelong learning tendency. Students' self-directed learning skills and their lifelong learning tendency were found to be related with each other. According to Mills and Gay (2016), a moderate positive relationship existed between them. According to Tekkol and Demirel (2018), a moderate positive relationship was detected between self-directed learning skills and lifelong learning tendency. Lifelong learning and self-directed learning have similar properties and at times include one another. Moreover, the concepts of lifelong and self-directed learning are taken as related concepts (Brockett & Hiemstra, 1991). Students will continue their lifelong learning activities in order to develop their knowledge, skills and competencies by organizing their own learning with their readiness to self-directed learning and determining their own goals.

Suggestions

For achieving higher self-directed learning skills among student teachers, they should be allowed to identify their own learning needs and various learning strategies should be addressed in classes. Then, the students should be encouraged to monitor and evaluate their own learning processes. The educator has to motivate students so that they will have a positive attitude, a feeling of independence and a willingness to learn and improve their SDL skills. For self-directed-learning, the educator should encourage students to move out of their comfort zone by providing new challenges and unfamiliar learning conditions and creating problem-solving situations. Moreover, students should have the required amount of time for self-directed learning and sufficient learning resources because the implementation of SDL takes time and lack of sufficient learning resources is one of the challenges for self-directed learning.

Further awareness about the lifelong learning approach should be created through activities such as seminars, conferences and the teachers should support students to acquire various lifelong learning skills. Moreover, the teachers should also provide the ways on how to regulate learning and students should know them well. The lifelong learning recognizes that learning is not confined to childhood or the classroom, but takes place throughout life and in a variety of situations. So, it is important to be continuous learning for an individual's personal development as well as their occupational information in terms of basic characteristics and practice areas.

Based on the research that has been done, recommendations that can be given are as follows. It is important to carry out a qualitative and mixed method research to provide a deeper understanding of the phenomena in the study. Moreover, it is very important to determine factors that would positively develop lifelong learning tendencies of student teachers. Undergraduate and graduate students' self-directed learning skills and lifelong learning tendencies should be investigated comparatively. Furthermore, the self-directed learning skills of academics and teachers and students from different stages of education should be explored.

Conclusion

Education is an ongoing process throughout one's lifetime. Especially, the main purpose of education is transferring global values to individuals. In modern society, education is an important

factor in every individual's life in order that they sustain their lives in a qualified way. Furthermore, it is a leading concept which facilitates the development of all aspects of society. Therefore, both students and teachers need to be educated about the rationale of self-directed learning which is essential for the education system. Self-directed learning provides individuals with the knowledge, skills, values, attitudes and understanding they will need in life, and it makes communities more productive and innovative. Lifelong learning is a self-monitor, reflective, directed learning situation. Therefore, no one can deny that the terms lifelong learning and self-directed learning are important for teachers and students at the present time and in the future, because both terms emphasize the learner's role as an active learner, the effectiveness of teaching learning process and the improvement of their life.

Self-directed learning and lifelong learning are continuously supportive processes which stimulate and empower individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes and to apply them with confidence, creativity and enjoyment in all roles, circumstances and environment. Both have been considered as the important parts of the education system in today's world. Moreover, students who enjoy self-directed learning and lead successful lifelong learning process will be able to make significant contributions to their individuals' lives, the communities and the country. The study also pointed out to be aware of student teachers' self-directed learning which is essential for lifelong learning and to improve self-directed learning skills. Therefore, this study will be the contributing factor to the effective teaching learning environment, the education system and the development of the country.

Acknowledgements

First of all, we are especially grateful 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, for their permission to do this study. We also wish to express our profound gratitude to Dr. Soe Than (Retired Professor and Head of Department of Curriculum and Methodology, Sagaing University of Education) for his valuable instruction, advice and guidance throughout this study.

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AN INVESTIGATION INTO TEACHERS' ATTITUDE TOWARDS CONTINUOUS PROFESSIONAL DEVELOPMENT

Khin Mu Zaw Aung¹ and Khin Mar Khine²

Abstract

The main purpose of this study is to investigate the teachers' attitude towards Continuous Professional Development (CPD). Specifically, this study aims to compare the teachers' attitude towards CPD among three kinds of groups; age level groups (over 40 years and under 40 years), total service level groups (over 15 years and under 15 years) and Education Degree groups (pre-service and in-service). To attain the research objectives, the survey method was used and the used questionnaire contains (45) items for four dimensions (personal competence, pedagogical competence, professional competence and social competence). All high school teachers of the selected sample of 17 schools from Naypyitaw Council Region participated in this study. Independent samples 't' test was used to compare significant differences between the groups. According to the results, younger, less service and education degree (pre-service) teachers have more positive attitudes than older, more service and education degree (in-service) teachers towards CPD. According to the results, 90.8% of teachers have a positive attitude towards CPD. They agreed that CPD can promote the competences of teachers and they have the willingness to continue their CPD to promote their competences. Therefore, CPD should be implemented at every school to promote the competences of teachers. Moreover, the Ministry of Education needs to recruit more effective CPD activities to meet the present demands of teachers.

Keywords: professional development, continuous professional development, personal competence, pedagogical competence, professional competence, social competence

Introduction

Teaching profession is based on vocational and personal skills and competencies, involves professional and ethical standards and models, and entails a continuous process of professional development. Positive teachers' attitudes and perceptions are fundamental for effective teaching. And teachers' beliefs, perceptions and attitudes affect their practice and influence the students' performance (Eggen & Kauchak, 2001). Teachers' attitudes towards the teaching profession have effects on their classroom performance and teaching practice.

The teaching profession has great importance in every society. The teacher requires two types of knowledge, content knowledge and pedagogical knowledge. And the teacher also requires two types of qualities personal and professional. If a teacher combines both types of qualities in content and functional areas, the teacher can achieve the objectives and may be called a good teacher or an effective teacher in the educational delivery process. (Craft, 2002).

In recent years, many countries have engaged in curriculum reform as a way to equip children with the knowledge, skills and competences needed for tomorrow. The main purpose of doing basic education curriculum reform in Myanmar is to implement a new curriculum that not only focuses on relevant 21st century knowledge and skills but also aims to mend deficiencies and weaknesses of the previous basic education curriculum.

According to the National Education Strategic Plan (NESP, 2016-2021), the new curriculum (KG + 12) is started in the 2016-2017 Academic Year from Kindergarten in basic education. In the 2019-2020 Academic Year, a secondary level new curriculum is started and teachers' Continuous Professional Development (CPD) guideline is introduced for secondary teachers. The CPD program approach enables the individual teacher to reinforce and enhance their current skills, to take the change of their career development and ensures that both academic and vocational qualifications.

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Purposes of the Study

- **The main purpose of the study**
 - To investigate the teachers' attitude towards Continuous Professional Development (CPD)
- **The specific objectives of the study**
 - To investigate high school teachers' attitude towards CPD by age level, total service level and education degree
 - To explore the competences of teachers by CPD and
 - To make suggestions concerning the implementation of CPD.

Research Questions

- (1) Are there significant differences between teachers' attitude towards CPD by age level (over 40 years and under 40 years), total service level (over 15 years and under 15 years) and education degree (pre-service and in-service)?
- (2) Do the teachers agree that CPD can promote their competences of teacher (personal competence, pedagogical competence, professional competence and social competence)?
- (3) Do the teachers have a positive attitude or a negative attitude towards CPD?

Scope of the Study

The following points indicate the scope of the study.

- (1) This study is geographically restricted to Naypyitaw Council Region.
- (2) The participants in the study are high school teachers from selected schools during the (2022-2023) academic year.
- (3) This study includes four dimensions (personal competence, pedagogical competence, professional competence and social competence).

Definition of Key Terms

- **Professional Development:** Professional development is defined as the process that result in specific changes in the professional knowledge, skills, attitudes, beliefs or actions of teachers (Day, 1999).
- **Continuous Professional Development:** Continuous professional development refers to the process of tracking and documenting the skills, knowledge and experience that teachers gain both formally and informally as they work, beyond any initial training, it is a record of their experience, learn and then apply (Allen, 2009).
- **Personal Competence:** Personal competence is identified as important for effective teaching. Primarily an effective teacher should have adequate self-knowledge and needs awareness of feelings, values and attitudes as a teacher (Palmer, 1998).
- **Pedagogical Competence:** Pedagogical competence refers to performance knowledge and skill in teaching and learning (Cooper, 1984).
- **Professional Competence:** Professional competence is defined as the ability or skills to devise and implement learning processes (Saedah & Mohammed, 2012).
- **Social Competence:** Social competence refers to the teacher's ability and skills to interact communicate with the community (Saedah & Mohammed, 2012).

Review of Related Literature

Teacher Professionalism

Teacher professionalism is determined as the competences that meet professional education standards so that a teacher is required to possess a qualified professional background and to obtain the consequences as professionalization principles. These competences include pedagogical competence, personal competence, social competence, and professional competence (Saedah & Mohammed, 2012).

The teacher's perception regarding professionalism was dramatically changed to professional development, which means that teachers were required to improve their quality linear to the growth of educational needs. The growth of educational needs requires professionalism development, thus professional teachers indicate the birth of a new era of education (Hargreaves, 2000, as cited in Cipto, Aulia & Sulikah, 2016).

Professional Development in Education

Throughout the world, teacher education programs are designed for providing educators with the certification and competencies required in their professional careers (Rao, 2004, as cited in Dilishad, Hussain & Batool, 2019).

Professional development is necessary for the reformation of the school and to improve the performance of the school. Professional development is a continuous process that empowers the individual teacher. Due to the professional development of the teacher, students' learning outcomes will be improved. It prepares teachers to meet world-class standards (Gray, 2005).

Continuous Professional Development for Teachers

Continuous professional development (CPD) is a long-term process. It plans and organizes systematically to promote the professional development of teachers both individually and collectively to enhance the quality of learning (Ganser, 2000). And, CPD is a process/program that develops the personal qualities among individuals that are necessary to perform their professional and technical roles. It systematically enhances and enlarges the knowledge and skill of the individual throughout the individual's working life. It fulfills the personal as well as professional needs of the individual for effective professional development. The main aim of continuous professional development is to bring about change in the classroom practices of teachers, in their attitudes and beliefs, and in the learning outcomes of students (Guskey, 2002, as cited in Irina, 2017).

Promotions of Teachers' Competences by Continuous Professional Development

Teacher is a professional position where the duties of a teacher must meet the competences which includes pedagogical competence, personal competence, social competence, and professional competence. Continuing Professional Development (CPD) is an important part of teacher education and it helps the teachers to keep their professional knowledge and skills updated.

Continuous Professional Development ensures that teachers are part of a skilled and up-to-date profession. It is a continuous process where teachers build on existing knowledge and understanding to access up-to-date knowledge needed to be effective on their job. Guskey (2000) defines CPD as those processes and activities designed to enhance the professional knowledge, skills, and attitudes of educators so that they might in turn improve the learning of students.

Previous Related Research

Hursen Cigdem (2012) determined the attitudes of teachers towards professional development activities in Cyprus. The findings indicated that male teachers, the younger teachers and the less the duration of service teachers have more positive attitudes towards the professional development activities. Ansie and Marike (2007) studied on the value of continuous professional

development: teacher perceptions in South Africa. According to the results, most of the teachers agreed that the importance of CPD for personal development and teaching competence.

Method

Research Design and Procedure

This study was a descriptive design to attain the research objectives and it used a survey method by using a questionnaire. This research aimed to study the high school teachers' attitudes towards Continuous Professional Development (CPD). The literature related to the study was explored through reading related books and, others related research papers about CPD and the competences of teachers.

The questionnaire is concerned with the attitude of high school teachers towards CPD which is mainly expressed the promotions of teachers' competences (personal competences, pedagogical competences, professional competences and social competences) by CPD. Pilot testing was conducted in December 2022 with (28) high school teachers (Senior Assistant Teachers - SAT) from two selected schools B.E.H.S (11), Zabu Thiri township and B.E.H.S (1) Naypyitaw, Zayar Thiri township of Naypyitaw Council Region.

In December 2022 and January 2023, the modified instruments were distributed to all participants of selected 17 schools. After two weeks, all instruments were collected from all participants.

Population and Sample Size

This study was geographically restricted to Naypyitaw Council Region. There are four districts and eight townships in Naypyitaw Council Region. There are 1028 high school teachers for 73 basic education high schools and 58 basic education high schools (branches) in Naypyitaw Council Region. By using a simple random sampling method, two townships were selected from two selected districts. Zabu Thiri Township was selected from Pyinmanar District and Zayar Thiri Township was selected from Zayar Thiri District. Then, from two selected townships, all high school teachers (184 Senior Assistant Teachers - SAT) of all basic education high schools (13 high schools and 4 high school branches – total of 17 schools) participated in this study.

Instrument

In this study, a questionnaire which contains 45 items with four dimensions was used to investigate the teachers' attitudes towards CPD. All items were composed with a five-point Likert scale. The statements of the questionnaire were modified from the literature review to suit the purposes of this study with the advice and guidance of the advisors. See table 1.

Table.1 Dimension, Sub-dimension and Total Item of Questionnaire

No	Dimension	Sub-dimension	Item	Total
1	Personal Competence of the Teachers (Promotions of Knowledge about Continuous Professional Development [CPD] of Teachers)		10	10
2	Pedagogical Competences of the Teachers	Promotions of Teaching Skills of Teachers	5	15
		Promotions of Classroom Assessment Skills of Teachers	5	
		Promotions of Classroom Management Skills of Teachers	5	
3	Professional Competences of the Teachers	Promotions of Knowledge about Learning and Profession of Teachers	5	10
		Promotions of Subject Matter Skills of Teachers	5	

No	Dimension	Sub-dimension	Item	Total
4	Social Competence of the Teachers (Improvement of 21 st Century Skills [soft skills] of Teachers)		10	10
Total	4		45	45

To investigate the high school teachers' attitudes towards CPD and the promotions of teachers' competencies by CPD, these 45 items were used. The score indicated the teachers' attitude according to 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree and 5 = strongly agree.

Data Analysis

The data will be analyzed by using a descriptive statistic (Mean, Standard deviation, percentage) and independent samples '*t*' test to compare the means on age level, total service level and education level. In order to determine the significant differences, the independent samples '*t*' test was used with the Statistical Package for Social Science (SPSS) 22.0.

Findings

Table 2. Results of the Differences between Teachers' Attitude towards CPD by Age Level (over 40 years and under 40 years)

Dimension	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
PC	over 40	79	38.89	4.04	-1.93	-3.31	182	.001**
	under 40	105	40.82	3.83				
PD	over 40	79	59.51	6.33	-3.54	-4.21	182	.001**
	under 40	105	63.05	5.07				
PF	over 40	79	39.62	4.00	-1.60	-2.77	182	.006**
	under 40	105	41.22	3.78				
SC	over 40	79	40.56	4.02	-0.74	-1.06	182	.293 (ns)
	under 40	105	41.30	5.16				

PC = Personal Competence,

PF = Professional Competence

PD = Pedagogical Competence,

SC = Social Competence

Note. ** $p < .01$, ns = not significant

According to the Table 2, the results showed that the teachers with an age level under 40 years have a more positive attitude than the teachers with an age level over 40 years towards CPD for all dimensions except the fourth-dimension social competence. For the fourth dimension, it was found that there was no significant difference between teachers of over and under 40 years for their attitude. And it was illustrated in Figure 1.

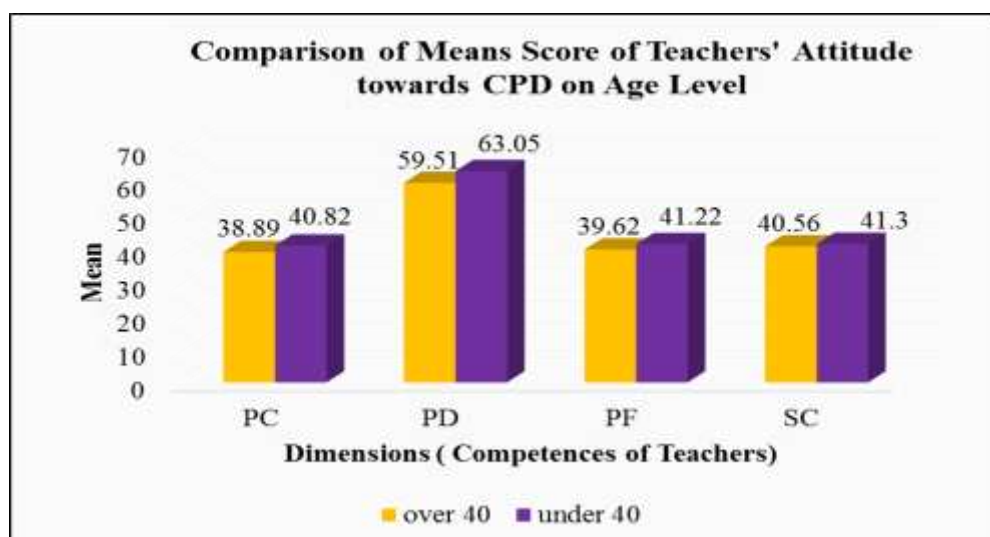


Figure 1 Comparison of Means Score of Teachers' Attitude towards CPD on Age Level

Table 3. Results of the Differences between Teachers' Attitude towards CPD by Total Service Level (over 15 years and under 15 years)

Dimension	Group	N	M	SD	MD	t	df	p
PC	over 15	110	39.13	3.89	-2.14	-3.66	182	.000***
	under 15	74	41.27	3.91				
PD	over 15	110	60.10	6.03	-3.55	-4.18	182	.000***
	under 15	74	63.65	5.01				
PF	over 15	110	39.94	3.71	-1.48	-2.58	182	.012*
	under 15	74	41.42	4.13				
SC	over 15	110	40.27	5.27	-1.76	-2.52	182	.013*
	under 15	74	42.03	3.48				

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

According to the Table 3, the results showed that the teachers who have total service under 15 years have a more positive attitude towards Continuous Professional Development (CPD) than the teachers who have total service over 15 years towards CPD for all dimensions. Therefore, it can be interpreted that fewer total service teachers have a willingness to participate in CPD activities actively and are interested in new modern active teaching methods. And it was illustrated in Figure 2.

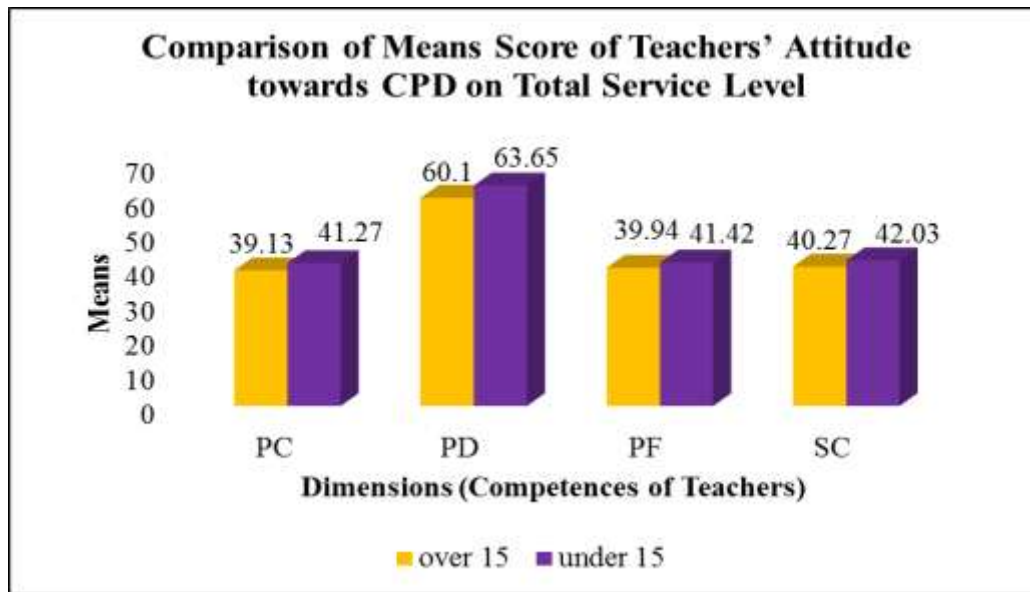


Figure 2 Comparison of Means Score of Teachers' Attitude towards CPD on Total Service Level

Table 4 Results of the Differences between Teachers' Attitude towards CPD by Education Degree (pre-service and in-service)

Dimension	Group	N	M	SD	MD	t	df	p
PC	pre-service	87	40.37	4.06	0.72	1.21	182	.228 (ns)
	in- service	97	39.65	3.99				
PD	pre-service	87	62.32	5.47	1.51	1.74	182	.083 (ns)
	in- service	97	60.81	6.19				
PF	pre-service	87	40.74	3.95	0.39	0.66	182	.510 (ns)
	in- service	97	40.35	3.95				
SC	pre-service	87	40.82	5.38	-0.30	-0.44	182	.659 (ns)
	in- service	97	41.12	4.02				

Note. ns = not significant

According to the Table 4, the results showed that the teachers who have an education degree (pre-service) had more positive attitudes towards CPD than the teachers who have an education degree (in-service) for the first three dimensions. But, for the fourth dimension, the teachers who have an education degree (in-service) had more positive attitudes than the teachers who have an education degree (pre-service). According to Probability Value, there were no significant differences between two teacher groups for all dimensions. Therefore, there were no differences in attitude towards CPD. And it was illustrated in Figure 3.

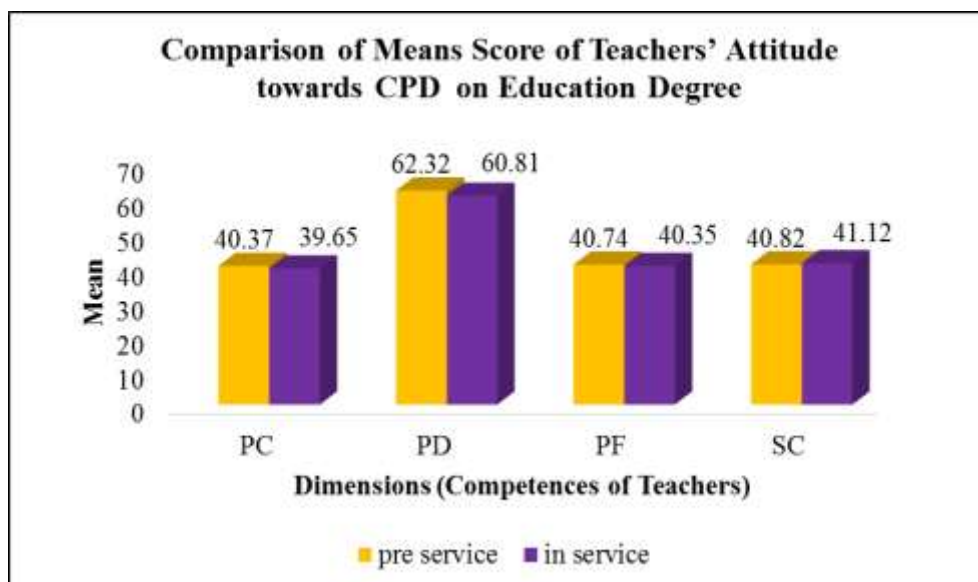


Figure 3 Comparison of Means Score of Teachers' Attitude towards CPD on Education Degree

Table 5. Percentage of Teachers' Attitude towards Competences of Teachers (Promotions of Competences of Teachers by CPD)

No	Dimension	Strongly Disagreed and Disagreed (%)	Undecided (%)	Agreed and Strongly Agreed (%)
1	Personal Competence	5.5	6.4	88.1
2	Pedagogical Competence	4.6	4.1	91.3
3	Professional Competence	5.8	3.9	90.3
4	Social Competence	2.6	4.1	93.3
	Average	4.6	4.6	90.8

Table 5 shows the percentage of teachers' attitude towards competences of teachers. A total of 184 high school teachers participated in it. The collected data for teachers' attitude towards CPD according to four dimensions are illustrated in following Figure 4.

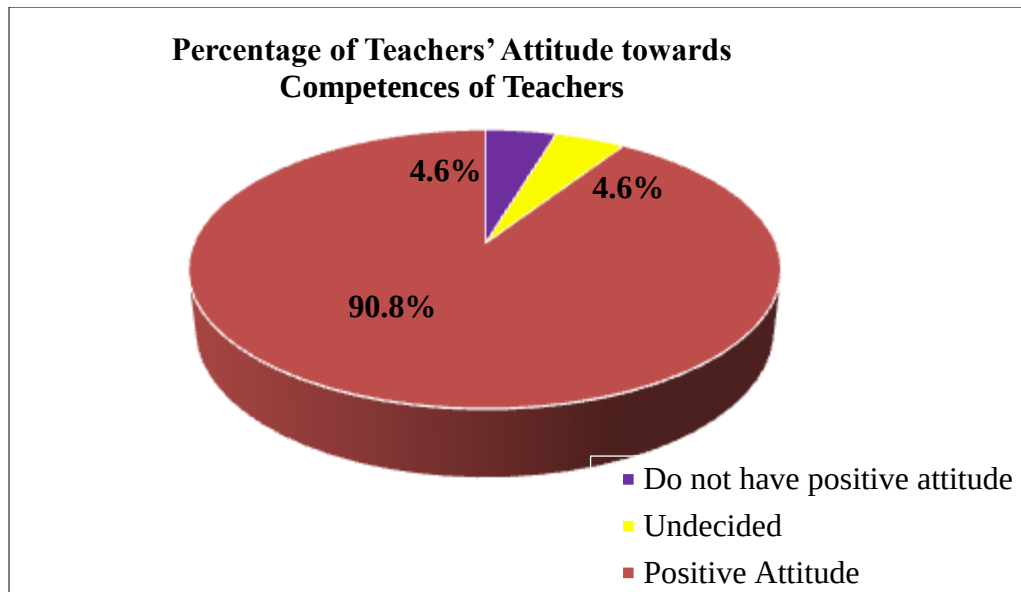


Figure 4 Percentage of Teachers' Attitude towards Competences of Teachers

According to the above results, it can be interpreted that 90.8% of participants (high school teachers) have a positive attitude, 4.6% of teachers have undecided and 4.6 % of teachers do not have a positive attitude towards promotions of the competencies of teachers by CPD.

Therefore, according to this study, it can be interpreted that most of the teachers are interested in Continuous Professional Development (CPD) and have positive attitudes towards CPD.

Discussion

Firstly, the results of this research were demonstrated to compare teachers' attitudes towards CPD among three kinds of groups. According to the means value of all groups, almost all teachers have a high positive attitude towards CPD for all dimensions. Moreover, according to the means differences (MD) of these groups, there are no significant differences for all dimensions. And the outcomes showed that younger, less service and education degree (pre-service) teachers have more positive attitudes than older, more service and education degree (in-service) teachers towards CPD for three dimensions, personal competence, pedagogical competence and professional competence. But for the fourth dimension (social competence), the teachers who got an education degree (in-service) have a little more positive attitude than the teachers who got an education degree (pre-service). But the mean difference was very small.

Secondly, according to this study, 88.1% of teachers agreed that their personal competence (knowledge about CPD) was promoted, and 91.3% of teachers agreed that their pedagogical competence (teaching skills, classroom assessment and management skills) were promoted, 90.3% of teachers agreed that their professional competence (knowledge about learning and profession, and subject matter skills) were promoted and 93.3% of teachers agreed that their social competence (21st century skills and soft skills) was promoted by CPD.

Thirdly, according to the research findings, all of the most of the teachers have positive attitude towards CPD. According to the results of the five-point Likert scale questionnaire, 90.8% of participants (high school teachers) agreed that they were promoted in their level of all four dimensions of competences of teacher by CPD. But 4.6% of participants did not agree for the promotions of their teacher competences by CPD. It may be due to the fact that they did not participate CPD activities in their schools and they did not understand the concept of CPD. Other 4.6% of teachers could not decide, agree or disagree with the statements of a questionnaire. It may

be because they did not understand the concept of CPD and they were not interested in CPD activities in their schools.

Suggestions

According to the results, to become more effective, some following suggestions can be provided for subject teachers, school head teachers and administrators.

- Every teacher should learn to know more about Continuous Professional Development (CPD) and should participate in CPD activities actively and effectively.
- The teachers should promote their teacher competencies (personal, pedagogical, professional and social) by CPD.
- Today teachers need to equip themselves with new technological skills and competences to perform effectively for future professionals.
- Every head teacher (Principals) should give clear instructions to the teachers.
- Every head teacher does the monitoring on the implementation of CPD activities and support the needed things (teaching aids, reference books).
- CPD should be implemented at every school to promote the competencies of teachers.
- CPD should implement according to the guidelines of the Ministry of Education.
- Education administrators, Township/ District/ State and Region Monitoring and Evaluating members should support the technique and more suitable things for CPD activities to teachers and school head teachers.
- The Ministry of Education should revise the framework of CPD and re-prepare to include all competencies of teachers to be more effective.
- And, Ministry of Education maintain a system that clearly depicts the duties and responsibilities of each stakeholder to provide practical training on CPD, support, follow-up and feedback on teachers' and schools' CPD activities.

Recommendations

According to this study, CPD has key role in improving teachers' teaching competences and their students' learning and achievement. And the results of this study recommended that the teachers have the willingness to continue their CPD to promote their competences (personal competence, pedagogical competence, professional competence and social competence) of teachers. And these recommendations are also for head teachers and other stakeholders from Ministry of Education.

- (1) Continuous Professional Development (CPD) can promote the competences of teachers and the teachers can become effective teachers.
- (2) Because of the development of teachers' teaching learning skills, subject matter skills, classroom assessment and management skills and communication skills, creative thinking and collaboration skills, the students' learning achievement will be promoted.
- (3) By encouraging the teachers to have more positive attitudes towards CPD, they can participate actively in CPD activities.
- (4) Further researches need to be performed in other states and regions.
- (5) It is needed to take the future researches at all levels such as primary and middle school level.

- (6) Ministry of Education need to recruit for more effective CPD activities to meet the present demands of teachers.

Conclusion

According to the research findings, all of the most of the teachers have positive attitudes towards Continuous Professional Development (CPD) for all dimensions. Most of the teachers were interested in CPD and they participate in CPD activities. They agreed that their competences (personal competence, pedagogical competence, professional competence and social competence) were promoted by CPD.

The four characteristics have been chosen as the distinguishing features of professions; (1) expertise, (2) autonomy, (3) commitment, and (4) responsibility (Dr. Kornhauser, 1962, as cited in Khin Zaw, 2001). And in modern societies, the professional person requires the repeated hurdling of countless obstacles. So, it is needed to have professional expertise for teachers to face the challenges of their teaching-learning societies. Professional expertise is based on the belief that the performance of a vital function in society requires specialized knowledge and skills. CPD can promote the teachers' expertise, required knowledge and skills of the teachers for their teaching-learning societies.

Moreover, competent teachers understand the situations of controversial overtones in education and know how to solve them effectively. And, the competent teacher not only establish beneficial student-teacher relationships and student-subject relationships but also help for the student-society relationships. Therefore, it is needed for all teachers to promote the competences (personal competence, pedagogical competence, professional competence and social competence) of teachers. Every teacher of every school, therefore, should participate in CPD activities because Continuous Professional Development (CPD) can promote competences of teachers in education.

Acknowledgements

We would like to express our sincere appreciation and gratitude to those whose support and encouragement made this study possible. We would like to thank 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 permission to conduct this study.

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THE IMPACT OF ACTIVITY-BASED MATHEMATICS PROCESS SKILLS MODEL ON HIGH SCHOOL STUDENTS' ACHIEVEMENT IN MATHEMATICS

Linn Htin Ko Ko¹ and Naing Naing Thein²

Abstract

The purpose of this study is to investigate the impact of activity-based mathematics process skills on high school students in mathematics. The design adopted for the research study was one of the quasi-experimental designs, non-equivalent control group design. The subjects were 80 Grade Ten students from BEHS (1) in Myitkyina Township, 100 Grade Ten students from BEHS (1) in Waingmaw Township, 75 Grade Ten students from BEHS (Namati) in Namati Town and 72 Grade Ten students from BEHS (1) in Moegaung Township. The instruments used in the study were pretest and posttest. The experimental groups were taught with activity-based mathematics process skills model while the control groups were taught the same concept using formal method. Students' mathematics achievement and mathematics process skills on posttest were compared using one-way ANCOVA. The results showed that there were significant differences between high school students who were taught with activity-based mathematics process skills model and those who do not receive it in performing mathematics process skills in all selected schools.

Keywords: Mathematics, Process, Mathematics Process Skills, Activity-based Mathematics Process Skills, Model.

Introduction

Mathematics is one of the branches of science that contributed greatly to the advancement of science and technology. Learners must possess mathematics process skills such as problem solving, reasoning, communication, connection, and representation in order to apply, combine and adapt their mathematical knowledge to new situations in their lives and works. These process skills form the basis of the functional skills standards for mathematics and apply at all levels. Enhancing mathematics process skills will provide the tools that learners will need to tackle situations involving mathematics in life. Activity Based Mathematics Instruction (ABMI) is guided by the progressive philosophy of education as propounded by John Dewey. The National Council of Educational Research and Training (NCERT, 2005) emphasizes that mathematics learning should be facilitated through activities from the very beginning of school education. The major concern of this study is to investigate the effectiveness of activity-based mathematics process skills model at the high school level.

Statement of the Problem

In mathematics instruction, the students need to use the 5 Cs as important 21st century skills for learning will enable them to participate actively in all lessons such as Collaboration, Communication, Critical thinking and problem solving, Creativity and innovation and Citizenship. In Myanmar, the present teaching strategy emphasizes on lecture method that focuses on memorized facts which leads to rote learning (MOE, 2013). This is one of the problems that the students are facing in mathematics instruction.

Purposes of the Study

The main purpose of this study is to investigate the effectiveness of activity-based mathematics process skills model at the high school level. The specific objectives of the study are;

- To develop a model for enhancing mathematics process skills through activities for the high school students.
- To investigate the impact of the activity-based mathematics process skills model and constructed activities on high school students' mathematics process skills achievement.

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- To make suggestions and recommendations based on the findings for the effectiveness of mathematics teaching at the high school level.

Research Hypotheses

In order to achieve the objectives of this study, two research hypotheses are formulated.

1. There is a significant difference in the posttest scores of high school students who are taught with the activity-based mathematics process skills model and those who are not.
2. There is a significant difference in each of the mathematics process skills achievement of high school students who are taught with the activity-based mathematics process skills model and those who are not.

Scope of the Study

This study is geographically restricted to Kachin State. Participants in this study are 80 Grade Ten students from BEHS (1) in Myitkyina Township, 100 Grade Ten students from BEHS (1) in Waingmaw Township, 75 Grade Ten students from BEHS (Namati) in Namati Town and 72 Grade Ten students from BEHS (1) in Moegaung Township. This study is restricted to five content areas: Quadratic Functions; Absolute Value Functions; Probability; Similarity and Trigonometry from Grade Ten mathematics textbook prescribed by Basic Education Curriculum and Textbook Committee, Ministry of Education, Myanmar. Activities used in this study are games, practical activities, math lab, exhibition, projects, ICT in math classroom, math quiz, cooperative learning or small group learning and use of teaching aids. The impact of the developed model is examined in terms of students' mathematics process skills achievement.

Definition of Key Terms

Mathematics: Mathematics is the study of quantity, structure, space and change; it has historically developed, through the use of abstraction and logical reasoning, from counting, calculation, measurement, and the study of the shapes and motions of physical objects (Hess, 2013).

Process: A process is a chain of activities to reach a specific aim to get a desired result (Zubair, 2012)

Mathematics Process Skills: Mathematics Process Skills are defined as the skills that can be acquired through the processes of problem solving, reasoning and proof, communication, connection and representation (NCTM, 2011).

Activity-based Mathematics Process Skills: In this study, activity-based mathematics process skills mean the skills for problem solving, reasoning, communication, connection and representation those can be acquired through different kinds of mathematics activity.

Model: Model is an instructional strategy that can be used to accomplish particular material and justify instructional goals (Zubair, 2012).

Significance of the Research

The process standards extend thinking/learning skills: problem-solving, reasoning and proof, communication, mathematical representation and connections (Kennedy & Tipps, 2000). This may be a challenging task for educators to show how the mathematics process skills can be developed through mathematics lessons. How to integrate these skills in the mathematics lessons is one end of the problem and how these planned activities are helpful in developing the mathematics process skills in students can be another end of the problem. For these reasons, there is a need to develop a model for enhancing activity-based mathematics process skills at the high school level.

Review of Related Literature

Philosophical Background of the Research

Progressivism, Cognitivism and Constructivism are presented as the philosophical background of the research.

Dewey (1916) stated that education is the process of the reconstruction of experience, giving it a more socialized value through the medium of increased individual efficiency. Today's teachers need to consider teaching learning activities in the teaching learning process to achieve the intended learning outcomes. Teaching mathematics through activities can provide the students the opportunities for the development of 21st century skills. Progressivist teachers make school interesting and useful by planning lessons that provoke curiosity. In a progressivist school, students are actively learning. The students interact with one another and develop social qualities such as cooperation and tolerance for different points of view. Moreover, students solve problems in the classroom similar to those they will encounter in their real situation.

A key concept of cognitivism is that learning constructs mental maps in the brain and learning process is the means by which these mental structures are understood. Cognitivism defined learning as an internal, active, creative process. Teachers need to assess the learner's abilities to discover whether he or she is ready to learn (Gage & Berliner, 1992).

Constructivism is an educational theory that emphasizes hands-on, activity-based teaching and learning (Ozomon & Craver, 1986). The purpose of constructivist teaching and learning is to enable students to acquire information in ways which make that information most readily understood and usable.

Theoretical Background of the Research

Paget's Cognitive Development Theory, Bruner's Theory of Constructivism and Vygotsky's Sociocultural Theory are described as the theories affecting the teaching model for enhancing activity-based mathematics process skills.

Piaget believed that the development of a child occurs through a continuous transformation of thought processes. Piaget has identified four primary stages of development: sensorimotor, preoperational, concrete operational and formal operational. In general, the knowledge of Piaget's stages helps the teacher understand the cognitive development of the child as the teacher plans stage-appropriate activities to keep students active. Teachers should give children first-hand experiences with the natural world in order to help them. They should let them interact with each other and encourage them to talk and think about their experiences in order to stimulate the growth of logical thinking and the development of language to express their thoughts. So, these ideas are considered for constructing teaching learning activities

According to Bruner, instruction must be concerned with the experiences and contexts that make the student willing and able to learn, instruction must be structured so that it can be easily grasped by the student and instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given). The purpose of mathematics teaching is to enable students to master the knowledge structure of mathematics in a comprehensive way. Mathematics teachers should actively create positive learning conditions in the classroom, and guide students to discover and learn through hands-on activities, thinking and representation.

For Vygotsky, who focused on the importance of social cultural dimensions and language as characteristics of schooling and learning (Moll, 1990), the social system in which children develop is crucial to their learning. Parents, teachers and peers interact with the child and mediate learning through socially organized instruction. Peer collaboration is also an important idea of the

Vygotskian perspective. Peer groups are commonly used for learning in field such as mathematics, science and language arts. Therefore, Vygotsky's sociocultural theory is considered for developing teaching learning activities in this study.

Background Teaching Models of the Research

Five teaching models are taken into consideration in the proposed model. Main ideas of each model are presented as follows. Glaser's basic teaching model is the fundamental teaching model among the various teaching model. This model is suitable for all levels of education i.e., elementary, secondary, higher etc. It consists of four main components such as instructional objectives, entering behaviors, instructional procedure and performance assessment with feedback loop.

Flander interaction analysis model captures the verbal behavior of teachers and students that is directly related to the social-emotional climate of the learning environment. The term "interaction" means an action – reaction or a mutual or reciprocal influence which may be between individuals. The improvement of pupils' interaction and social skills is one of the most important aims of education. To enhance communication skill, one of mathematics process skills, these ideas of interaction analysis model should be taken into account.

Dr. Talyzina's neocybernetic model is composed of the following: instructional objectives, input level or entering behavior, selection and/or structuring of knowledge technological devices or multi-media presentation of materials, acquisitional steps or step-by-step psychological theory, teaching algorithm, feedback phase and regulation or corrective actions stage (Khin Zaw, 2001a).

Polya created his famous four-step process for problem solving, which is used to help students in problem solving process. He developed the four steps for problem solving; understand the problem, plan the solution process, carry out the problem solution steps and looking backwards. These four steps should be practiced in every mathematics classroom to develop students' problem solving skills and ability in mathematics.

Moreover, the multimodal model by Dr. Khin Zaw (2001b) is a vital theoretical construct in the modern pedagogy. This model consists of channel capacity, brain resilience, redundancy, unitilizing/symbolizing modes and diffusing/resynthesizing mode. These modes are essential in the teaching learning process.

Proposed Model for Activity-Based Mathematics Process Skills at the High School Level

The development of the proposed model includes four phases. They are: (1) Preactive Phase, (2) Interactive Phase, (3) Postactive Phase and (4) Feedback Phase.

Preactive Phase

Step (1) Identification of Content

A teacher should select the intended content from prescribed mathematics textbook.

Step (2) Identification of Learning Outcomes

After selecting the content, the teacher has to identify the learning outcomes that are related to the selected learning content.

Step (3) Preparation of Teaching Learning Activities

Teachers have to prepare activities which may contribute to making the learning permanent, creating positive attitudes towards the class, attracting interest for the class and enhancing mathematics process skills.

Step (4) Selection of Teaching Strategies and Methods

The selected teaching strategies and methods should be student-centered.

Teachers have to select innovative teaching methods that provide positive mathematical learning experiences could help to enhance students' mathematics process skills.

Step (5) Selection of Teaching Aids

Selecting relevant teaching aids is the prerequisite step in the preactive phase. Teachers have to explore the resources considering questions: who are the participants? what materials are required? what facilities are needed to conduct the activity?

Step (6) Decisions about How to Assess

Teacher has to decide how to assess and which tools will be used to check the intended learning outcomes are received or not.

Interactive Phase

Step (1) Letting Students Know Learning Outcomes

By letting student know learning outcomes, they will clearly understand beforehand what they are going to learn from the lesson.

Step (2) Giving Activity/ Task

The second step of the interactive phase is giving students teaching learning activities. Mathematics teachers may use one or more teaching learning activities according to selected content and targeted learning outcomes.

Step (3) Discussing Mathematical Ideas in Small Group

Discussing mathematical ideas in small group is one of the best practices that encourage students to be actively participated in the teaching learning process. It creates the environment that engages students who might not otherwise be engaged in their own learning in meaningful ways.

Step (4) Using a Pattern of Relationship to Analyze the Condition

Students have to use the ideas of small group discussion and pattern of relationship to analyze the condition. Using these ideas and patterns, students have to prepare for the presentation.

Step (5) Presentation to the Whole Class

It is the final step of the interactive phase. Students' presentation to the classroom is an important element in delivering positive learning experiences.

Postactive Phase

Step (1) Summary of the Learning Outcomes

In the first step of the postactive phase, teacher and students will discuss the key concepts and main points of the lesson.

Step (2) Reflection on the Lesson

At the end of the lesson, teacher should reflect on the lesson with the students and analyze its effectiveness.

Step (3) Assessment

In this step, the teacher may assess students' performance through observation, questioning, writing student learning journal and giving them extended exercises.

Feedback Phase

The teacher has to continue to the feedback phase when the students do not achieve the expected learning outcomes. Feedback guides the teachers to adapt and adjust their teaching strategies, instructional materials and teaching learning activities.

The Activity-based mathematics process skills model is presented in Figure 1.

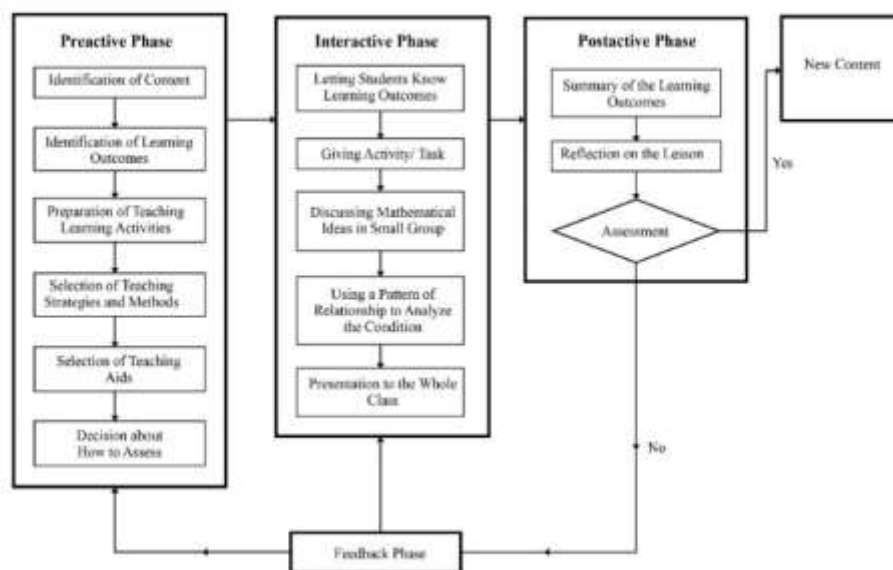


Figure 1 Activity-based Mathematics Process Skills Model
Method

Quasi-Experimental Research Design

The design adopted in this study is one of quasi-experimental research designs, viz., non-equivalent control group design.

Population and Sample

Among the four districts in Kachin State such as Myitkyina, Monyin, Banmaw and Putao District, two districts were randomly selected. Three townships and one town were also chosen from these two districts. One school was randomly chosen from each township and town.

Instruments

The main instruments to collect the data for quasi-experimental design are a pretest and a posttest.

Pretest

This test includes four chapters from mathematics textbook: Introduction to Coordinate Geometry; Exponents and Radicals; Logarithms; and Functions. This pretest includes three sections. Section A consists of 10 multiple choice items, section B consists of short questions and section C consists of long questions. The total score is 50 marks, and the allocated time is one hour and thirty minutes for this pretest.

Posttest

Posttest covers Chapter 5; Quadratic Functions, Chapter 6; Absolute Value Functions, Chapter 7; Probability, Chapter 8; Similarity and Chapter 10; Trigonometry of Grade Ten

mathematics textbook. It consists of multiple-choice items, short question items and long question items. The total score for the test is 50 marks.

Pilot Study

Before starting the main study, for the validation of the tests, pilot study was conducted with Grade Ten students from No (1) Basic Education High School Shwegu, Shwegu Township, Kachin State. The internal consistency reliability of the pretest is tested by Cronbach's Alpha and the posttest is also tested by Cronbach's Alpha. The Cronbach's Alpha internal consistency reliability is .714 for pretest and .752 for posttest.

Research Procedure

At the beginning of the experimental study, the two intact groups were assigned: the experimental group and the control group randomly. Then, a pretest was administered to both groups to analyze the initial level of basic mathematics knowledge. After administering pretest, the experimental group was given the treatment by the proposed model and the control group was taught by formal instruction. After the treatment, a posttest was administered to both experimental and control groups to investigate the impact of proposed model on students' mathematics process skills. And then, the findings are presented based on the experimental and control groups' scores.

Data Analysis

Quantitative data from pretest and posttest were analyzed by applying inferential statistics: Analysis of Covariance (ANCOVA). Analysis of covariance (ANCOVA) is used as a means of increasing the power of a statistical test. ANCOVA is used for controlling extraneous variables. ANCOVA adjusts posttest scores for initial differences on some variable and compare adjusted scores (Mills & Gay, 2016). To be able to determine whether there are significant differences between the experimental group and the control group, the posttest scores of the groups are analyzed by using ANCOVA.

Findings

Research findings for pretest, posttest and mathematics process skills are presented in this section.

Research Findings of Pretest

Table 1 One-way ANCOVA Results for Pretest Scores of Grade Ten Students in S1

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig (2-tailed)
Corrected Model	2.812 ^a	1	2.812	1.381	.244
Intercept	74415.313	1	74115.313	36387.061	.000
Group	2.813	1	2.813	1.381	.244 (ns)
Error	158.875	78	2.037		
Total	74277.000	80			
Corrected Total	161.687	79			

Note. S1 = No. (1) Basic Education High School, Myitkyina; ns = not significant.

The results in Table 1 show that there was no significant difference between the pretest scores of the experimental group and those of the control group in S1.

Table 2 One-way ANCOVA Results for Pretest Scores of Grade Ten Students in S2

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig (2-tailed)
Corrected Model	275.560 ^a	1	275.560	53.602	.000
Intercept	96596.640	1	96596.640	18790.136	.000
Group	275.560	1	275.560	53.602	.000***
Error	503.800	98	5.141		
Total	97376.000	100			
Corrected Total	779.360	98			

Note. S2 = No. (1) Basic Education High School, Waingmaw; *** $p < .001$.

The results in Table 2 show that there was significant difference between the pretest scores of the experimental group and those of the control group in S2.

Table 3 One-way ANCOVA Results for Pretest Scores of Grade Ten Students in S3

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig (2-tailed)
Corrected Model	0.137 ^a	1	0.137	0.138	.712
Intercept	67392.137	1	67392.137	67630.365	.000
Group	0.137	1	0.137	0.138	.712 (ns)
Error	72.743	73	0.996		
Total	66753.000	75			
Corrected Total	72.880	74			

Note. S3 = Basic Education High School, Namati: ns = not significant.

The results in Table 3 show that there was no significant difference between the pretest scores of the experimental group and those of the control group in S3.

Table 4 One-way ANCOVA Results for Pretest Scores of Grade Ten Students in S4

Source	Type III Sum of Squares	df	Mean of Squares	F	Sig (2-tailed)
Corrected Model	0.683 ^a	1	0.683	0.264	.609
Intercept	65657.627	1	65657.627	25418.104	.000
Group	0.683	1	0.683	0.264	.609 (ns)
Error	180.817	70	2.583		
Total	66066.000	72			
Corrected Total	181.500	71			

Note. No. (1) Basic Education High School, Moegaung: ns = not significant.

The results in Table 4 show that there was no significant difference between the pretest scores of the experimental group and those of the control group in S4.

Research Findings of Overall Posttest

The following table show the one-way ANCOVA results for mathematics achievement on posttest of Grade Ten students in S1, S2, S3 and S4.

Table 5 One-way ANCOVA Results for Overall Posttest Scores of Grade Ten Students

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	p	η^2	EG	CG	EG	CG
S1	Pretest	1	0.773	0.382	.010	42.60	31.90	42.56	31.94
	Group	1	204.200	.000***	.726				
	Error	77							
S2	Pretest	1	0.958	0.330	.010	43.28	33.48	43.13	33.63
	Group	1	353.586	.000***	.785				
	Error	97							
S3	Pretest	1	1.045	0.310	.014	42.34	30.55	42.36	30.54
	Group	1	546.284	.000***	.884				
	Error	72							
S4	Pretest	1	0.170	0.682	.002	39.82	31.59	39.81	31.60
	Group	1	136.642	.000***	.664				
	Error	69							

Note. S1 = No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG = Experimental Group; CG = Control Group; *** $p < .001$.

The results presented in Table 5 show that there was a significant difference between the posttest scores of the experimental group and control group in S1, S2, S3 and S4 without considering the extraneous variables on these scores.

Research Findings of Students' Mathematics Process Skills on Posttest

Quantitative research findings of students' mathematics process skills on posttest in each selected school were presented in this section.

(i) Quantitative Research Findings of Students' Problem-Solving Skill on Posttest

Table 6 One-Way ANCOVA Results for Problem-Solving Skill on Posttest

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	p	η^2	EG	CG	EG	CG
S1	Pretest	1	0.111	0.740	.001	8.73	6.48	8.73	6.47
	Group	1	37.219	.000***	.326				
	Error	77							
S2	Pretest	1	0.333	0.565	.003	8.76	6.88	8.77	6.87
	Group	1	66.266	.000***	.406				
	Error	97							
S3	Pretest	1	0.118	0.732	.002	9.00	7.30	9.00	7.30
	Group	1	30.230	.000***	.296				
	Error	72							
S4	Pretest	1	0.215	0.644	.003	8.74	6.71	8.75	6.70
	Group	1	63.024	.000***	.447				
	Error	69							

Note. S1 = No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG = Experimental Group; CG = Control Group; *** $p < .001$.

According to the results in Table 6, there were significant differences in the problem-solving skill on posttest between experimental group and control groups in S1, S2, S3 and S4.

(ii) Quantitative Research Findings of Students' Communication Skill on Posttest

Table 7 One-Way ANCOVA Results for Communication Skill on Posttest

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	P	η^2	EG	CG	EG	CG
S1	Pretest	1	0.008	.927	.000	8.40	6.08	8.40	6.08
	Group	1	30.267	.000***	.282				
	Error	77							
S2	Pretest	1	0.413	.522	.004	8.70	6.64	8.71	6.63
	Group	1	86.458	.000***	.471				
	Error	97							
S3	Pretest	1	2.988	.088	.040	8.51	5.90	8.52	5.89
	Group	1	86.123	.000***	.545				
	Error	72							
S4	Pretest	1	0.013	.909	.000	8.03	6.29	8.03	6.29
	Group	1	27.196	.000***	.283				
	Error	69							

Note. S1 = No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG = Experimental Group; CG = Control Group; *** $p < .001$.

According to the results in Table 7, there were significant differences in the communication skill on posttest between experimental group and control groups in S1, S2, S3 and S4.

(iii) Quantitative Research Findings of Students' Connection Skill on Posttest

Table 8 One-Way ANCOVA Results for Connection Skill on Posttest

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	P	η^2	EG	CG	EG	CG
S1	Pretest	1	0.022	.883	.000	8.63	6.85	8.63	6.85
	Group	1	33.726	.000***	.305				
	Error	77							
S2	Pretest	1	9.736	.002	.091	8.74	7.00	8.63	7.11
	Group	1	56.497	.000***	.368				
	Error	97							
S3	Pretest	1	1.325	.254	.018	8.60	5.78	8.61	5.77
	Group	1	97.344	.000***	.575				
	Error	72							
S4	Pretest	1	0.255	.615	.004	7.76	6.21	7.77	6.20
	Group	1	38.524	.000***	.358				
	Error	69							

Note. S1 = No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG = Experimental Group; CG = Control Group; *** $p < .001$.

According to the results in Table 8, there were significant differences in the connection skill on posttest between experimental group and control groups in S1, S2, S3 and S4.

(iv) Quantitative Research Findings of Students' Skill of Reasoning and Proof on Posttest
Table 9 One-Way ANCOVA Results for Skill of Reasoning and Proof on Posttest

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	p	η^2	EG	CG	EG	CG
S1	Pretest	1	0.022	.883	.000	8.50	6.70	8.50	6.70
	Group	1	40.138	.000***	.343				
	Error	77							
S2	Pretest	1	0.612	.436	.006	8.46	6.56	8.45	6.58
	Group	1	61.682	.000***	.389				
	Error	97							
S3	Pretest	1	0.060	.808	.001	7.86	5.85	7.86	5.85
	Group	1	59.344	.000***	.452				
	Error	72							
S4	Pretest	1	0.000	.983	.000	7.53	6.38	7.53	6.39
	Group	1	19.699	.000***	.222				
	Error	69							

Note. S1= No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG= Experimental Group; CG= Control Group; *** $p < .001$.

According to the results in Table 9, there were significant differences in the skill of reasoning and proof on posttest between experimental group and control groups in S1, S2, S3 and S4.

(v) Quantitative Research Findings of Students' Representation Skill on Posttest
Table 10 One-Way ANCOVA Results for Representation Skill on Posttest

School	Tests of Between-Subjects Effects					Observed Mean		Adjusted Mean	
	Source	df	F	p	η^2	EG	CG	EG	CG
S1	Pretest	1	1.271	.263	.016	8.35	5.80	8.36	5.79
	Group	1	39.466	.000***	.339				
	Error	77							
S2	Pretest	1	2.276	.135	.023	8.62	6.40	8.47	6.55
	Group	1	30.888	.000***	.242				
	Error	97							
S3	Pretest	1	2.812	.098	.038	8.37	5.73	8.37	5.72
	Group	1	104.019	.000***	.591				
	Error	72							
S4	Pretest	1	.016	.900	.000	7.76	6.00	7.76	6.00
	Group	1	44.334	.000***	.391				
	Error	69							

Note. S1= No. (1) Basic Education High School, Myitkyina; S2 = No. (1) Basic Education High School, Waingmaw; S3 = No. (1) Basic Education High School, Namati; S4 = No. (1) Basic Education High School, Moegaung; EG= Experimental Group; CG= Control Group; *** $p < .001$.

According to the results in Table 10, there were significant differences in the representation skill on posttest between experimental group and control groups in S1, S2, S3 and S4.

Discussion

Mathematics is a powerful equipment needed for many jobs in the increasingly complex and technological society. The lack of mathematics process skills might cause the difficulties among students while learning mathematics. Myanmar students are also facing this difficulty. Therefore, this study was conducted as a new contribution to mathematics teaching and the proposed model could be enhanced students' mathematics process skills. This study mainly aimed to develop a model for enhancing mathematics process skill at the high school level and to investigate the impact of that model in order to give suggestions and recommendations for the effectiveness of mathematics teaching in Myanmar.

There were significant differences between the two groups in all selected schools on the overall mathematics achievement of Grade Ten students. It can be interpreted that the use of the proposed model had a significant effect on students' mathematics achievement. For mean scores of problem-solving skills, communication skill, connection skill, the skill of reasoning and proof, representation skill, it was found that there were significant differences between the two groups in all selected schools. According to these findings, it can be interpreted that the proposed model makes the students enhance mathematics process skills such as problem solving, communication, connection, reasoning and proof, and representation.

Students' performance had significant differences in overall mathematics achievement and in the achievement of mathematics process skills in terms of the statistical results. Therefore, it can be concluded that the proposed model has positively contributed to the improvement of mathematics teaching methodology at the high school level and could encourage the enhancement of students' mathematics achievement and mathematics process skills.

The results of quantitative study were consistent with the findings of previous related studies. Firstly, these findings support Thompson's findings: This study suggests the use of preparation, practice, and performance model work to validate the effectiveness of the standard-based instruction as an effort for a systematic change in the education of mathematics and science (Thompson, 2009). Secondly, it supports Yupadee Panarach' finding: the students' mathematics achievement after receiving the mathematical learning model using activity-based learning was higher than the criteria of 60 percent at .05 level of significance. Overall, their level of work commitment and attitudes toward mathematics were considered high (Yupadee, 2021). Finally, it supports Harjinder Kaur and Anurag Sankhian's finding: activity-based method helps in the improvement of achievement motivation and academic achievement in mathematics as compared to the traditional method (Harjinder & Anurag, 2017). According to the findings of the present study prove that the proposed model has positive influence on students' achievement in mathematics process skills. It is sure that the proposed model can enhance students' mathematics achievement and mathematics process skill. It is also sure that the present study could contribute a new teaching model for mathematics at the high school level in Myanmar.

Suggestions

Mathematics teachers should create classroom environment with the opportunities for students to apply and adapt a variety of appropriate strategies to solve problems, to make and investigate mathematics conjectures, to discuss their thinking as well as evaluate thinking and strategies of other students, to construct mathematical ideas through connecting their previous ideas, and to create and use multiple representation in expressing mathematical ideas. Mathematics teachers should apply modern active teaching methods which encourage students enhance mathematics process skills and they also should use relevant teaching learning activities which

develop 21st century skills. Mathematics teachers should collaborate with students, asking questions or thinking aloud when a student or a group of students is not making progress. They should scaffold base on knowledge and skills of individual students. They should provide resources and time for students to gather data, detect patterns, make and justify conjectures. They should ask probing questions if data or strategy seems to be unconnected or inappropriate to the inquiry. They should organize pooling of data, as appropriate. They should guide students as they apply their chosen strategy. They should facilitate the purposeful sharing of different problem-solving strategies for the same problem. They should direct students to use multiple strategies to solve the same problem, when appropriate.

Conclusion

As a conclusion of this study, it was seen that the proposed model and learning activities enhance students' academic achievements and mathematics process skills. This study also demonstrated that proposed model may be utilized more than formal learning in teaching mathematics. Finally, it is expected that the proposed model will lead to positive results on the academic success levels of students in case of its implementation in the mathematics curriculum.

Acknowledgements

Firstly, we would like to offer our respectful thanks to Dr. Kay Thwe Hlaing, (Rector), Dr. May Myat Thu, Dr. Khin Khin Oo, and Dr. Nyo Nyo Lwin (Pro-Rectors, YUOE), Dr. Khin Zaw (Retired Rector, YUOE) and Dr. Khin Mar Khine (Professor and Head of Department, Department of Curriculum and Methodology, YUOE) who allowed us to carry out this study successfully.

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AN INVESTIGATION INTO TEACHER EDUCATORS' TECHNOLOGY ANXIETY

Pyae Hlyan Chan Myae Khin¹ and Khin Mar Khine²

Abstract

The main purpose of the study is to examine the level of technology anxiety of teacher educators of Education Degree Colleges within the academic year 2022-2023. The specific objectives are to find out technology anxiety of teacher educators in terms of the level of educational qualification, teaching service and time to study online teaching-learning resources daily. Quantitative survey research method was used in this study. The samples are 236 teacher educators (20% of population) from Education Degree Colleges (EDCs) by using stratified random sampling method. The instrument used in this study was the questionnaire. The descriptive statistical analysis and inferential statistical analysis (independent samples *t* test and ANOVA) were employed to analyze the data. According to the results, the majority of the teacher educators falls under the high technology anxiety level. There was no significant difference of technology anxiety in educational qualification. There were significant differences in technology anxiety with regard to teaching service and time to study online teaching-learning resources daily. A key contribution of the current study is to enlighten the teacher educators about the hardware, software and technical issues to realize the effectiveness of the educational technology and feel assertive using it. Moreover, this study is invaluable as it allows teacher educators to see the weaknesses and needs to minimize their technology anxiety.

Keywords: Technology, Anxiety, Technology Anxiety, Educational Technology, Educational Technology Anxiety

Introduction

Modern day is the age of science and technology. The world of today is very dynamic. There have been enormous changes in the life style of human beings which may be attributed to the contribution of science and technology. The contribution of science and technology has been accomplished in almost all the spheres of human life including education. The word 'technology' antiquated taken from the Greek word 'techniques' which means an art and which is related with skill and dexterity. Educational technology as 'the development of a set of systematic techniques and accompanying practical knowledge for designing, testing and operating schools as educational systems' (Gagne, 1988). It has become an increasingly ultimate objective for improving the teaching and learning process of students.

Statement of the Problem

Organizations face changes more extensive and far reaching in implications than anything since the modern industrial revolution occurred in the early 1900s (Phillips, 2008). Technology is one of the central forces driving these changes. Organizations that want to survive in the 21st century must recognize the tremendous force of technology, carry out required organizational changes in the face of it, and learn to operate in an entirely different way.

The end of the last millennium was marked by rapid technological advancement and very great changes in many aspects of human activities, often referred to as indicative of the world moving into the knowledge age. Such changes have energized much discussion about the role and processes of education as well as the role of information and communication technology (ICT) in teaching and learning in the new era.

The work of teachers changes because expectations of schools should achieve change. Normally, shifts are gradual and accumulative. Many of the commentators upon teachers and

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teaching, particularly those in the mass media, hold a simplistic view of teaching as a process of transmission. However, while the past change in education has been comparatively slow, at the same time social, economic, cultural and technological change in the community has been moving at considerable speed.

The present-day learner community is tech savvy and spent huge amount of time engaged with electronic devices especially in internet. The magical world, 'internet', is able to supply any information as the consumer wish. In teaching-learning process both teacher and students have equal role to produce a fruitful result (Ajithkumar, 2017). Students prefer learning in multiple ways and modern devices and internet are inseparable to learning culture. But it is sad to say, still many teachers fail to organize technical rich classroom learning activities.

The world today is demanding skills and competencies that enable any individual to be skillful and perform at workplaces and at places of living. According to the report of Myanmar Comprehensive Education Sector Review (CESR) Series (1), the priority is to improve teachers' quality for promoting Teacher Education Department in line with the international level. Therefore, analyzing the use of ICT is one of the Continuous Professional Development (CPD) programs for teachers. In the present study, the anxiety of teacher educators regarding ICT has to be subjected to research.

Purpose of the Study

The main purpose of this study is to examine the level of teacher educators' technology anxiety of Education Degree Colleges. The specific objectives are:

1. To measure mean values of technology anxiety of teacher educators based on their level of educational qualification, teaching service and time to study online teaching-learning resources daily
2. To find out the differences in technology anxiety of teacher educators by their level of educational qualification, teaching service and time to study online teaching-learning resources daily
3. To make suggestions and recommendations for stakeholders of Education Degree Colleges based on the findings of the study

Research Questions

1. To what degree do teacher educators feel anxious about technology anxiety while using technology for teaching-learning?
2. How do teacher educators feel anxious about technology anxiety by their level of educational qualification, teaching service and time to study online teaching-learning resources daily?
3. Are there any significant differences in the teacher educators' technology anxiety about educational technologies in terms of their time to study online teaching-learning resources daily, their teaching service and their educational qualification?

Scope of the Study

The following points indicate the scope of the study.

- (1) The study is geographically restricted to four Regions: Ayeyarwady, Yangon, Magway and Sagaing.
- (2) The participants in the study are teacher educators from selected Education Degree Colleges within the academic year 2022-2023.

Definition of Key Terms

Technology: It was defined as “high-tech media utilized in instruction such as computers, e-mail, Internet, CDROMs, software, laser disc players, interactive CDs, digital cameras, scanners, digital camcorders, etc.” (Othman & Maat, 2020).

Anxiety: It is "an unpleasant emotional state or condition which is characterized by subjective feelings of tension, apprehension, and worry, and by activation or arousal of the automatic nervous system" (Spielberger, 1972).

Technology Anxiety: It is a negative emotional state or a negative cognition experienced by an individual when he/she uses technology or technology equipment (Bozionelos, 2001).

Educational Technology: It is a combination of the processes and tools involved in addressing educational needs and problems, with an emphasis on applying the most current tools: computers and their related technologies (Roblyer & Edwards, 2000).

Educational Technology Anxiety: It is defined as a person's prejudices or fears about utilizing instructional technology or thinking about the outcomes of using instructional technology (Marcoulides, 1989).

Significance of the Study

This study is significant in many ways. First, pedagogues would also benefit from the study as the status of their anxiety about technology used. Second, study will be able to give out things that cause technology anxiety. This would inform the barriers and needs for weaknesses of ICT technology. Third, most studies described years of teaching experiences; however, this study analyses the differences among means of technology anxiety based on not only educational qualification but also time to study online teaching-learning resources daily. Finally, the findings of the study will be supported as a reference source for inspiration further studies on the teacher educators' anxiety regarding technology.

Review of Related Literature

Education has evolved as the result of technology. When integrating technology into the teaching and learning environment, it is vital to consider the developmental stage of the learner, human development from a cognitive perspective (based on the work of Piaget), (Thompson, 2019).

Cognitive Theories of Learning

In the 1960s, cognitive theories of learning gradually started to replace Behaviorism as a predominant view. Cognitive theorists claim that observable behaviors are not sufficient to describe learning because the internal thought processes are also part of learning. The cognitive perspective was massively influenced by the development of computer technology and telecommunications, and use the computer as a metaphor to understand what is happening in the human mind.

Information Processing

One of the early cognitive theories of learning and memory was Information Processing Theory of Atkinson and Schiffman (1968). This theory considers the mind as a computer that receives inputs and performs processing activities on those inputs, alike to the way a computer

processes data. In this view there are three buckets: seeing, hearing, smelling. It starts in the sensory register known as memory stores.

Cognitive Theory of Multimedia Learning

Richard Mayer's Cognitive Theory of Multimedia Learning is a particularly useful theory for educational technologists because it endeavours to offer some prescriptive advice for designing media for learning. This theory suggests three main assumptions when it comes to learning with multimedia: there are two separate channels (auditory and visual) for processing information, each channel has a limited (finite) capacity, learning is an active process of filtering, selecting, organizing and integrating information based upon preceding knowledge.

Implications of Constructivism

Using technologies as constructivist tools is assumed that conceptions of education will change, that schools or classrooms will reform the educational process. In order for students to learn with technology, teachers must accept and learn a new model of learning. The teachers' roles transfer from dispensing knowledge to helping learners construct more viable conceptions of the world.

Philosophical Basis of Educational Technology

The works of Psychologists such as B.F. Skinner, Pressey and Watson greatly influenced the method and practice of educational technology (Ouyang & Stanley, 2014). The works of B.F. Skinner in the production of the teaching machines led to massive involvement of educational technologists in the production of more modern teaching machines. The instructional format used in teaching machines became appeared as programmed instruction (PI), and this new technology became a popular subject of educational research and development by the late 1950s.

Educational Technology

Educational technology can be identified as a complex, integrated process involving people, procedures, ideas, devices, and organization, for analyzing problems and devising, implementing, evaluating, and managing solutions to those problems, involved in all aspects of human learning (Force, 1977, as cited in Roblyer & Edwards, 2000).

Saettler (1990) urges the seeking precision to remember that "the historical function of educational technology is a process rather than a product. In accordance with specialists, educational technology can be explained by looking at the two major components of the concept "Technology in Education" and "Technology of Education".

Use of Technology in Education

A history of technology in education since 1920 placed the emphasis on radio and television, with computers as an afterthought (Cuban, 1986).

Technology in education is denoted application of machines, gadgets or equipment to improve the quality of education. It is "hardware" approach to educational technology. It means utilizing devices like computers, laptops and mobile phones for providing education. It involves the use of pieces of instructional materials: audio media, visual media, audio-visual media, broadcast / telecommunication media, projected media.

Use of Technology of Education

Technology of education relates to application of theories and laws/rules in education and related disciplines for the purpose of enhancing the quality of education. It is techniques and methodologies of the teaching learning process. This is certainly the software aspect of educational technology.

Differences between Technology in Education and Technology of Education

Technology in education, its origin lies in the application of physical sciences or engineering to education (Khin Zaw, 2001). It is related to teaching aids. Skilled personnel in hardware technology are needed. It is called relative technology.

Technology of education based on child psychology (age, ability and mental level). Its origination lies in the application of behavioral sciences to the problems. The use of this approach does not have need of the skilled personnel as in hardware technology. It is called constructive educational technology.

Anxiety

Anxiety can be expressed as an unpleasant emotional state which makes individuals feel weak and powerless when confronted with danger or threat (Aydın & Zengin, 2008).

Although computer-assisted instruction holds an important place in educational settings, not all teachers are capable enough to benefit from technology due to their anxiety (Rahimi & Yadollahi, 2011). Teachers who do not keep up with the latest educational technologies: talking motion pictures, overhead projectors and cell phones will almost certainly fall behind, and unfortunately, stay behind (Schmidt, Baran, Thompson, Mishra, Koehler, & Shin, 2009).

Educational Technology Anxiety

Educational technology anxiety can be defined as a person's prejudices or fears about utilizing instructional technology or thinking about the outcomes of using instructional technology (Marcoulides, 1989), or as teachers' discomfort, nervousness, and fear of dealing with ICT instruments, as well as uneasiness in anticipation of unfavorable outcomes from computer-related operations (Chang, 2005).

Hardware Approach

The hardware approach relates to the use of machines and other mechanical devices in the educational process. It adopts a product-oriented approach. It based on the concept of service, such as using technology in education (Silverman 1968, as cited in Jonassen, Howland, Moore, & Marra, 2003). While teaching in a big hall, a teacher uses a microphone for making voice audible, it may be said to approach such type of education technology for making teaching effective.

Software Approach

Software approach is characterized by task analysis, writing precise objectives in behavioral terms, selection of appropriate learning strategies, immediate reinforcement of responses and constant evaluation. It tries to adopt a process-oriented technique for production of suitable teaching-learning material, teaching-learning strategies, and evaluating techniques for the optimum results in the process of teaching and learning.

Research Method

Research Design

The present study intended to collect data regarding technology anxiety of teacher educators. The method selected for the study was one of the quantitative research approaches, survey research.

Instrument

The instrument using in this study was the questionnaire (Aruna & Kumar, 2015, as cited in Ajithkumar, 2017) for investigating teacher educators' technology anxiety. The inventory included three parts. Each dimension contains seven items. All items are composed of five-point Likert scale. The questionnaire is validated by eight experienced teacher educators of Department of Curriculum and Methodology, Yangon University of Education, 2022. Some items were revised for clarification and to avoid misunderstanding. Pilot study is conducted with the sample of 39 teacher educators from Education Degree College. The internal consistency of technology anxiety inventory was (0.93) by using Cronbach's Alpha and the main study was carried out in November, 2022.

Population and Sample Size

There are two strata: upper and lower, and 25 Education Degree Colleges (EDCs) in Myanmar. The total number of populations are 1179 (Male =164, Female =1015) teacher educators in teaching of 25 EDCs. For this study, the total number of participants is (N=236, 51% of upper and 49% of lower) from Education Degree Colleges. The samples in this study are teacher educators and selected by using stratified random sampling method. The number of participants is described in the following Table 1.

Table 1. Population and Sample Size

No.	Strata	No. of Education Degree Colleges	No. of Population	No. of selected Education Degree Colleges	Sample
1	Upper	13	598	2	120 (51%)
2	Lower	12	581	2	116 (49%)
Total		25	1179	4	236 (20% of population)

Note: EDC= Education Degree College

Data Analysis

In order to analyze the data collected, the descriptive and inferential statistical analysis were employed to answer the research questions. Descriptive statistics: mean, standard deviation and frequency; and inferential statistical analysis: independent samples *t* test and ANOVA were employed to find teacher educators' technology anxiety.

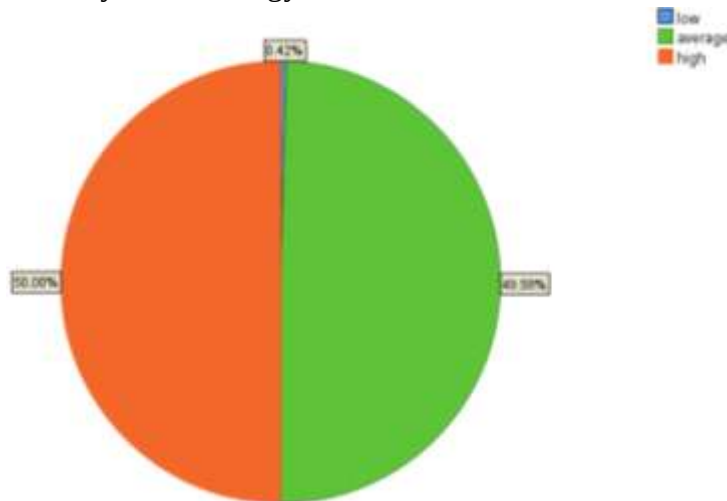
Findings

Frequency and percentage of teacher educators' technology anxiety level were shown in Table 2 and Figure 1.

Table 2. Frequency and Percentage of Teacher Educators' Technology Anxiety Levels at Education Degree Colleges (EDCs)

Technology Anxiety Level	Frequency	Percentage (%)
low	1	0.4
moderate	117	49.6
high	118	50.0

According to the result of Table 2, most of the teacher educators at EDCs clearly showed the high anxiety to technology.

**Figure 1. Percentages of Teacher Educators at EDCs by Technology Anxiety Level**

As shown in Figure 1, most of the teacher educators at EDCs clearly showed the high anxiety to technology.

The following tables show findings for research question (2) and (3).

Table 3. Mean Values and Standard Deviations of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	Teaching Service	No. of Teacher Educators	Mean	SD
Technology Anxiety	0-5 years	51	60.73	11.74
	6-10 years	55	58.29	13.95
	11-15 years	39	61.72	13.84
	16-20 years	44	64.41	14.69
	above 20 years	47	68.96	14.11

According to the result of Table 3, the teacher educators' group who experienced above 20 years teaching services (68.9574) had the highest technology anxiety level and the teacher educators' group who experienced 6-10 years teaching services (58.2909) had the lowest technology anxiety respectively by comparing mean values.

Table 4. One-Way ANOVA Results of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	Teaching Service	Sum of Squares	df	Mean Square	F	p
Technology Anxiety	Between Groups	3273.858	4	818.465	4.385	.002**
	Within Groups	43115.951	231	186.649		
	Total	46389.809	235			

Note: **p<.01

According to Table 4, there was a significant difference between teacher educators grouped by Teaching Service.

Table 5. Results of Post Hoc Multiple Comparisons of Teacher Educators' Technology Anxiety Grouped by Teaching Service, N = 236

Variable	(I) Teaching Service	(J) Teaching Service	Mean Difference (I-J)	p
Technology Anxiety	above 20 years	0-5 years	8.23*	.026*
	above 20 years	6-10 years	10.67*	.001***
	above 20 years	11-15 years	7.24	ns
	above 20 years	16-20 years	4.55	ns
	16-20 years	0-5 years	3.68	ns
	16-20 years	6-10 years	6.12	ns
	16-20 years	11-15 years	2.69	ns
	11-15 years	0-5 years	0.99	ns
	11-15 years	6-10 years	3.43	ns
	0-5 years	6-10 years	2.43	ns

Note: ***p<.001, *p<.05, ns = not significant

According to Table 5, the teacher educators' group who experienced above 20 years teaching services were higher in the level of technology anxiety than both of the teacher educators' group who experienced teaching services, 0-5 years and the teacher educators' group who experienced teaching services 6-10 years.

Table 6. Independent Samples t Test Results Showing Mean Values of Teacher Educators' Technology Anxiety Grouped by Educational Qualification N = 236

Variable	Educational Qualification	No. of Teacher Educators	Mean	SD	t	df	p
Technology Anxiety	Bachelor	73	65.3151	14.30800	1.963	234	ns
	Master	163	61.4540	13.81054			

Note: ns = not significant

According to Table 6, there was no significant difference between the teacher educators grouped by Educational Qualification.

Table 7. Mean Values and Standard Deviations of Teacher Educators' Technology Anxiety Grouped by Time to Study Daily Online Teaching-Learning Resources, N = 236

Variable	Time to study daily online teaching-learning resources	No. of Teacher Educators	Mean	SD
Technology Anxiety	not study daily	49	67.0612	15.83431
	15min-1hour	116	61.7672	12.54374
	above1hr-3 hours	37	58.9730	15.16847
	3hours and above	34	63.2941	13.94693

According to the mean values of Table 7, the teacher educators' group who do not study online teaching-learning resources daily had the highest technology anxiety level and the teacher educators' group who study online teaching-learning resources for above 1hr-3hours daily had the lowest technology anxiety level.

Table 8. One-Way ANOVA Results of Teacher Educators' Technology Anxiety Grouped by Time to study daily online teaching-learning resources, N=236

Variable	Time to study daily online teaching-learning resources	Sum of Squares	df	Mean Square	F	p
Technology Anxiety	Between Groups	1558.246	3	519.415	2.688	.047*
	Within Groups	44831.564	232	193.239		
	Total	46389.809	235			

Note: *p<.05

According to Table 8, there was a statistically significant difference between the teacher educators grouped by Time to study daily online teaching-learning resources.

Table 9. Results of Post Hoc Multiple Comparisons of Teacher Educators' Technology Anxiety Grouped by Time to study daily online teaching-learning resources, N=236

Variable	(I) Time to study daily online teaching-learning resources	(J) Time to study daily online teaching-learning resources	Mean Difference (I-J)	p
Technology Anxiety	not study daily	above 1hr-3hours	8.08825*	.040*
	not study daily	15min-1hour	5.29398	ns
	not study daily	3hours and above	3.76711	ns
	15min-1hour	above 1hr-3hours	2.79427	ns
	3hours and above	15min-1hour	1.52688	ns
	3hours and above	above 1hr-3hours	4.32114	ns

Note: *p<.05, ns = not significant

According to Table 9, the group of teacher educators who do not study online teaching-learning resources daily was higher in the technology anxiety level than the group of teacher educators who do study online teaching-learning resources for above 1hr-3hours daily. However, no significant differences were found between the study groups daily.

Discussion

The study surveyed the anxiety of teacher educators while they employed technology in teaching. This present study highlighted inadequate consideration of technology in education and technology of education, allied communities of educational technology.

The teacher educators were grouped into three groups based on the scores obtained namely low technology anxiety, average technology anxiety and high technology anxiety. According to the results, 50 % of teacher educators had high technology anxiety among the participants selected for the study. Therefore, majority of the teacher educators falls under high technology anxiety group. It is expressed that teacher educators suffer from technology anxiety due to technical concerns. As continuous changing and upgrading of technology usually require newer and higher level of skills and knowledge (Rosen & Weil, 2000), the respondents felt that this resulted in added pressure. However, organization can help reduce the technology anxiety by providing good training, continuous learning and good technical and organizational support (Ajithkumar, 2017).

Another discussion in the study is that there is no significant difference of Technology anxiety in educational qualification. This means that teacher educators' technology anxiety is irrespective of the level of education. This finding is in line with (Kagizmalı, Tatar & Zengin, 2013) who revealed that there was no significant difference in teacher educators' Technology anxiety according to the level of education. However, this finding is different from the study of (Erdogan & Sahin, 2010). They showed that there were significant differences in Technology anxiety of primary and secondary mathematics teachers. This might happen due to the fact that the difference between teacher educators and school teachers.

Moreover, the results of the current study show that there is a significant difference of time to study daily online teaching-learning resources on Technology anxiety. The group of teacher educators who do not study online teaching-learning resources daily was significantly highest level of technology anxiety by comparing mean scores. It is observed that teacher educators also suffer from technology anxiety due to the amount of time using technology and technical issues. This finding is also due to the fact that the technology has made their tasks more complex and they needed more time, not only to understand and use the technology, but to upgrade their technological skills (Awofala, Olabiyi, Awofala, Arigbabu, Fatade & Udeani, 2019). Teacher educators who have computer skills, computer literacy, application, and positive attitudes toward computers and network use are less anxious. Besides, technology-supported environments lessen teacher educators' anxiety.

The last discussion prevailed from the study is that there is a significant effect of teaching service on Technology anxiety. The study revealed that the teacher educators' group who experience 6-10 years teaching had the lowest technology anxiety level. This result is consistent with the exponential increase of teachers' functions affects the appearance of anxiety, especially in older people (Hassan, Yaakob, Halif, Aziz, Majid, & Sumardi, 2019). It is indicated that young teacher educators perceive that technology is unavoidable with regard to the whole teacher community in present day, moreover, online learning and the utilization of mobile devices are also

effective for lowering anxiety. On the other hand, the aged teacher educators hesitate to use technology in educational practices and have the desire to use classic teaching methods in their teaching-learning process.

Suggestions

According to the findings of the study, the following suggestions for responsible persons of Teacher Education, administrators and teacher educators are outlined.

1. The responsible persons should provide technical support, resources and access to learn how to apply technology for new curriculum and continuous professional development of teacher education through providing training courses.
2. The responsible persons should support to get internet access and sufficient technology facilities in the Campus.
3. The responsible persons should bring down the technology anxiety of teacher educators by providing hands on experience.
4. The administrators should supply teacher educators with knowledge of ICT through training courses from the beginner to the advanced stage like Lesson Study regularly.
5. The administrators should encourage teacher educators to create ICT-based lessons.
6. The teacher educators should employ theoretical and practical knowledge in educational technology.
7. The teacher educators need to keep in touch with modern teaching devices and regular practice in web-based technology.

Recommendations

1. The participants participated in this study are teacher educators at Education Degree Colleges. Sample EDCs, Department of Teacher Education were randomly selected. The only questionnaire survey method was used to investigate the status of teacher educators' Technology anxiety in this study.
2. A key contribution of the current study is to enlighten the teacher educators about the hardware, software and technical issues to realize the effectiveness of the educational technology and feel assertive using it.
3. In addition, it could also be fruitful to explore the technology anxiety of teacher educators who study online teaching-learning resources daily. This result is a strong and encouraging evidence, especially for these teacher educators who can be anticipated to a certain extent to have lower level of technology anxiety.
4. For further study, it is needed to examine the level of Technology anxiety of teachers at the Basic Education and Higher Education Sectors.
5. In the future, it is necessary to explore reasons and challenges of the teacher educators' technology anxiety and educational technology.

Conclusion

In the past few years, educational technology has become critical in education as well as in the professional growth of teachers. Moreover, teacher education is a delicate and deep process, and it is very important for teacher educators to continue their professional development. It is crucial role to carry out the development of teacher education to produce qualified teachers.

From the findings of the study, teacher educators need to take into account not only technology in education but also technology of education to reduce their technology anxiety. Therefore, this study is invaluable as it allows teacher educators to see the weaknesses and needs to minimize their technology anxiety.

In conclusion, the administrators, educators, specialists and those who are involved in the educational organization should take into consideration for reducing and overcoming technology

anxiety of teacher educators. Therefore, continuous improvement programs must be conducted regularly in line with new curriculum and today demands for teacher educators.

Acknowledgements

We would like to thank 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 the administrative support and permission. Our special thanks also go to all participants in this study.

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DEVELOPING A PROPOSED MODEL FOR PRINCIPAL LEADERSHIP PRACTICES FOR TEACHER COLLEGIALLY IN BASIC EDUCATION SCHOOLS*

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Abstract

The main objective of the study was to develop a proposed model for principal leadership practices for teacher collegiality in basic education schools. Principal leadership practices were studied with five domains based on school-level leadership practices developed by Belchetz and Leithwood (2007), Day and Sammons (2010) and Leithwood (2012). Teacher collegiality was examined with eight dimensions based on the teacher collegiality scale developed by Barth (1990), Little (1990) and Shah (2011). Mixed methods research was used. Two sets of questionnaires: questionnaire (1) for principals and questionnaire (2) for teachers were utilized. Four-point Likert scale was employed. By using simple random sampling, 33 principals and 390 teachers were selected as participants. The value of Cronbach's alpha for principal leadership practices was .92 and for teacher collegiality was .93. Descriptive statistics, correlation and regression analysis were employed to interpret the quantitative data. Interview forms for principals and teachers were used in qualitative study. Principals *practice to a moderate extent* in the leadership practices. The leadership practices of MEd degree holder principals were significant from MA/MSc degree holder principals ($p<.01$, $d=.96$) and BEd degree holder principals ($p<.01$, $d=.47$). The principals who had 16-20 years of administrative service were significant from those who had 6-10 years of administrative service ($p<.001$, $d=.98$) and those who had 11-15 years of administrative service ($p<.001$, $d=.47$). Teachers *practice to a moderate extent* in collegiality. There was a positive relationship between principal leadership practices and teacher collegiality ($r=.682$, $p<.01$). The results showed that the domains of principal leadership practices appeared as predictors for teacher collegiality. Qualitative results revealed that principals provided teacher collegiality by supporting mutual trust among teachers, promoting a culture of openness, and organizing teachers to work on instructions for student achievement. Finally, a proposed model for principal leadership practices for teacher collegiality could be developed.

Keywords: leadership, principal leadership practices, teacher collegiality

Introduction

The need for education has increased the demand for more effective principal leadership practices and higher performance of teachers. Many schools today are in strong need to understand the purpose of the effective principal leadership practices and the new modern strategies to achieve success in the education process. Principals play a crucial role in promoting teacher collegiality because it can foster teachers' professional development (Leithwood, 2012). Professional collegiality among teachers could be either indirect, which can take place before or after school or in the teacher planning period, which includes peer coaching or supervision and different types of cooperative teaching practices (Shah, 2011).

Principal is the most significant person to promote the professional relationship among teachers. Principals provide an environment that motivates teachers to improve the ways in which they deliver instruction. Their leadership practices in schools play the major role of achieving the growth of the pedagogical system and focus on teachers' professional development, as teachers

* Special Award(2023)

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are considered to be the most important element in the education process (Belchetz & Leithwood, 2007). Therefore, teachers need to be supported by qualified leaders, especially qualified principals who appreciate the value of teachers and provide all ways to success.

Significance of the Study

Day and Sammons (2010) stated that strong principal leadership practices can develop guidelines, direct to influence and motivate people. Additionally, principals can foster teacher collegiality in their schools as it is essential for prominent efforts to increase student learning. Teachers need to be empowered to develop skills to be able to experience, think, reflect and learn. Principals also need to understand how to provide the opportunities to empower teachers, and to understand their role within this process.

However, many principals in schools have faced challenges in school leadership, management, and relationship with teachers. So, they need to have a strong theoretical knowledge, skill, attitude and adequate experiences in their leadership practices and they need to have various trainings on school leadership so as to play active and effective leadership practices in school improvement programs (Lipham, 1981). Therefore, this study seeks to investigate principal leadership practices model for teacher collegiality in basic education schools. The results of this study contribute principal leadership practices and teacher collegiality, towards enhancing the capacity of principals, who are responsible for leadership in their schools and teacher collegiality that can assist the capability of teachers.

Research Objectives

The main objective of the study is to develop a proposed model for principal leadership practices for teacher collegiality in basic education schools.

The specific objectives are:

- to find out the extent of principal leadership practices,
- to determine the variations on principal leadership practices in terms of principals' academic qualification and principals' administrative service,
- to identify the predictors of principal leadership practices in terms of principals' academic qualification and principals' administrative service,
- to investigate the levels of teacher collegiality,
- to examine the relationship between the principal leadership practices and teacher collegiality,
- to identify the predictors of principal leadership practices on teacher collegiality, and
- to develop a proposed model for principal leadership practices for teacher collegiality.

Research Questions

- What is the extent of principal leadership practices?
- Are there any variations on principal leadership practices in terms of principals' academic qualification and principals' administrative service?
- What are the predictors of principal leadership practices in terms of principals' academic qualification and principals' administrative service?
- What is the extent of teacher collegiality?
- Is there any relationship between principal leadership practices and teacher collegiality?
- What are the predictors of principal leadership practices on teacher collegiality?
- What is a proposed model for principal leadership practices for teacher collegiality?

Theoretical Framework

In this study, principal leadership practices are investigated with five domains based on practices of school level leadership developed by Belchetz and Leithwood (2007), Day and Sammons (2010) and Leithwood (2012). These five domains are as follows:

Setting Directions: In this set of practices, principals establish overall sense of purpose in their schools, regularly encourage teachers to evaluate their progress, build consensus among teachers for the school's goals, have high expectations for teachers, and for themselves, and make expectations known through both their words and actions.

Building Relationships and Developing People: In these practices, principals provide a support to individual staff and offer intellectual stimulation that promotes reflection and models the desired values and practices.

Developing Organization to Support Desired Practices: In this set of leadership practices, principals build a culture of openness, restructure the organization to support collaboration, build productive relationships with families and communities, and connect the school to the wider community.

Improving the Instructional Program: In this set of leadership practices, principals focus on teaching and learning such as staffing the program, providing instructional support, monitoring school activity, buffering staff from distractions to their work, and aligning resources.

Securing Accountability: In this set of practices, principals build a sense of internal or personal accountability for achieving their schools' goals and priorities on the part of staff members, as well as meeting a set of external conditions for such accountability.

Based on teacher collegiality scale developed by Barth (1990), Little (1990) and Shah (2011), teacher collegiality scale is investigated with eight dimensions. They are:

Mutual Support and Trust: Teachers provide a strong social support for colleagues. They respect the professional competence of colleagues. Professional interactions among teachers are cooperative and supportive. There is a feeling of trust and confidence among staff. Teachers can count on most of their colleagues to help them out anywhere.

Storytelling and Scanning for Ideas: It is described as an exchange if incomplete stories, complaining and griping by school staff members such as teachers openly discuss their failures and mistakes. It is a means of considering their colleagues as their friends.

Observing One another Teaching: It is an increased involvement and ownership among teachers in coaching and mentoring the collegial problem. Teachers observe one another teaching as a part of sharing and improving instructional strategies. Feedback among teachers are considered and responded appropriately.

Joint Planning and Assessment: It is a better communication, more trust, and comfortable to share their expertise and seek professional help from peers. Teachers collectively analyze teaching practices. Cooperation and collaboration exists across departments. They jointly plan and prepare teaching strategies and procedures.

Sharing Ideas and Expertise: Teachers ask for suggestions to specific discipline problems and about the classroom management ideas and suggestions. They discuss frequently about school improvement strategies, discussing their student problems and encourage each other to contribute ideas and suggestions.

Teaching each other: Teachers like to share what they have learned and want to learn. They observe the guidance of expert teachers. They teach each other informally. They enjoy teaching in teams and give demonstrations on how to use new strategies.

Developing Curriculum Together: Teachers in schools contribute actively to making decisions about the curriculum. They find time to work with colleagues on curriculum during a regular work day and jointly discuss and prepare their lessons plan.

Sharing Resources: It is a good social support for achievement and authentic pedagogy. Teachers lend and borrow materials like worksheets and lesson plans. They share journal articles, educational books and materials related to subjects they teach.

Definition of Key Terms

Leadership is a process whereby a person influences the individuals or organization to achieve shared common goals (Northouse, 2004).

Principal Leadership Practices refers to the principals' initiatives or actions with the aim of addressing essential features of a school, which can subsequently contribute to the productivity of school organizations (Hallinger & Heck, 1998).

Teacher Collegiality refers to the professional relationships among teachers, whereby teachers openly and continually observe and discuss classroom practices for the positive outcomes of the school (Shah, 2011).

Operational Definition

Principal leadership practices are the practices or behaviours of principals in schools in order to improve the professional relationship among teachers. Principal leadership practices are measured through the five domains: setting directions, building relationships and developing people, developing organization to support desired practices, improving the instructional program and securing accountability.

Teacher collegiality is the professional relationships among teachers in schools. It is determined through mutual support and trust, storytelling and scanning for ideas, observing one another teaching, joint planning and assessment, sharing ideas and expertise, teaching each other, developing curriculum together and sharing resources.

Review of Related Literature

Principal Leadership Practices

Leadership means vision, cheerleading, enthusiasm, love, trust, passion, obsession, consistency, the use of symbols and paying attention as illustrated by the leaders (Northouse, 2004). Leadership practices are natural predispositions or recurring pattern of behaviours. They are observable and learnable qualities that manifest themselves when leaders actually do those qualities (Enueme & Ekwunoye, 2008).

Principal leadership practices increase teachers' commitment, capacity, and engagement in attaining goals. Sergiovanni (2007) described that principals encourage teachers to focus on the organizational purpose, share beliefs, and incorporate in team work. Since principals play an important role in determining the direction for successful schools, the quality of the principal's leadership is crucial to the success of the school (Lipham, 1981). According to Peters and Austin (1985), principals as leaders are able to create a shared vision and build a sense of commitment among staff, students, and parents.

Teacher Collegiality

Sergiovanni (1991, as cited in Jarzabkowski, 2002) defined teacher collegiality as the responsibility given to teachers to become an integral part of the management and leadership processes of the school that are guided by that school's shared vision. It is a process of assimilation that involves encouraging personal visions to establish a vision built on synergy.

Katz (1955, as cited in Kelchtermans, 2006) stated that collegiality in an organization was where teachers work in a supportive, transparent, caring, and encouraging climate for success of each other. Teacher collegiality was defined as cohesion and ability for adjustments of the school community members who have mutual respect and commitment, and work towards stability with shared power as a unit (Kelchtermans, 2006).

Relationship between Principal Leadership Practices and Teacher Collegiality

Successful schools should have leadership that is supportive of the efforts of the teachers. Principal leadership plays a dominant role in the overall success of a school. It is important for principals to understand the time requirements of professional development opportunities and to take the time to learn and engage together. Gale and Bishop (2014, as cited in Martin, 2016) stated that principals have to build relationships with people in order to create a picture of the ongoing and end goals.

Collegiality stimulates teachers to be risk-takers and to feel comfortable and confident enough to participate in leadership roles outside their classrooms. Teachers are able to lighten their individual workloads when they collaborate together in planning, assessment and even instruction (Jarzabowski, 2002). Teacher collegiality is a workplace factor that can improve the organization's effectiveness. Thus, principals need to engage in the manifold interpersonal interactions with the teaching staff, including being involved in dealing with problems of the school, like parent-school issues (Shah, 2011).

Research Methodology

Research Method

Mixed methods research was employed to collect the required data.

Population and Sample

The participants were chosen from Basic Education High Schools in Mandalay City Development Area. There are 47 Basic Education High Schools in Mandalay City Development Area in 2021-2022 AY. By using simple random sampling, 33 principals and 390 teachers from 33 Basic Education High Schools in Mandalay City Development Area were selected as sample for the quantitative study. The respondent rate was 100%.

For the qualitative study, sample schools were determined by purposive sampling method based on quantitative results. The schools were divided into two groups according to mean values. Two schools that had highest mean values for principal leadership practices and teacher collegiality and the other two schools that had lowest mean values for principal leadership practices and teacher collegiality were selected to interview. Interviewees were four principals, eight primary teachers, eight junior teachers and eight senior teachers from two groups.

Instrumentation

Questionnaire survey and interview questions were used in this study. Two sets of questionnaires, a set of questionnaire for principals and a set of questionnaire for teachers, were developed after the thorough review of the literature. These questionnaires were composed with three parts: part (A) demographic information of participants, Part (B) the survey for principal leadership practices, and part (C) the survey for teacher collegiality. Principals' and teachers' perceptions of principal leadership practices and teacher collegiality were rated by using four-point Likert scale (1= do not practice at all, 2= practice to some extent, 3= practice to a moderate extent and 4= practice to a great extent).

Interview was conducted with principals and teachers in order to get in depth and detailed information. Two set of interview forms were developed based on the findings of quantitative results. For principals' interviews, two questions were developed based on principal leadership practices and teacher collegiality. For teachers' interviews, two questions were developed to investigate principal leadership practices that support teacher collegiality, and factors affecting teacher collegiality.

Data Collection Procedures

The questionnaires were developed after reviewing the related literature. The advice and guidance from the fourteen expert teacher educators who have special knowledge and experience in the education field were taken as an expert view. For item clarity, the wording and content of items were assessed in term of the results of expert review.

The pilot test was conducted with eight Basic Education High Schools in Tada-U Township. Eight principals and 122 teachers from all high schools participated in the pilot test. Based on the results from the pilot study, the questionnaire was revised. The reliability coefficient for principal leadership practices was .92 and teacher collegiality was .93. Then, the modified questionnaires were distributed to 33 Basic Education High Schools in Mandalay City Development Area in the 26th September, 2021 and they were collected after two weeks. The response rate was 100%.

Based on the quantitative results, principals and teachers were selected as participants to take interview for the qualitative study. An interview period was ranged 15 minutes to 30 minutes for each participant. The researcher recorded the detailed notes and used telephone recorder during each interview not to miss the accurate information.

Data Analysis

The collected data were investigated by employing the Statistical Package for the Social Science (SPSS) version 23. The descriptive analysis, one-way ANOVA, multiple comparison tests, Pearson product moment correlation and multiple regression analysis were utilized to analyze the data. The mean value from 1.00 to 1.49 was identified as do not practice at all, the mean value from 1.50 to 2.49 was noted as practice to some extent, the mean value from 2.50 to 3.49 was identified as practice to a moderate extent and the mean value from 3.50 to 4.00 was noted as practice to a great extent. Then, the concept, patterns and themes that emerged from the interviews were compared with quantitative results. The data groups were translated into English language and presented in a reported speech forms.

Findings

Quantitative Findings

Quantitative data analyses were presented through the interpretation of the results.

Table 1 Mean Values and Standard Deviations Showing the Level of Principal Leadership Practices (N=423)

Domain	Mean	SD	Remark
Setting Directions	3.28	.56	practice to a moderate extent
Building Relationships and Developing People	3.15	.65	practice to a moderate extent
Developing Organization to Support Desired Practices	3.13	.53	practice to a moderate extent
Improving the Instructional Program	3.02	.59	practice to a moderate extent
Securing Accountability	3.35	.64	practice to a moderate extent
Grand Mean	3.19	.53	practice to a moderate extent

Scoring Direction: 1.00-1.49 = do not practice at all

1.50-2.49 = practice to some extent

2.50-3.49 = practice to a moderate extent

3.50-4.00 = practice to a great extent

Table 1 showed that principals and teachers perceived that principals *practice to a moderate extent* in leadership practices because grand mean value for principal leadership practices was 3.19.

In order to analyze the academic qualification, principals were classified into four groups: PhD degree (Academic) (PhD) holder principals, Master of Education (MEd) degree holder principals, Bachelor of Education (BEd) degree holder principals and Master (Academic) (MA/MSc) degree holder principals.

Table 2 Mean Values and Standard Deviations of Principal Leadership Practices according to Principals' Academic Qualification (N=423)

Domain	N		Principals' Academic Qualification	Mean	SD
	N ₁	N ₂			
Principal Leadership Practices	4	45	PhD	3.21	.49
	7	76	MEd	3.41	.51
	2	20	MA/MSc	2.83	.57
	20	249	BEd	3.14	.52

Scoring Direction: 1.00-1.49 = do not practice at all

1.50-2.49 = practice to some extent

2.50-3.49 = practice to a moderate extent

3.50-4.00 = practice to a great extent

Note : n₁ = number of principals

n₂ = number of teachers

Table 2 described that principals and teachers perceived that all principals *practice to a moderate extent* in leadership practices in terms of principals' academic qualification.

Table 3 One-way ANOVA Result Showing Principal Leadership Practices according to Principals' Academic Qualification (N=423)

Domain		Sum of Squares	df	Mean Square	F	P
Principal Leadership Practices	Between Groups	7.68	3	2.56	9.78	.000** *
	Within Groups	109.64	419	.26		
	Total	117.32	422			

Note: *** $p < .001$

As described in Table 3, it was found that there was a statistically significant difference in four groups of principals' academic qualification, $F(3,419)=9.78$, $p < .001$.

Table 4 Multiple Comparisons for Principal Leadership Practices Grouped by Principals' Academic Qualification (N=423)

Domain	(I) Principals' Academic Qualification	(J) Principals' Academic Qualification	Mean Difference (I-J)	p
Principal Leadership Practices	MA/MSc	MEd	-.49*	.001**
	BEd	MEd	-.25*	.001**

Note: ** $p < .01$

Table 4 revealed that the leadership practices for the group of MEd degree holder principals were significant from the group of MA/MSc degree holder principals ($p < .01$, $d = .96$) and the group of BEd degree holder principals ($p < .01$, $d = .47$).

Principals' administrative service was categorized into three groups: principals who had 6-10 years of administrative service, principals who had 11-15 years of administrative service and principals who had 16-20 years of administrative service.

Table 5 Mean Values and Standard Deviations of Principal Leadership Practices according to Principals' Administrative Service (N=423)

Domain	N		Principals' Administrative Service	Mean	SD
	N ₁	N ₂			
Principal Leadership Practices	9	104	6-10 years	2.88	.58
	13	149	11-15 years	3.18	.50
	11	137	16-20 years	3.42	.44

Scoring Direction: 1.00-1.49 = do not practice at all

2.50-3.49 = practice to a moderate extent

Note : n₁ = number of principals

1.50-2.49 = practice to some extent

3.50-4.00 = practice to a great extent

n₂ = number of teachers

According to the Table 5, principals *practice to a moderate extent* in their leadership practices because the mean values for all groups of principals in terms of their administrative service were between 2.50 and 3.49

Table 6 One-way ANOVA Result Showing Principal Leadership Practices according to Principals' Administrative Service (N=423)

Domain		Sum of Squares	df	Mean Square	F	p
Principal Leadership Practices	Between Groups	19.00	2	9.50	40.59	.000***
	Within Groups	98.32	420	.23		
	Total	117.32	422			

Note: *** $p < .001$

Table 6 revealed that there was a significant difference in the three groups of principals' administrative service $F(2,420) = 40.59$ ($p < .001$).

Table 7 Multiple Comparisons for Principal Leadership Practices Grouped by Principals' Administrative Service (N=423)

Domain	(I) Principals' Administrative Service	(J) Principals' Administrative Service	Mean Difference (I-J)	p
Principal Leadership Practices	6-10 years	11-15 years	-.27*	.000***
		16-20 years	-.49*	.000***
	11-15 years	16-20 years	-.23*	.000***

Note: *** $p < .001$

In Table 7, leadership practices for principals who had 16-20 years of administrative service was significant from those who had 11-15 years of administrative service ($p < .001$, $d = .47$) and from those who had 6-10 years of administrative service ($p < .001$, $d = .98$). Similarly, principals who had 11-15 years of administrative service were different from those who had 6-10 years of administrative service ($p < .001$, $d = .52$).

Table 8 Correlations between Principal Leadership Practices and Principals' Personal Factors (N=423)

Variable	PLP	PAQ	PAS
Principal Leadership Practices (PLP)	1	.207**	.402**
Principal Academic Qualification (PAQ)		1	.390*
Principal Administrative Service (PAS)			1

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

* Correlation is significant at the 0.05 level (2-tailed).

As described in Table 8, principal leadership practices was correlated with their academic qualification ($r=.207$, $p<.01$). Principal leadership practices was also moderately related with their administrative service ($r=.402$, $p<.01$).

Table 9 Mean Values, Standard Deviations, and Inter-correlations for Principal Leadership Practices and Predictors Variables (N=423)

Variable	Mean	SD	PLP	PAQ	PAS
Principal Leadership Practices (PLP)	3.20	.39	1	.207**	.402*
Predictor Variables					
Principal Academic Qualification (PAQ)	2.97	.77		1	.390*
Principal Administrative Service (PAS)	2.06	.79			1

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

* Correlation is significant at the 0.05 level (2-tailed).

According to Table 9, principal leadership practices was moderately correlated with principals' administrative service ($r=.402$, $p<.01$). However, there was a weak relationship between principal leadership practices and their academic qualification ($r=.207$, $p<.01$).

Table 10 Simultaneous Multiple Regression Analysis for Principals' Personal Factors Predicting Principal Leadership Practices (N=423)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.27	.17		19.52	.000***		
Principals' Academic Qualification (PAQ)	.04	.04	.060	1.24	.217	.85	1.18
Principals' Administrative Service (PAS)	.26	.03	.378	7.81	.000***	.85	1.18

Note: $R=.402$, $\bar{R}^2=.16$, $F(1,421)=80.91$, *** $p<.001$

For the model, the regression equation is:

$$\text{Principal Leadership Practices} = 2.27 + .04\text{PAQ} + .26\text{PAS}$$

To evaluate the regression, the value of $\bar{R}^2$ was .16. This indicated that 16% of the variance in principal leadership practices was explained.

Based on the findings, potential factors affecting principal leadership practices were expressed in Figure 1.

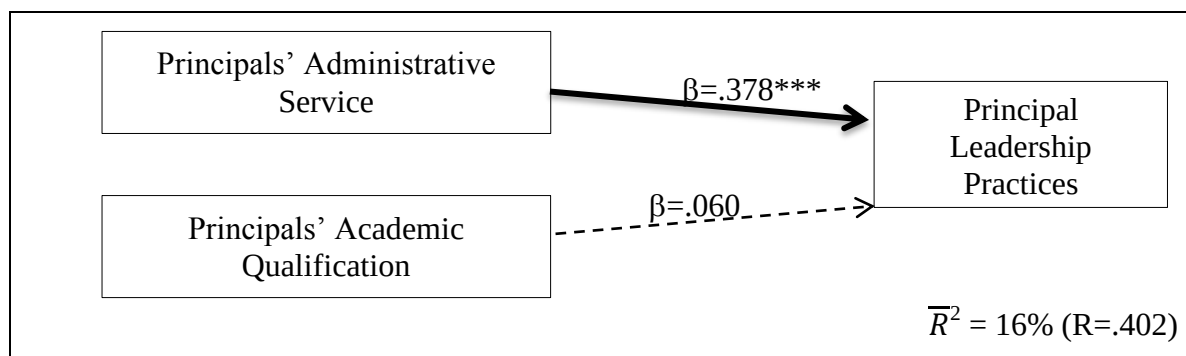


Figure 1 Potential Factors Affecting Principal Leadership Practices

—→ Predicting on Principal Leadership Practices (statistically significant)

--→ Predicting on Principal Leadership Practices (not statistically significant but show relationship)

The value for principals' administrative service was $\beta = .378$ ($p < .001$) and it was appeared as the predictor of principal leadership practices. Principals' academic qualification showed relationship with principal leadership practices.

Table 11 Mean Values and Standard Deviations Showing the Level of Teacher Collegiality (N=423)

Dimension	Mean	SD	Remark
Mutual Support and Trust	3.40	.54	practice to a moderate extent
Storytelling and Scanning for Ideas	3.36	.59	practice to a moderate extent
Observing One Another Teaching	3.07	.56	practice to a moderate extent
Joint Planning and Assessment	2.92	.56	practice to a moderate extent
Sharing Ideas and Expertise	3.18	.55	practice to a moderate extent
Teaching Each Other	3.05	.60	practice to a moderate extent
Developing Curriculum Together	3.33	.61	practice to a moderate extent
Sharing Resources	3.24	.60	practice to a moderate extent
Grand Mean	3.19	.48	practice to a moderate extent

Scoring Direction: 1.00-1.49 = do not practice at all 1.50-2.49 = practice to some extent
2.50-3.49 = practice to a moderate extent 3.50-4.00 = practice to a great extent

Table 11 showed that principals and teachers perceived that teachers *practice to a moderate extent* in their collegiality because the grand mean value was 3.19.

Table 12 Correlation between Principal Leadership Practices and Teacher Collegiality (N=423)

	Principal Leadership Practices	Teacher collegiality
Principal Leadership Practices	1	.682**
Teacher collegiality	.682**	1

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

Table 12 revealed that principal leadership practices was highly correlated with teacher collegiality ($r = .682$, $p < .01$).

In this study, five variables were identified as predictors for teacher collegiality: setting directions (STD), building relationships and developing people (BRDP), developing organization to support desired practices (DOSDP), improving the instructional program (IIP) and securing accountability (SA). Simultaneous multiple regression was utilized to analyze the best predictors

for teacher collegiality. The mean values, standard deviations, and inter-correlations were described in Table 13.

Table 13 Mean Values, Standard Deviations, and Inter-correlations for Teacher Collegiality and Predictor Variables (N=423)

Variable	Mean	SD	STD	BRDP	DOSDP	IIP	SA
TC	3.19	.48	.630**	.709**	.744**	.688**	.660**
Predictor Variables							
STD	3.28	.56	1	.792**	.681**	.577**	.614**
BRDP	3.15	.65		1	.837**	.755**	.718**
DOSDP	3.13	.54			1	.811**	.731**
IIP	3.02	.59				1	.800**
SA	3.35	.64					1

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

As shown in Table 13, teacher collegiality was moderately correlated with setting directions ($r=.630$, $p<.01$), highly correlated with building relationships and developing people ($r=.709$, $p<.01$), developing organization to support desired practices ($r=.744$, $p<.01$), improving the instructional program ($r=.688$, $p<.01$), and securing accountability ($r=.660$, $p<.01$).

Table 14 Simultaneous Multiple Regression Analysis for Principal Leadership Practices Predicting Teacher Collegiality (N=423)

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>p</i>	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	.87	.10		8.65	.000***		
STD	.14	.04	.158	3.08	.002**	.36	2.79
BRDP	.07	.05	.091	1.31	.191	.19	5.18
DOSDP	.32	.06	.354	5.44	.000***	.22	4.51
IIP	.11	.05	.139	2.22	.027*	.24	4.15
SA	.09	.04	.127	2.34	.020*	.32	3.14

Note: $R=.779$, $\bar{R}^2=.602$, $F(5,417)=128.74$, *** $p<.001$, ** $p<.01$, * $p<.05$

STD = Setting Directions

BRDP = Building Relationships and Developing People

DOSDP = Developing Organization to Support Desired Practices

IIP = Improving the Instructional Program

SA = Securing Accountability

The results revealed that, developing organization to support desired practices appeared to be the best predictor of teacher collegiality ($\beta=.354$, $p<.001$). Setting directions appeared to be the second predictor of teacher collegiality ($\beta=.158$, $p<.01$). Moreover, improving the instructional program was the third ($\beta=.139$, $p<.05$) and securing accountability was the fourth predictors of teacher collegiality ($\beta=.127$, $p<.05$). In addition, building relationships and developing people appeared to be important for teacher collegiality.

For the model, the regression equation is:

$$\text{Teacher Collegiality} = .87 + .14SD + .07BRDP + .32DOSDP + .11IIP + .09SA$$

According to the findings, potential factors affecting principal leadership practices for teacher collegiality were revealed in Figure 2.

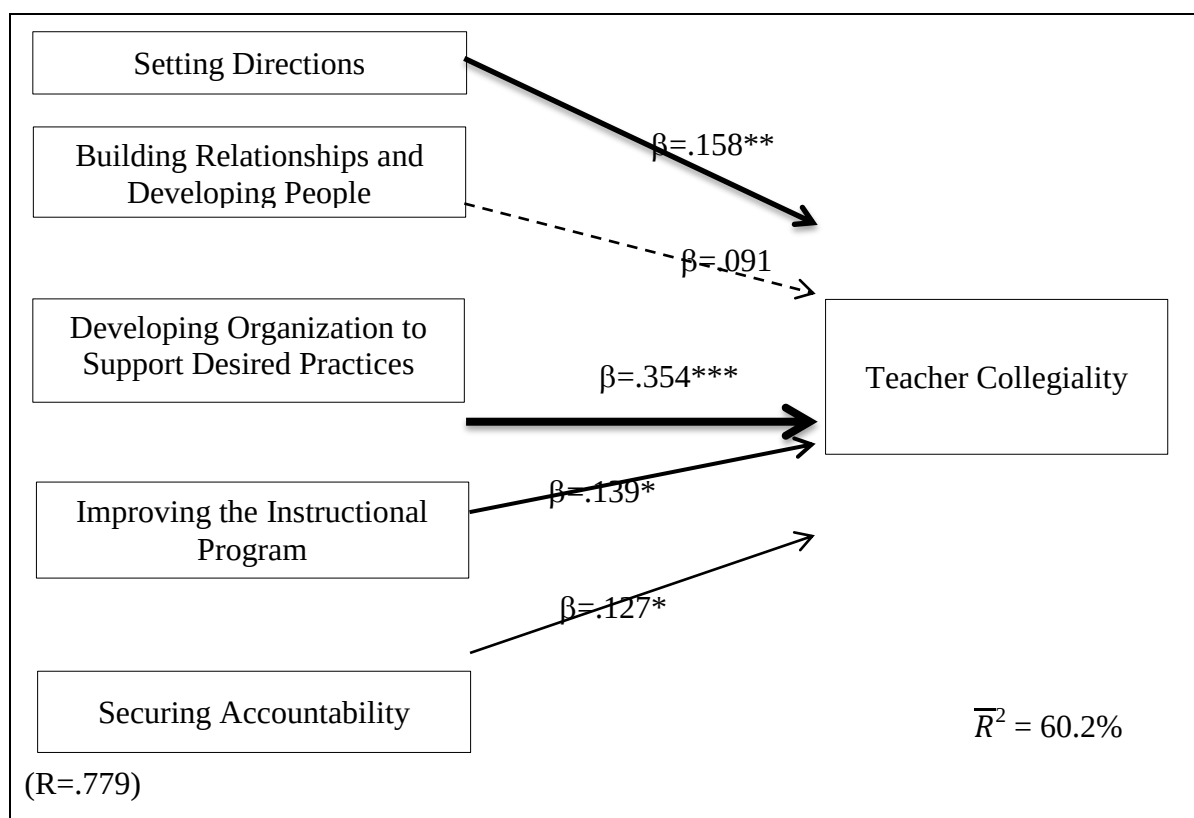


Figure 2 Potential Factors Affecting Principal Leadership Practices for Teacher Collegiality in Basic Education Schools

—→ Predicting on Teacher Collegiality (statistically significant)

--→ Predicting on Teacher Collegiality (not statistically significant but show relationship)

Qualitative Findings

Interview Responses of Principals

Four principals were asked interview questions to gain in-depth information. The first question was “What is the most important factor to contribute leadership in school? How would you learn to practice your leadership skills in your schools?” All principals said that their administrative experiences were very important factor for leadership practices and these experiences were helpful for them. Moreover, they had much valuable knowledge by attending administrative training courses. They also said that they wanted to attend the administrative

training courses to be more focused on school administration, leadership and management because the more they knew their leadership, the higher accountability was formed.

The second question was “How do you support teacher collegiality in your schools? Two principals answered that they supported positive relationship among teachers. They always openly discussed with their teachers’ difficulties. The other two principals responded that they guided teachers to study and observe experienced teachers’ teaching and their lessons preparation. Their schools held continuous professional development (CPD) meetings every month and thus, teaching methods and the use of teaching aids and assessment could be discussed during CPD.

Interview Responses of Teachers

Twenty four teachers were asked interview questions to fulfill the meaningful answers. The first question was “How does the principal provide for enhancing teacher collegiality?” According to the responses, ten teachers answered that their principals provide teacher collegiality by supporting mutual trust among teachers, promoting the culture of openness, and inclusion within schools. They also said that their principals managed the teaching by empowering teachers according to their roles such as subject deans, class heads, class teachers and subject teachers. They could share their experiences in subject-wise discussions. They check students’ academic records cooperatively. Six teachers also responded that their principals support teacher collegiality by facilitating effective learning environment with divergent views and opinions. They also replied that their principals worked with them to establish achievable goals and specific processes to improve school performance. The remaining eight teachers answered that their principals provided technical and other necessary support including coaching and mentoring for teachers to improve their instructional practices.

The second question was “What are the important factors for enhancing teacher collegiality?” According to their response, four teachers responded that collective accountability and responsibility were important for enhancing teacher collegiality. They also expressed that creating a collaborative learning environment through coordinating the activities of professional communities, arranging mentoring pairs, instructing uncooperative teachers, providing instructional support, and delegating responsibilities were also essential feature for teacher collegiality. Fifteen teachers said that the important factors for enhancing teacher collegiality were transparency among teachers, mutual trust, sharing experiences and information, supporting and mentoring teachers and working together in teams. The other five teachers replied that teachers with warm and careful mind were important factors for enhancing teacher collegiality. They also said that a good support of principals’ leadership would contribute teacher collegiality and teacher student relationships in their schools.

Discussion and Conclusion

Based on the findings of the study, discussion and conclusion are presented as follows:

For research question one, principals and teachers perceived that principals *practice to a moderate extent* in their leadership practices. Qualitative findings advocated that their leadership was important for their leadership practices. This finding was similar with the finding of Belchetz and Leithwood (2007) that successful principals who knew the importance of their leadership were highly accountable for their leadership practices. Therefore, it could be noted

that principal would *practice to a great extent* if they knew the important and salient features of leadership practices.

For research question two, findings suggested that principals who are more experienced in school administration with education degree holders revealed greater leadership practices. Interview results from all principals showed that their administrative experiences were important factors for leadership practices and these experiences were helpful for them. Enueme and Egwunyenga (2008) found out in their research that BEd and MEd degrees holder principals had demonstrated a better management of schools. Therefore, principals should have opportunities to attend the administrative training courses and join to the higher education degree such as Master of Education would be effective and successful leaders in school organization.

For research question three, principals' administrative service was appeared as predictor for principal leadership practices. Therefore, principals' administrative service was an important factor for practicing their leadership. Principal academic qualification was correlated with their leadership. Aji (2006) expressed that principals' administrative service and their academic qualification have an impact on principals' leadership in secondary schools. Thus, principals' academic qualifications should be considered as predictor for the positions for headmasters and headmistress.

For research question four, principals and teachers perceived that teachers *practice to a moderate extent* in teacher collegiality. According to interview, creating a collaborative learning environment through coordinating the activities of professional communities, arranging mentoring pairs, instructing uncooperative teachers, providing instructional support, and delegating responsibilities were also essential feature for teacher collegiality. McLaughlin and Talbert (2001) stated that collegial support and interaction influence on teachers' feel about their jobs and their students. Thus, teacher professional relationship support and promote their instruction and make a significant result in teaching.

For research question five, principal leadership practices were highly correlated with teacher collegiality. It can be noted that the higher the principal leadership practices, the greater the teacher collegiality.

For research question six, it was found that setting directions, developing organization to support desired practices, improving the instructional program and securing accountability appeared as predictors for the teacher collegiality. Additionally, building relationships and developing people was important for teacher collegiality. Teacher answered in the interviews as their principals provide teacher collegiality by directing and supporting mutual trust among teachers, empowering teachers, facilitating effective learning environment with divergent views and working on instructions to improve the student outcomes. Perera (2015) described that principal leadership practices foster and support teacher collegiality by providing individual support and intellectual stimulation. Therefore, principal leadership practices highlight for their teacher collegiality.

For research question seven, a proposed model for principal leadership practices and teacher collegiality for this study was developed based on the findings and it was shown in Figure 3.

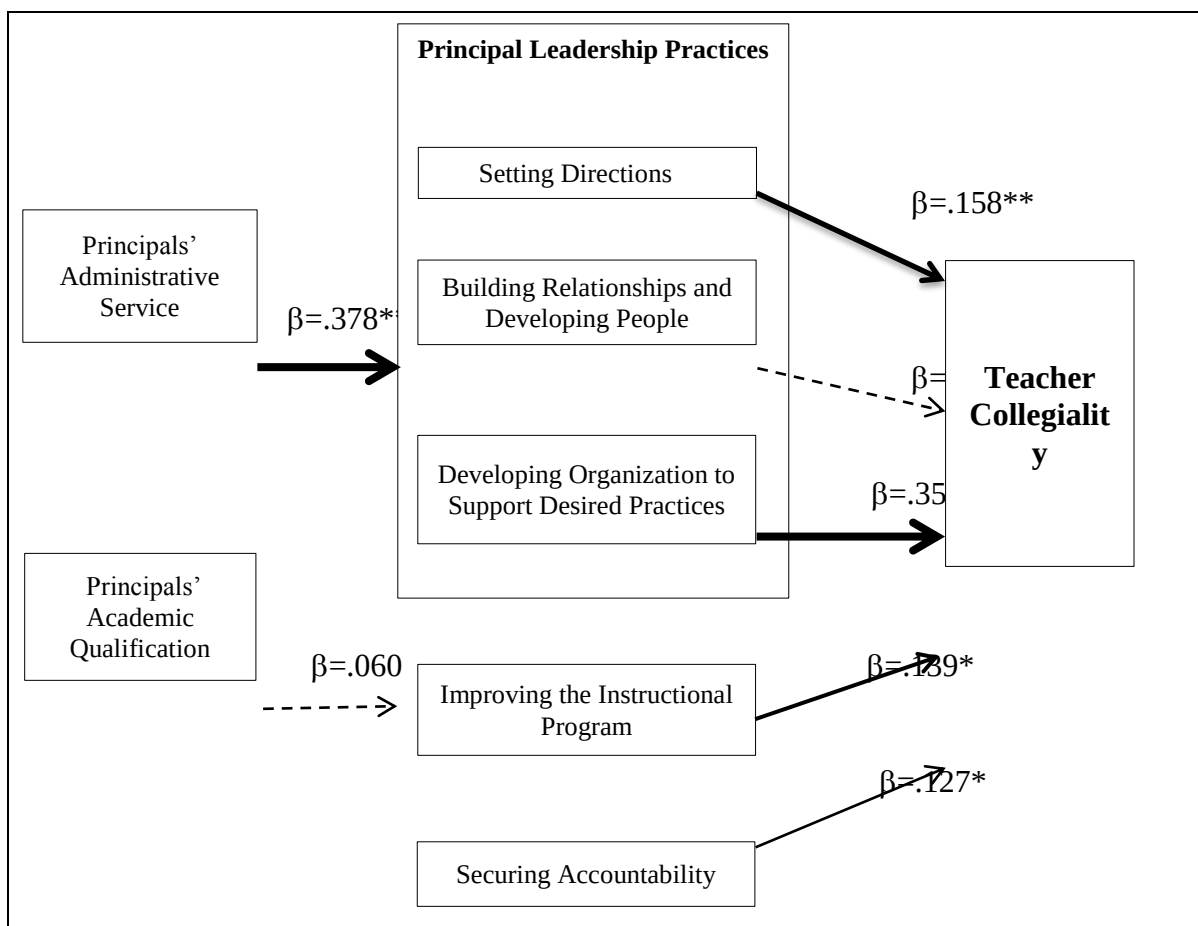


Figure 3 A Proposed Model for Principal Leadership Practices for Teacher Collegiality in Basic Education Schools

—→ Predicting on Teacher Collegiality (statistically significant)

- - -> Predicting on Teacher Collegiality (not statistically significant but show relationship)

In this proposed model, principals' administrative service enacted the principal leadership practices. Their academic qualification was important for principal leadership practices. Moreover, principal leadership practices impact teacher collegiality. Therefore, leadership practices should be promoted in order to improve teacher collegiality. Principals' administrative service and principals' academic qualification need be considered in order to predict principal leadership practices in basic education schools. It was found that principal leadership practices promote teacher collegiality. Khin Zaw (2001) described that teaching and pedagogy is a high profession, it is not a routine job and teachers cannot be replaced. Thus, principals play essential roles in culturing the teaching and pedagogy of teachers' profession and teacher collegiality. For this reason, it is need to encourage and support principal leadership practices. To be an effective leader in school, leadership and management training workshop or courses should be provided for all principals.

Suggestions

Based on the findings of the study, the following suggestions for policy makers, principals, and teachers will be presented.

Policy makers should

- elaborate the training programs for principal leadership preparation and development programs to become effective leaders in the basic education sector,
- consider personal factors of principals such as administrative service and academic qualification for promotion to administrative positions in the education sectors, and
- permit principals to attend the Master of Education (MEd) as it was significant in the principal leadership practices.

Principals should

- enhance their personal leadership knowledge and promote the professional development for themselves and teachers,
- encourage teachers to develop and periodically review their professional growth,
- supervise and monitor the instruction and communicate with subject experts to promote students' learning, and
- create a school environment in which parents and community are welcomed, respected and valued as partners in their children's learning.

Teachers should

- support the strong collegial relations among teachers,
- discuss openly with principals or colleagues while they have a feeling of failures and mistakes to their teaching,
- work collaboratively to apply teaching strategies that promote student learning,
- improve their classroom practices by working together and organizing learning teams, and
- take responsibility and accountability in their works.

Recommendations for Further Research

This paper contributed to develop a model for principal leadership practices for teacher collegiality in basic education schools. Based on the findings of this study, further study should be undertaken in other school levels, such as, primary and middle schools to determine whether or not the particular results concerning principal leadership practices and teacher collegiality. The comparative study of principal leadership practices and teacher collegiality between the government schools and private schools should be investigated so that their strengths and weaknesses will be found out. Additionally, factors affecting principal leadership practices and teacher collegiality should be explored.

Acknowledgements

First and foremost we would like to express our respectful thanks to Dr. Kay Thwe Hlaing (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. May Myat Thu (Pro-Rector, Yangon University of Education), Dr. Khin Mar Ni (Professor and Head of Department, Department of Educational Theory and Management, Yangon University of Education). We would like to offer our respectful gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yi (Pro-Rector, Sagaing University of Education), Dr. Cho Kyi Than (Pro-Rector, Sagaing University of Education), Dr. Zin Nwe Than (Professor and

Head of Department, Department of Educational Theory and Management, Sagaing University of Education) and Daw Swe Swe Nwe Tun (Associate Professor and Head of Department, Department of English, Sagaing University of Education). Moreover, special thanks would be given to the township education officers, school principals and the participant teachers from selected schools for their willingness to help in this study.

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TEACHERS' CRITICAL THINKING DISPOSITIONS, SUPPORTS OF THE PRINCIPALS AND TEACHERS' PRACTICES IN PROMOTING PRIMARY STUDENTS' CRITICAL THINKING SKILLS

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Abstract

The main purpose of this study is to investigate the teachers' critical thinking disposition, supports of their principals and their teaching practices in promoting primary students' critical thinking skills. The specific objectives are 1) to examine the critical thinking dispositions among primary teachers, 2) to explore the level of the principals' supports, 3) to inspect the practices of teachers in promoting primary students' critical thinking skills, 4) to investigate the best predictors for teachers' practices in promoting primary students' critical thinking skills, and 5) to study the primary students' critical thinking skills. Both quantitative and qualitative research methods were used to collect the required data for this study. Three phases were conducted in this study. In phase I, quantitative study was conducted by using questionnaire survey method. In phase II, qualitative study on teacher's practices in teaching primary students' critical thinking skills was conducted by using observation method and interview method. As the phase III, primary students' critical thinking skills was assessed by using the questionnaire. Three hundreds and eighteen teachers who are teaching at the primary level participated in this study. The collected data were systematically analyzed by quantitative and qualitative data analysis method. The results revealed that the critical thinking dispositions of primary teachers in this study were high and the supports of the principals was enough. It was found that the principals' supports is the best predictor on teachers' practices on promoting primary students' critical thinking skills, teachers' critical thinking dispositions as the second predictor and teachers' qualification as the third predictor. The findings underscore the significant role that teachers' practices play in promoting critical thinking abilities among their students.

Keywords: critical thinking skills, critical thinking dispositions, practices

Introduction

The world is moving very fast to become a global village. So, there are many challenges because of changing environment in the society. According to Chang (2009), the human nature in a social content of the new century will be a multiple person, as technological person, economic person, social person, political person, cultural person and the learning person in a global village. To become such a multiple intelligence person, everyone must have critical thinking skills as it gives the right direction to think and work and assist in determining the relationship with other accurately.

According to Synder and Synder (2008), critical thinking is a learnable skill. Critical thinking should be developed, practiced and continually integrated into the curriculum. They suggested that instruction should focus on the application of content rather than the content itself. Besides, the quality of students in the future is determined by the role of teachers in today's schools. Khin Zaw (1993) noted that no educational system can ever be better than its teachers. One of the important roles of teacher is to promote the students' critical thinking skills. The practice of teaching and learning and encouraging the achievement of the necessary critical thinking skills of teachers in primary schools are associated with the development of students' critical thinking skills (Slameto, 2014).

Education reforms are now being actively implemented in Myanmar. The purpose of Myanmar's education is to develop human resources capable of meeting the challenges of the

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21st century. Therefore, all the educational activities emphasize on the developing 21st century skills. Critical Thinking is one of the 21st century skills and improving students' critical thinking skills is the salient factor in implementing education activities in Myanmar. Therefore, the practices of teacher are the major factor in implementing curriculum and which factors are influenced on their practices is important to study.

Purpose of the Study

The purpose of this study is to study the teachers' critical thinking disposition, principals' supports and their teaching practices for promoting primary students' critical thinking skills are as follows:

1. To investigate the critical thinking dispositions among primary teachers
2. To study the practices of teachers in promoting primary students' critical thinking skills
3. To study the levels of principals' supports in teaching critical thinking skills
4. To investigate the best predictors for teachers' practices in promoting primary students' critical thinking skills
5. To study the primary students' critical thinking skills

Definitions of Key Terms

Critical Thinking Skills – the ability of the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven & Paul, 1987)

Critical Thinking Dispositions- an attribute or habit of mind that is integrated into one's beliefs or actions to effectively solve problems and make decisions as a product of thinking (Fitriani, H. et al., 2018).

Review of Related Literature

The concept of critical thinking has been in existence for many years, based on the work of Socrates, “the unexamined life is not worth living” (Socrates, 470-399 BC). Critical thinking has been variously defined as “thinking that is the use of those cognitive skills (or) strategies that increase the probability of a desirable outcome and thinking that is purposeful, reasoned and goal directed: the kind of thinking involved in solving problems, formulating inferences, calculating likelihood, and making decisions when thinker is using skills that are thoughtful and effective for the particular context and type of thinking task (Halpen, 1996) and “thinking that is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing and evaluating information gathered from, or generated by observation, experience, reflection, reasoning, or communication as a guide to belief and action” (Paul, R. & Elder, L.2006).

Critical Thinking Disposition

In 2000, Facione, and Giancarlo developed the California Critical Thinking Disposition Inventory (CCTDI). This is suitable for use with secondary students, college students and adults. In this inventory, there are seven sub-scales. These sub- scales are truth- seeking, critical thinking self-confidence, systematicity, analyticiy, maturity, open-mindedness and inquisitiveness.

Truth-seeking: Truth-seeking is the habit of always desiring the best possible understanding of any given situation.

Critical thinking self-confidence: The tendency to trust the use of reason and reflective thinking to solve problems is reasoning self-confidence. This habit can apply to individuals or to groups.

Systematicity: Systematicity is the tendency or habit of striving to approach problems in a disciplined, orderly, and systematic way.

Analyticity: Analyticity is the tendency to be alert to what happens next. This is the habit of striving to anticipate both the good and the bad potential consequences or outcomes of situations, choices, proposals, and plans.

Maturity of judgment: Cognitive maturity is the tendency to see problems as complex, rather than black and white. It is the habit of making a judgment in a timely way, not prematurely, and not with undue delay. It is the tendency of standing firm in one's judgment when there is reason to do so, but changing one's mind when that is the appropriate thing to do. It is prudence in making, suspending, or revising judgment. It is being aware that multiple solutions may be acceptable while appreciating the need to reach closure in certain circumstances even in the absence of complete knowledge.

Open-mindedness: Open-mindedness is the tendency to allow others to voice views with which one may not agree. Open-minded people act with tolerance toward the opinions of others, knowing that often we all hold beliefs which make sense only from our own perspectives.

Inquisitiveness: Inquisitiveness is intellectual curiosity. It is the tendency to want to know things, even if they are not immediately or obviously useful at the moment.

Charlotte Danielson's Framework for Teaching

Teaching is an incredibly complex profession. It requires teachers to maintain core skills and the necessary knowledge to help students succeed throughout their academic careers. Danielson created the framework to capture "good teaching" in all of its complexity. The broad framework was also intentionally designed to capture effective teaching at every grade level and across a wide range of student populations. The Danielson Framework include four domains. These are

- Planning and preparation
- Classroom environment
- Instruction and
- Professional responsibilities (Danielson, 2013).

Methodology

Research Method

Both quantitative and qualitative research methods were used to collect the required data for this study. There were three phases in this study. In phase I, critical thinking dispositions of teachers, principals' supports and teachers' practices in teaching students' critical thinking skills were studied by using questionnaire survey method. In phase II, qualitative study on teacher's practices in teaching primary students' critical thinking skills was conducted by using observation method, and teachers' critical thinking ability and dispositions, difficulties in teaching critical thinking skills and need for support in teaching primary students' critical thinking skills were studied by using interview method. In phase III, primary students' critical thinking was assessed.

Sampling

In phase I, the sample of the study included three hundred and eighteen teachers who teach in primary level from Thegon Township. In Thegon Township, there were 1300 teachers who teach in primary level. In order to get the required sample, the researcher selected the participants by using simple random sampling method. In phase II, the participant teachers were

selected by purposive sampling method. For observation study, nine teachers who were teaching upper primary level were chosen based on both mean value of teachers' practices and critical thinking dispositions such as low, average and high. For interview, twenty-five participants who have highest mean value of critical thinking dispositions were selected. In phase III, the researcher selected all students who were taught by teachers who participated in observation study. There were 83 students in this study.

Research Instrumentation

For quantitative study, two instruments were used in the proposed study. The first was the researcher- constructed questionnaire and the second was the California Critical Thinking Disposition Inventory. The four-part researcher constructed questionnaire consisted of (1) demographic sheet, (2) items for teachers' practices in teaching critical thinking skills and (3) principals' supports in teaching critical thinking skills and (4) four open-ended questions. For qualitative study, the observation checklists were consisted with four dimensions with 22 items to investigate teachers' teaching practices in classroom. The semi- structured interview form consists of 12 items to cover building critical thinking dispositions and 3 items to cover teaching critical thinking skills. It consisted of five dimensions: analysis, evaluation, inference, induction and deduction and critical thinking attitude. There were 5 items for each dimension and the number of total items for critical thinking skills was 25. There were 5 items for critical thinking attitude. Then, three phase of this research was conducted.

Data Analysis and Findings

Phase I: Quantitative Research Findings

Investigating Critical Thinking Dispositions of Primary Teachers

In this study, mean value interpretation of level was 1.00 to 2.66 (Weak), 2.67 to 4.33 (Moderate) and 4.34 to 6.00 (High) (Source: Fraenkel & Wallen, 2003).

Table 1 Mean and Standard Deviation for Critical Thinking Dispositions Inventory (CCTDI) Subscales for Primary Teachers (N=318)

No.	Variable	Mean	SD	Remark
1.	Critical Thinking Self- confidence	4.36	.60	High
2.	Inquisitiveness	4.37	.44	High
3.	Truth -seeking	3.75	.42	Moderate
4.	Systematicity	4.23	.41	Moderate
5.	Analyticity	4.57	.48	High
6.	Open- mindedness	4.19	.43	Moderate
7.	Maturity	4.39	.46	High
Critical Thinking Disposition		4.17	.26	Moderate

Scoring range for CCTDI: 1.00-2.66 = Weak , 2.67 – 4.33 = Moderate , 4.34 – 6.00= High

According to Table 1, critical thinking dispositions of primary teachers in this study was moderate level.

Table 2. Teachers' Critical Thinking Dispositions Grouped by Personal Factors (N=318)

		N	Mean Score	SD	p
Gender	Male	88	4.33	.56	n.s
	Female	230	4.37	.62	
Academic	Undergraduate	24	4.33	.64	n.s
Qualification	Graduate	294	4.36	.60	

		N	Mean Score	SD	p
Service	10 years and below	160	4.36	.64	n.s
	Above 10 years	158	4.36	.57	
Age	25-34 years	156	4.19	.26	n.s
	35-44 years	59	4.11	.27	
	45 and above years	103	4.18	.24	

Note: n.s= no significance

According to Table 2, there was no significantly difference in critical thinking dispositions according to personal factors (gender, academic qualification, service and age.

The Extent of Principals' Support in Teaching Primary Students' Critical Thinking Skills

To study the principals' support in promoting primary students' critical thinking skills, the researcher developed 3- point Likert scale questionnaire for principals' support with 7 items. The results will be showed the followings.

Table 3 Number and Percentage of Participant Teachers Showing the Level of Receiving Support of Principals (N= 318)

No.	Variable	Mean (SD)	Number of Teachers who		
			Receive a little support	Receive moderate support	Receive adequate support
1.	Supervising the inclusion of Bloom's taxonomy in setting learning goals	2.26 (0.56)	20 (6.3%)	193 (60.7%)	105 (33.0%)
2.	Giving advice in implementing teaching learning process to achieve the learning goals	2.38 (0.62)	24 (7.5%)	146 (45.9%)	148 (46.6%)
3.	Supporting teaching aids	2.61 (0.53)	7 (2.2%)	109 (34.3%)	202 (63.5%)
4.	Observing and providing the necessary guidance	2.39 (0.62)	23 (7.2%)	146 (45.9%)	149 (46.9%)
5.	Creating opportunities to support professional development	2.31 (0.69)	42 (13.2%)	134 (42.1%)	142 (44.7%)
6.	Appreciating teachers' performance	2.22 (0.73)	57 (17.9%)	133 (41.8%)	128 (40.3)
7.	Communicating with teachers well and intimating relationship with teachers	2.83 (0.44)	9 (2.8%)	35 (11.0%)	274 (86.2%)
Principals' Support		2.43 (0.40)	5 (1.6%)	131 (41.2%)	182 (57.2%)

Scoring range: 1.00-1.66 = little support; 1.67-2.33= moderate support ; 2.34-3.00 adequate support

According to the data presented in Table 3, teachers received adequate supports from principals.

The Extent of Teachers' Practices in Teaching Primary Students' Critical Thinking Skills

The questionnaire consisted of four dimensions: planning and preparation, the classroom environment, instruction and professional responsibilities. the total items for teachers' practices were 58. There items were five-point Likert scales (1= Never to 5=Always).

Table 4 Means and Standard Deviations and Percentages of Teachers' Practices in Teaching Primary Students' Critical Thinking Skills (N= 318)

No.	Variable	Mean	SD	Remark
1.	Planning and Preparation	4.35	0.49	Good
2.	Classroom Environment	4.19	0.48	Moderate
3.	Instruction	4.03	0.03	Moderate
4.	Professional Responsibilities	4.27	0.48	Good
Teachers' Practices		4.21	0.36	Moderate

Scoring range: 1.00 to 1.80 = not at all practiced 1.81 to 2.61= slightly practiced
 2.62 to 3.42 = somewhat practiced 3.43 to 4.23 = moderately practiced
 4.24 to 5.00 =good practiced

According to the Table 4, the participant teachers in this study moderately practiced in promoting primary students' critical thinking skills.

Table 5. Teachers' Practices in Promoting Primary Students Critical Thinking Skills Grouped by Personal Factors (Gender, Service, and Age) (N=318)

		N	Mean Score	SD	p
Gender	Male	88	4.19	.36	n.s
	Female	230	4.26	.35	
Service	10 years and below	160	4.25	.37	n.s
	Above 10 years	158	4.23	.35	
Age	25-34 years	156	4.25	.37	n.s
	35-44 years	59	4.19	.34	
	45 and above years	103	4.26	.35	

Note: n.s= no significance

According to Table 5, there was no significantly difference in teachers practices in promoting primary students critical thinking skills according to personal factors (gender, service and age).

Table 6. Independent Samples t Test Result Showing Mean Values of Teachers' Practices in Teaching Critical Thinking According to Qualification (N=318)

Variable	Qualification	N	Mean	SD	t	df	p
Teachers' Practices	Undergraduate	24	4.07	.37	-2.35	316	.015*
	Graduate	294	4.26	.35			

Note: * $p < .05$

The result showed that there was significant difference between the overall practices of graduate teachers and that of undergraduate teachers.

Table 9. Independent Samples t Test Result Showing Mean Values of Teachers' Practices in Teaching Critical Thinking According to Level of Critical Thinking Dispositions (N=318)

Variable	LCTD	N	Mean	SD	t	df	p
Teachers' Practices	Moderate	229	4.05	.19	.377	316	.000***
	High	89	4.45	.12			

Note: *** $p < .001$ LCTD= Level of Critical Thinking Dispositions

The result showed that there was significant difference between the practices of teachers who are high level of critical thinking dispositions and moderate level of critical thinking dispositions.

Table 10 One-Way ANOVA Result Showing Mean Values of Teachers' Practices in Teaching Critical Thinking According to Level of Principals' Supports

Variable	LPS	N	Mean	SD	F	p
Teachers' Practices	Little	5	4.07	.31	7.04	0.001***
	Moderate	131	4.11	.24		
	Enough	182	4.22	.26		

Note: *** $p < .001$ LPS= Level of Principals' Supports

Table 11 Tukey HSD Result Showing Multiple Comparisons for Significantly Different Areas in Teachers' Practices in Promoting Primary Students' Critical Thinking Skills by Level of Principals' Supports (N=318)

Dependent Variable	(I) LPS	(J) LPS	Mean Difference (I-J)	p
Teachers' Practices	Enough	Moderate	.107	.001***

Note: *** $p < .001$ LPS= Level of Principals' Supports

According to Table 11, Tukey HSD indicates that the group of teachers who were got high supports from principal significantly differed with the group of teachers who were got somewhat degree supports.

The Potential Factors Affecting on Teachers' Practices in Promoting Primary Students' Critical Thinking Skills

Table 12 Mean, Standard Deviations, and Inter-correlations for Teachers' Practices in Promoting Primary Students' Critical Thinking Skills (N=318)

	Variables	M (SD)	1	2	3
	Teachers' Practices	4.21(.36)	.136*	.283***	.348***
1.	Qualification	1.92(.26)		.012	.021
2	Critical Thinking Dispositions	4.17(.40)		.	.180***
3	Principals' Support	2.43(.40)			

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

Table 13 Simultaneous Multiple Regression Analysis for Predicting Teachers' Practices in Promoting Primary Students' Critical Thinking Skills (N= 318)

Variables	B	Std.Error	Beta	p
Qualification	1.97	.328	.13	.013*
Teachers' Critical Thinking Disposition	.311	.072	.23	.000***
Principals' Supports	.274	.047	.30	.000***
Constant	1.947	.328		

$R = .43$, $R^2 = .19$, $F(3,316) = 23.88$, * $p < .05$, *** $p < .001$

The data presented in Table 4.65 shows that the beta coefficients, three variables such as teachers' critical thinking dispositions, qualification, and received principal's support significantly predicted on teachers' practices in promoting primary students' critical thinking skills. The adjusted R squared value was 0.19 ($R = .43$). This indicates that 19% of the variance on teachers' practices in promoting primary students' critical thinking skills by the model, this is a medium effect according to Cohen (1992).

The Regression Equation is:

Teachers' Practices in Promoting Primary

Students' Critical Thinking Skills

$$= 1.94 + 1.97TQ + 0.311 TCTD + 0.27PS$$

According to the β weights, it was also concluded that the principals' support variable ($\beta = .30$, *** $p < .001$) appears to be the best predictor on teachers' practices in promoting primary students' critical thinking skills. Teachers' critical thinking dispositions ($\beta = .23$, *** $p < .001$) appears to be the second predictor and teachers' qualification ($\beta = .13$, * $p < .05$) appears to be the third predictor. (See figure 1).

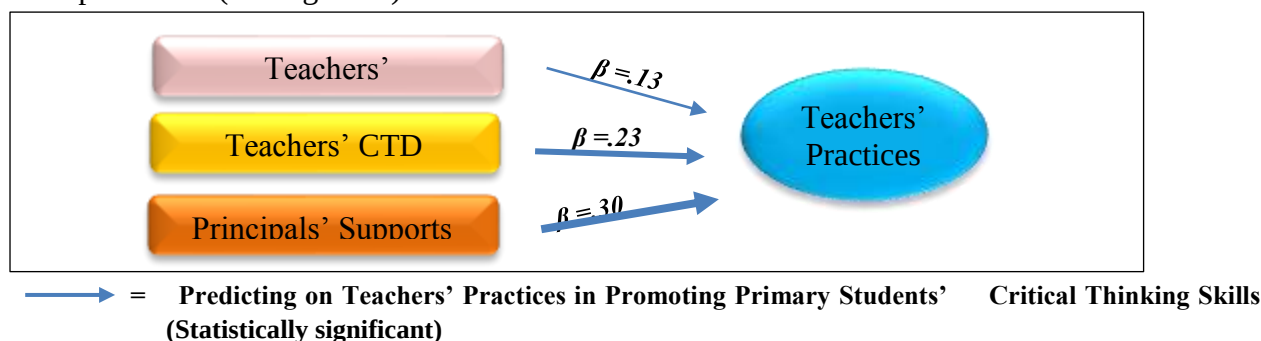


Figure 1. Predictors Affecting on Teachers' Practices in Promoting Primary Students' Critical Thinking Skills

Table 14 Mean and Standard Deviations Showing the Primary Students' Critical Thinking Skills (N= 83)

Variable	Mean	SD	Achievement Level
Analysis	6.68	1.02	Moderate
Evaluation	6.44	1.02	Moderate
Inference	7.43	1.03	Moderate
Induction	6.56	.95	Moderate
Deduction	7.42	1.29	Moderate
Total Critical Thinking Skills	6.91	1.06	Moderate

Scoring range: < 5.85 = low 5.85- 7.97 = moderate > 7.97= high

According to the results, the level of the participant students' critical thinking skills was in moderate level.

Table 15 One-Way ANOVA Result Showing Mean Values of Students' Critical Thinking Skills by Teachers' Levels of Practices (N=83)

Variable	Group	N	Mean	SD	F	p
Students' Critical Thinking Skills	Group A	27	35.63	2.81	7.512	0.001**
	Group B	29	35.21	3.23		
	Group C	27	32.63	2.89		

Note: * $p < .001$**

Group A= group of teachers who had highest mean value in practices and critical thinking dispositions

Group B = group of teachers who had average mean value in practices and critical thinking dispositions

Group C= group of teachers who had lowest mean value in practices and critical thinking dispositions

Table 15 described that statistically significant difference was found students' critical thinking skills $F(2,80) = 7.512$, *** $p < .001$.

Table 16 One-Way ANOVA Result Showing Significantly Different Areas Students' Critical Thinking Skills by Teachers' Levels of Practices (N=83)

Variable		Sum of Squares	df	Mean Square	F	p
Students' Critical Thinking Skills	Between Groups	134.807	2	67.403	7.512	.001
	Within Groups	717.796	80	8.972		
	Total	852.602	82			

Table 17 Tukey HSD Result Showing Multiple Comparisons for Significantly Different Areas in Students' Critical Thinking Skills (N= 83)

Dependent Variable	(I) Level of Teachers' Practices	(J) Level of Teachers' Practices	Mean Difference (I-J)	p
Students' Critical Thinking Skills	Group C	Group A	-2.57*	.005
		Group B	-2.85*	.002

Note: *** $p < .001$

According to Table 17, Tukey HSD indicates that the practices of teachers who had the lowest mean value in teachers' practices significantly differed with that of the teachers who had average mean value in teachers' practices (** $p < .01$, $d=.80$) and with that of the teachers who had the highest mean value in teachers' practices (** $p < .01$, $d= 0.90$) in students' critical thinking skills.

Phase II: Qualitative Research Findings

Results of Open- ended Questions

Question 1. Describe your teaching methods used to teach critical thinking skills?

The response rate for this question was 76.41% (n= 243). With regard to this question, the following methods were taught by the participant teachers; practical method (51.85%), inductive approach method (31.68%), problem solving method (22.22%), storytelling method (21.81%), role-playing method (19.34%), cooperative learning method (19.34%), Inquiry learning method (16.46%), brainstorming method (6.99%), debate (0.82%) and think-pair-share method (0.82%).

Questions 2 Describe the difficulties you encountered in promoting primary students' critical thinking skills?

The response rate for this question was 76.41% (n= 243). They said that there was no sufficient time for curriculum implementation **concerning the curriculum** (n=54, 22.5%), they said that they have insufficient teaching aids and there was no partition among classroom (n=11, 4.58%) concerning the **physical aspects of classroom environment**. The difficulties teacher encountered with students are that students lack the courage to express their opinions (16.25%), in group discussion, some children may be uncooperative and uninterested (10.42%), students have limited vocabulary and general knowledge (9.58%) and they cannot reflect themselves and

build their own ideas well (2.92%). Some teachers (12.08%) have difficulties when students ask unexpected questions and answers and they cannot discuss well (9.58%).

Question 3. What support do teachers need to improve the teaching of critical thinking skills to primary school children?

The response rate for this question was 77.04% (n= 245). With regard to this question, the participant teachers need supports with **facilities and equipment**; lesson-related teaching aids that were difficult to obtain (44.89%), providing books of philosophy that improve teachers' thinking and Quiz books (21.63%), provision of recording equipment, Video and Computers (14.28%), story books and comic books concerning moral and civic (4.89%). **Relation with teachers**, they expected to get adequacy of teaching staff (25.32%), and conducting workshops on curriculum content and teaching methods (19.59%). They expected support from principal such as they want the principal to supervise lesson preparation, classroom instruction, and the use of teaching aids (6.12%), recognizing the teacher's efforts (4.08%), make a program that provides habit of reading for both teacher and student (1.22%), cooperating with parents and teachers (12.34%).

Results of Observation

The observation checklist was used to conduct classroom observations on teaching in promoting primary students' critical thinking skills. Teaching of every 9 selected teachers was observed at least 2 or 3 periods. These teachers were divided into three groups based on both mean values of teachers' practices and critical thinking dispositions such as high (Group A), average (Group B) and low (Group C). In observation study, concerning with **Planning and Preparation**, the researcher found that teachers in group (A) read the teacher guide and prepared the lesson with clear expectations, with descriptors for each level of performance and describe the procedures clearly. They also prepared the questions for formative or summative assessment. It was also founded that some activities and questions represented high- order thinking. Concerning with **Classroom Environment**, they all established warm and respectful learning environment and they were confidence in language and behaviours. In teaching learning process, concerning **Instruction**, they used equal control of teacher and students. They also listen actively to students' response and they gave equal opportunities for all students. It was also founded that they provided positive and constructive feedback to students' response. The researcher also found that the group of teachers who have highest mean in teaching practices and critical thinking dispositions used the following teaching-methods, story- telling method, questioning method, discussion method, inductive approach, demonstration method, observation method, practical method, brain-storming method and inquiry- based Learning method. It was also found that they asked the questions with correct and imaginative use of language and the questions concerning with facts, comparison, generalization, self- reflection, open-ended questions. They also asked not only all students but also each student. When they asked the open-ended questions, they gave enough time to think students and gave constructive feedback. It was found that they all praised students who provide unexpected answers.

The researcher found that teachers in group B read the teacher guide and prepared the lesson. They describe the procedure clearly and expressed the questions for formative assessment (concerning with **Planning and Preparation**). It was also found that 1 out of 3 teachers used equal control of teacher and students but others use teachers' control and 2 out of 3 teachers listened actively student' response. Only 1 out of 3 teachers provided positive and constructive feedback to students' response. All teachers established warm and respectful learning environment and 2 out of teachers and their students were confidence in language and behaviours (**Classroom Environment**). It was also found that they used the following methods; lecture

method, questioning method, discussion method, brain-storming method, practical method and demonstration method. It was also found that they asked the questions concerning with facts, comparison, and generalization. They also asked open-ended questions and they asked questions to both all students and each student. One of the teachers gave time to answers students and gave feedback (**Instruction**).

The researcher found that teachers in group C read the teacher guide and do not prepare but teach with the instruction of teacher guide (**Planning and Preparation**). It was also found that all teachers used teachers' control and 1 out of 3 teachers listened actively students' response but all teachers encouraged students to participate (**Classroom Environment**). They used the following teaching methods; lecture method, questioning method demonstration method. The researcher also founded that most asked the questions concerning with facts, comparison, and generalization and they asked to all students (**Instruction**).

Overall Findings of Teacher Interviews

The key themes that emerged of collected data from interview were; critical thinking dispositions, critical thinking abilities, attitude towards their profession, difficulties in teaching critical thinking skills and supports from administration.

Teachers said with **critical thinking dispositions** that they can critically think moderately. 5 out of 25 teachers said that if a teacher teaches students critical thinking skills, he must be a critical thinker. Fourteen of the participant teachers believed that they have a reasonable amount of confidence and they prepare the lesson when they teach students because they can teach with confidence. Teachers said that attending training and supervising principals can improve their confidence in teaching. Five out of twenty-five teachers described that they like learning new things and they study how the knowledge gained apply in real life. 14 out of 25 teachers described that if they read and accepted the news, they search for the source of the news. 40% of the teachers stated that when they decide what is right or wrong, they did not judge by own opinion and they considered different perspectives from different point of views. Seven out of 25 said that when they have a lot of work to do, they focused on the most important thing and allocated time systematically. 56% of the participants believed that working together was more effective than working alone. They had desired to do collective teaching activities.

It was founded that teachers have some **critical thinking abilities**. Eleven out of twenty-five teachers stated that they keep records of daily activities and they always reflected their actions. 20% of the participant teachers said that they conclude the events based on relevant data and facts gathered. It was found that they acknowledged because of their parents' teaching and life experience, their ability to think would develop. 15 out of 25 teachers said that before doing a task, they were imaginative and they set plan well and think about alternatives. Ten of the participant teachers stated that they evaluate something according to its usefulness. It was also found concerning with **attitude towards profession** that all the participants were satisfied with their profession and they loved and appreciated teaching. They also loved their children.

Teachers also expressed **their difficulties in teaching critical thinking skills**. Ten of the participants said that there is no sufficient time to implement the curriculum. They also have difficulties in teaching arts (performing and virtual). 7 out of 25 teachers said that they have difficulties in teaching because there are no sufficient teachers in their school. They explained that if they teach students thinking skills, they prepared lesson well and gave time students to give their opinion. Because of no sufficient teachers, they had to teach two or more classes simultaneously. And so, they did not prepare the lessons well. Some teachers said that they have not enough ability to teach students' thinking skills and it was found that they had desired to

attend effective training. Eleven out of 25 described that some students did not have basic knowledge and skills in reading, writing, and computing. Ten participants said that some students did not have courage to express their opinions. 9 out of 25 stated that there is no TV and Video to use in their teaching in their school.

18 out of 25 teachers acknowledged with **supports** that their principal supervised and gave advice their teaching and they said that teaching and helping of their principal was very valuable for them. All participants described that they want the Ministry to provide a separate classroom for each class. Six participants suggested that workshops for effective teaching would be planed for the teachers and when it was implemented, TEO or DTEO and the experience teachers supervised.

Conclusion and Discussion

A critical thinking disposition was defined as ‘the personal traits, habits of mind, attitudes or affective dispositions which seem to characterize good critical thinkers’ (Facione,1990). In this study, the critical thinking dispositions of primary teachers were explored by the CCTDI. The results indicated that the critical thinking dispositions of primary teachers in this study were moderate levels. The findings were similar to the results of the study by by Demirhan and Koklukaya (2014) found that the critical thinking dispositions of prospective science teachers’ were in general at medium level.

The critical thinking dispositions of primary teachers were studied with personal data. By the finding, critical thinking dispositions of the primary teachers did not differ according to gender. This finding was similar with the finding of Karagol and Bekmezci (2015) in which critical thinking dispositions of teachers do not differ according to gender. The finding indicated that there was significant difference in critical thinking dispositions of the primary teachers depending on their academic qualification. This result match with the finding in which Onwuegbuzie (2001) stated that students’ critical thinking skills are directly related to level of education. The findings indicated that there were also no significant differences in teachers’ critical thinking dispositions according to service. The results of the findings were not similar to the results of the study by Sulaiman et al. (2017) who have found that critical thinking disposition of novice teachers are significantly higher than experienced teachers according to teaching experience. In addition, the results of the finding supported that age is not a significant predictor for critical thinking dispositions (Rodriquez, 2001). To enhance the critical thinking disposition in teachers, workshops and courses can be conducted on a regular basis to foster critical thinking disposition so that they often apply these skills in their daily life (Sulaiman et al., 2017).

Most quantitative studies concluded that principals exert indirect influence on student achievement through teachers and school culture; in essence, principals established conditions (eg. Professional learning opportunities, teaming) so that teacher make the direct effort toward improving student outcomes (Waters & Mc Nulty,2005 as cited in Printy 2008). In this research, the extent of principals’ support in teaching to promote primary students’ critical thinking skills was explored. The results of quantitative study showed that primary teachers received adequate support from their principal. Teachers and administrators continually strive to improve instruction effectiveness (Cotton, 1989). The observation also revealed that it was found that the lesson plan of group A teacher included in the instructional objectives that described higher order cognitive skills such as hypothesizing, analyzing, and evaluating skills. Although teaching guide had lesson plans for each content in the textbook, they created their own lesson plans using teaching guide.

They said that their principal instructed them to plan lesson by themselves and supervised their lesson preparation and gave advice and suggestion. Steps for critical thinking teaching includes five steps: (1) determining learning objectives, (2) teaching through questioning, (3) practicing before assessing, (4) reviewing, refining, and improving, and (5) providing feedback and assessment of learning. A lesson plan should reflect these five steps (Norwanto, 2011). In contrast, group C teachers did not prepare lesson plan and they used teacher guide only. It can be summarized that supervising the principal in teachers' lesson preparation is important in teaching critical thinking skills.

In interview study, the group A teachers answered that they sometimes used real object as teaching aids because the principal provided the resources and materials necessary. Teachers can secure relevant resources essential to teaching thinking skills. School libraries should be promoted into resource centers and made available any time for primary teachers and students (Dr San San Hla, 2008). In observation study, most of school did not have school library and a classroom library. In interview study, teachers answered that they had desire to read extensive text related to the lesson but there was no sufficient book for both teacher and students in their schools. Every school should have a library because it plays a great role in the life of students by serving as the store house of knowledge (Cyrille, 2019 as cited in Pearson & Reddy, 2021). The teachers also said that they imitated their principal' teaching styles and their principals asked to think about the ideas and encouraged to reflect on thinking practices in meeting or in informal conversation. It was also found that the principals of group A teachers encouraged teachers' collaboration in performing school activities and professional development activities and they also recognized teachers' performance and the principals collaborated with teachers in teaching learning process and in implementing school activities. Principle of collaborative leadership styles established professional learning community between teachers (Howard, 2020). Thus, this finding supported the assumption made by Sandra Love (2019) in which principals support teachers in developing a thinking culture across the campus to improve their thinking capacity, leading to increased productivity.

In this research, the practices of teachers in promoting primary students' critical thinking skills were also investigated. Finding indicated that primary teachers moderately practiced in promoting primary students' critical thinking skills. Because teaching is an extremely complex activity, Danielson's framework was useful in laying out the various areas of competence in which professional teachers need to develop expertise. The complex activity of teaching clustered into four domains; (1) planning and preparation, (2) the classroom environment, (3) instruction, and (4) professional responsibilities.

In this research, the critical thinking skills of the primary students were also investigated. Finding indicated that primary students were moderate level in critical thinking skills. Primary students participated in this study were also moderate level in analysis, evaluation inference, induction and deduction dimensions of critical thinking skills. As a result of students' attitudes to critical thinking, some students were not easily confused difficult problem and they can explain well what they are doing. According to Beyer (1995), critical thinker are tolerating ambiguity and respect clarity and precision. Therefore, some students have critical thinking attitude. According to quantitative research, most of students did not desire to argue with other when their answer was correct. It was needed to improve their fair-mindedness because critical thinkers assess all viewpoints with the same standards and do not base their judgments on personal or group bias or prejudice (Wilkinson, 2012). It was also found that most of students did not want to change their mind after they had made decision. To improve students' decision-making skill, teachers need to

promote student's critical thinking because decision making is the process that leads to actionable conclusions, critical thinking is the element that defines whether the choice is sound (Discover Business, 2022). The factors that provide primary teachers to improve in teaching students' critical thinking skills were academic qualification, teachers' critical thinking dispositions and obtaining from principal support. The finding also indicated that the more teacher practiced in teaching critical thinking skills, the more they promote students' critical thinking skills. This finding supported that the assumptions by Snyder and Synder (2008) in which critical thinking is a learning skill that requires relevant instruction and practices. The factors that provide primary teachers to improve in teaching students' critical thinking skills were academic qualification, teachers' critical thinking dispositions and obtaining from principal support. The finding also indicated that teachers' practice can promote students' critical thinking skills. This finding supported that the assumptions by Snyder and Synder (2008) in which critical thinking is a learning skill that requires relevant instruction and practices.

Suggestion

Based on the findings and the review of relevant literature, the following suggestions were drawn to improve teachers' practices in promoting primary students' critical thinking skills. In order to teach students' critical thinking skills, teachers need to understand the concept and foundations of critical thinking and should be provided teachers to understand critical thinking. Primary teachers should understand cognitive development of children and cognitive psychology well. Primary teachers should be confidence in their reasoning processes. Primary teachers need to desire to seek the truth and courage to overcome the difficulties in every situation and should have information management skills. Primary teachers should have the ability to consider the consequences of their behaviour and reflect their actions and also should be a model as a critical thinker for their students. Principals should supervise lesson planning of teachers whether their preparation is consistent with the purpose of education and can be implemented practically or not and teachers' implementing the curriculum. Principals should provide material support and advice teachers in making teaching learning materials and should create school-based professional learning community. Principals should encourage teachers to ask open-ended question and to provide time for students to think and to use brainstorming method, problem-solving method, discussion method, modeling as a critical thinker, story-telling method to encourage students think critically. Principals should organize debate competitions in their school. Primary school principals and teachers should be provided training workshop concerning with nature of critical thinking and teaching method for improving students' critical thinking skills. The empower concerning with using ICT of principals and teachers should be improved. Classrooms should be the separate spatial classroom. There should be a school library or a classroom library which has sufficient books for teachers and students in primary school. Teacher-classroom ratio should be considered to promote students' critical thinking skills. Teacher educators need to be model as a critical thinker and to use the method of teaching and assessment that can improve students' critical thinking. The teacher education program that supports critical thinking should be provided to teachers based on needs of teachers. Primary teachers should have training to use and foster critical thinking in their teaching learning process and cooperate with parents for their students' thinking skills.

Limitations of the Study

This study is geographically limited to Thegon Township, Bago Region. The participants of this research are three hundred and eighteen teachers who taught in primary level for quantitative study. Based on the results of quantitative study, nine teachers were selected for

observation study and twenty- five teachers were selected for interview. Eighteen- three students were selected to test critical thinking skills.

Acknowledgements

First, I would like to convey my sincere 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 supports and official permission to conduct this study. I would like to offer respectful gratitude to all my teachers and colleagues.

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AN ANALYTICAL STUDY OF AUTHENTIC LEADERSHIP OF PRINCIPALS IN BASIC EDUCATION SCHOOLS

Khin Chan Myae Aung¹, Khin Mar Ni², Su Su Hlaing³

Abstract

The main purpose of this study is to investigate authentic leadership of principals in Basic Education Schools. In this study, descriptive survey design and quantitative approach will be used. A total of 66 principals by using purposive sampling and 396 teachers by using the equal size stratified random sampling from Mon State were selected as subjects. The required data for quantitative study were collected by using two sets of questionnaires. The first set of questionnaire was developed for principals and the second was for teachers. Questionnaire for principals was composed of two parts; factors affecting authentic leadership and authentic leadership practices of principals with eight dimensions. The questionnaire for teachers was also developed based on these eight dimensions of authentic leadership. The internal consistencies (α) of the questionnaire were 0.86 for principals' authentic leadership practices, 0.91 for psychological capital, 0.82 for self-leadership, 0.86 for self-knowledge and 0.76 for social intelligence. Descriptive statistics, multiple regression analysis were conducted to analyze the data. The result of multiple regression showed that psychological capital was the best predictor, self-knowledge was the second and self-leadership was the third predictor for principals' authentic leadership practices. This study also highlights the importance of authentic leadership practices of principals in Basic Education Schools.

Keyword: Authentic leadership

Introduction

In this day and age, there is an urgent need, both on a global and local scale, for a new type of leadership that will maintain the credibility and authenticity of individuals and organizations. Effective leadership has been shown to be the critical attribute of any successful enterprise and is essential for implementing strategies that engage followers and ensure organizational success. Leadership is a way to produce a vision for the organization and followers, and encourages followers with self-confidence and trust through coordination and communication (Bohn & Grafton, 2002).

Authentic leadership behaviors play a crucial role in creating and developing ethical culture in organizations (Ardichvili et al., 2011, as cited in Peter, 2016). Authentic leaders acting as moral agents responsible for validating the ethical and moral standards of their followers, and creating ethical culture within their organizations. The society must be assured that its professionals are faithfully fulfilling the weighty ethical obligation which their advanced training has thrust upon them (Khin Zaw, 2001). Authentic leaders have the ability to adjust their behavior in accordance with their own self, a clear personal identity, and the ability to harmonize their preferences with the demands of society.

In this regard, the presence of sincere and supportive leadership is essential to improving followers' performance and organizational success by positively changing followers' attitudes in the current educational environment (Alok & Israel, 2012).

Significance of the Study

There is vast agreement that ethics should be at the heart of the vision for 21st century schools. Authentic leadership has given a considerable emphasis in leadership literature amidst the prevalent hitches of economic failures, ethical meltdowns, corporate scandals, and corruption

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in the government. Begley (2001, p.353) states that authentic leadership is a metaphor for “professionally, effectively, ethically sound, and consciously reflective practices in educational administration”. Also, authenticity must be prevalent in education, because experiences are value-based. Society derives a lot of its morals from education (Bhindi & Duignan, 2003).

One recently expected leadership from school administrators is authentic leadership. Thus, authentic leadership is an essential form of leadership that school administrators should demonstrate. Authentic leadership includes school administrators being like themselves with sincere behavior rather than giving them a leader impression, honest and transparent relationships, and the establishing a school climate based on trust and ethical principles. The trust factor at the core of authentic leadership is a very important concept as it affects the quality of education. The decline of trust in schools is an important factor leading to deterioration of school climate and poor quality of education (Başaran & Kırıl, 2020).

This study also provides significant values to principals, teachers and responsible officers in the education field. This study shows why authentic leadership is important within an organization for organizational development and teachers’ success.

Theoretical Framework

This research study will be led by the following theoretical framework.

Authentic leadership is a process based on both positive psychological capacities and a highly developed organizational context, leading to increased self-awareness and self-regulated positive behaviors on the part of leaders and associates, fostering positive self- development” (Luthan & Avolio, 2003). Based on aspects of authentic leadership developed by Walumbwa, et al., (2008), George (2003), George, et al., (2007), Robertson (2012) & Partrid (2016), the following dimensions of authentic leadership will be used in this research work.

- Self-awareness
- Balanced Processing
- Internalized Moral Perspective
- Relational Transparency
- Demonstrating Self-discipline
- Empowering Others to Lead
- Courage
- Integrity and Humility

Based on these research findings of Northouse (2013), Kotze (2016), Peus et al., (2012) and Harter (2012, as cited in Boateng et al., 2018) about the factors affecting authentic leadership, the following factors will be measured to identify the predictors for developing authentic leadership in this research work.

- Psychological Capital (Confidence, Hope, Resilience and Optimism)
- Self-leadership
- Self-knowledge
- Social Intelligence

Research Objectives

General Objective

- To investigate authentic leadership practices of principals in Basic Education Schools

Specific Objectives

- To analyze levels of principals' authentic leadership practices

- To investigate the levels of psychological capital, self-leadership, self-knowledge and social intelligence of principals
- To identify the factors affecting the authentic leadership practices of principals

Research Questions

1. What are the levels of principals' authentic leadership practices?
2. What are the levels of psychological capital, self-leadership, self-knowledge and social intelligence of principals?
3. What are the factors affecting the authentic leadership practices of principals?

Limitation of the Study

The study is geographically limited to the Mon State. The subjects of this study are sixty-six High School principals, three-hundred and ninety-six teachers (including an equal proportion of senior teachers, junior teachers and primary teachers). The aim of the study is to investigate authentic leadership practices of principals in limited areas. The study will make a broad description of principals' current efforts of authentic leadership practices and the factors affecting this leadership and various issues concerning to the theme of this study.

Definition of Key Term

Authentic leadership

A process based on both positive psychological capacities and a highly developed organizational context, leading to greater self-awareness and self-regulated positive behavior on the part of leaders and employees, fostering positive self-development. (Luthans & Avolio, 2003).

Review of Related Literature

Authentic Leadership

Authentic leadership is a process that emerges from both positive psychological skills and a highly developed organizational context, leading to both self-awareness and self-regulated positive behavior in leaders and employees, leading to positive self-esteem and promoting development (Luthan & Avolio, 2003).

Factors Affecting Authentic Leadership

Positive Psychological Capital

Confidence has to do with self-efficacy, namely, “the belief that one has the ability to successfully accomplish a specified task” (Northouse, 2013). This is one of the hallmarks of a virtuous person.

Hope has been described as a positive motivational state based on willpower and goal planning. Authentic leaders with hope have goals they know they can achieve; their hope encourages followers to trust them and believe in their goals (Northouse, 2013).

Optimism refers to the cognitive process of seeing situations positively and having favorable expectations about the future (Northouse, 2013). Optimistic leaders are also positive about their skills and their achievable outcomes.

The fourth positive psychological attribute is **resilience**. It refers to the ability to recover and adjust to adversity including the ability to positively adapt to hardships and suffering (Northouse, 2013).

Self-Leadership as an Antecedent of Authentic Leadership

Self-leadership is a process through which people influence themselves to possess self-direction and self-motivation necessary for achievement (DiLiello & Houghton, 2006).

In addition, Stewart et al., (2011) propose that self-leaders are more likely to leave if the organization does not share their standards or values.

Self-Knowledge as Antecedent of Authentic Leadership

Leaders who possess a high degree of self-knowledge are clear about their values and beliefs (Shamir & Eilam 2005). In short, self-knowledge about their values and beliefs as well as their personal strengths and weaknesses is a prerequisite for leaders to act in ways that are perceived as authentic by their followers.

Social Intelligence as Antecedent of Authentic Leadership

Social intelligence is the ability to think, apprehend, manage and act properly in human social relationships (Thronkike, 1920). To work effectively as an authentic leader, there is a need for a better understanding of the environment of the environment and how this environment can be manipulated to serve the purpose of the organization-social intelligence (Boateng et al., 2018).

Methodology

In this study, descriptive survey design and quantitative approach will be used.

Instrumentation

The survey questionnaire was used to collect the required data for the study. Through the review of related literature and based on the established questionnaires, the two sets of questionnaire were developed: Questionnaire 1 for principals and Questionnaire 2 for teachers. Questionnaire 1 for principals was composed of two parts. The first part was the questions for factors affecting authentic leadership practices of principals and the second was questions for principals' authentic leadership practices.

The first part was composed of four dimensions (Psychological Capital, Self-leadership, Self-knowledge and Social intelligence) and based on Psychological Capital Questionnaire (PCQ) developed by Luthans, et al. (2007), Abbreviated Self-Leadership Questionnaire (ASLQ) developed by Houghton et al. (2012), Integrative Self-knowledge Skill, developed by Ghorbani, N et al. (2008) and Social Intelligence Scale, developed by Kriemeen and Hajaia (2017) and through literature review. This was developed as four-point Likert scale ranging from 1 to 4 (1=*strongly disagree*, 2=*disagree*, 3=*agree*, and 4=*strongly agree*) and comprised with 51 items. Out of these 51 items, 26 items were for "Psychological capital", 9 items for "Self-leadership", 8 items for "Self-knowledge" and 8 items for "Social Intelligence".

The second part was comprised with eight dimensions and based on Authentic Leadership Inventory (ALI) developed by Neider and Schriesheim (2011), Authentic Leadership Questionnaire (The ALQ) Survey developed by Fiona Beddoes-Jones (2015) and through the review of related literature. This was developed as four-point Likert scale ranging from 1 to 4 (1=*never*, 2=*sometimes*, 3=*often* and 4=*always*) with 60 items. Out of these 60 items, 7 items for "Self-awareness", 8 items for "Balanced Processing", 6 items for "Internalized Moral Perspective", 8 items for "Relational Transparency", 9 items for "Demonstrating Self-discipline", 7 items for "Empowering Others to Lead", 7 items for "Courage" and 8 items for "Integrity and Humility".

Questionnaire 2 for teachers was for their perceptions of principals' authentic leadership practices with eight dimensions of authentic leadership.

Instrument Reliability: Cronbach's alpha was used to measure the reliability of this instrument. The internal consistencies (α) of the questionnaire were 0.86 for principals' authentic leadership practices, 0.91 for psychological capital, 0.82 for self-leadership, 0.86 for self-knowledge and 0.76 for social intelligence.

Research Findings

Levels of Principals' Authentic Leadership Practices

Table 1 Levels of Principals' Authentic Leadership Practices (N=462)

Variables	Mean	SD	Remark
Self-awareness	3.14	.37	High
Balanced Processing	3.26	.40	High
Internalized Moral Perspective	3.07	.39	High
Relational Transparency	3.20	.38	High
Demonstrating Self Discipline	3.28	.43	High
Empowering Others to Lead	3.20	.40	High
Courage	3.19	.44	High
Integrity and Humility	3.24	.41	High
Overall Authentic Leadership Practices	3.20	.36	High

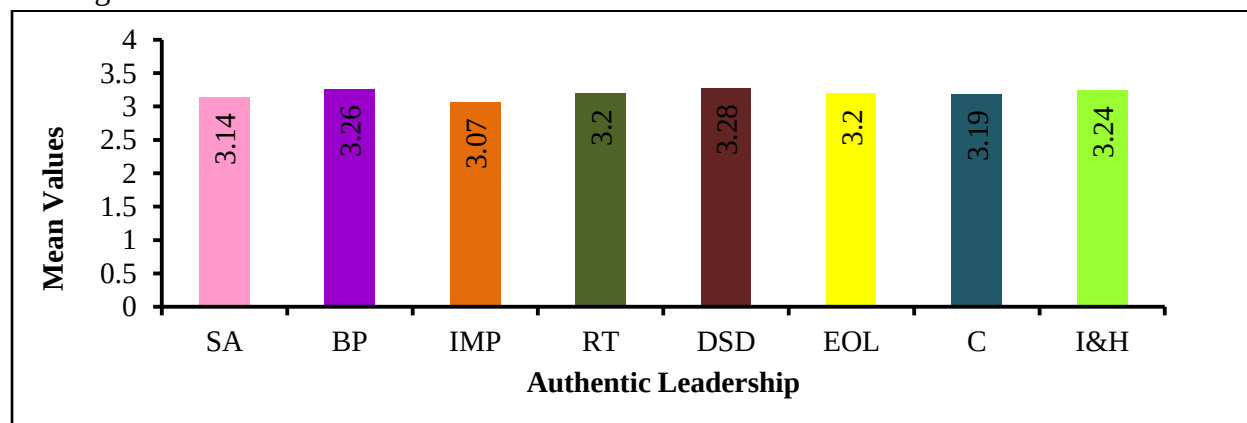
Scoring Direction:

1.00-1.99=Low

2.00-2.99=Moderate

3.00-4.00=High

According to the Table 1, it could be analyzed that the sampled principals' authentic leadership practices were high in all dimensions as the mean values were between 3.00 and 4.00. Furthermore, it was found that principals' overall authentic leadership practices in their schools was high as its mean value was 3.20.



SA=Self-awareness

BP=Balanced Processing

IMP=Internalized Moral Perspective

RT=Relational Transparency

DSD=Demonstrating Self-discipline

EOL=Empowering Others to Lead

C=Courage

I &H= Integrity and Humility

Figure 1 Mean Values for Principals' Authentic Leadership Practices

Next, Table 2 shows the number and percentages of the sampled principals showing the level of authentic leadership practices.

Table 2 Number and Percentages of the Sampled Principals Showing the Level of Authentic Leadership Practices (N=66)

Variable	No. of Principals (%)	Remark
Authentic Leadership Practices	51 (77.27%)	High
	15 (22.73%)	Moderate

Scoring Direction:

1.00-1.99=Low

2.00-2.99=Moderate

3.00-4.00=High

According to the scoring range in Table 2, 51 (77.27%) of the sampled principals possessed high level and 15 (22.73%) possessed moderate level of authentic leadership practices. So it can be realized that most of the sampled principals had high level of authentic leadership practices in their schools.

Investigating the Levels of Psychological Capital, Self-leadership, Self-knowledge and Social Intelligence of Principals

The descriptive results of principals' psychological capital, self-leadership, self-knowledge and social intelligence were described in Table 3.

Table 3 Levels of Psychological Capital, Self-Leadership, Self-knowledge and Social Intelligence of Principals in Basic Education Schools (N=66)

Predictor Variables	Mean	SD	Remark
Psychological Capital	3.09	.51	High
Self-leadership	3.14	.46	High
Self-knowledge	3.23	.55	High
Social Intelligence	2.99	.27	Moderate

Identifying Factors Affecting Authentic Leadership Practices of Principals

Four variables were identified as factors to affect principals' authentic leadership: psychological capital (confidence, hope, resilience and optimism), self-leadership, self-knowledge, social intelligence. Simultaneous multiple regression was conducted to find out the factors affecting principals' authentic leadership. Means, standard deviations and inter-correlations were shown in Table 4.

Table 4 Means, Standard Deviations and Inter-correlations for Principals' Authentic Leadership Practices and Predictor Variables (N=66)

Variables	Mean	SD	PC	SL	SK	SI
AL Practices	3.20	.42	.66***	.63***	.56***	.18
Predictor Variables						
PC	3.09	.28		.60***	.39**	.23
SL	3.14	.37			.48**	.17
SK	3.23	.41				.07
SI	2.99	.42				

*** $p < .001$ ** $p < .01$

Note: PC=Psychological Capital, SL=Self-leadership, SK=Self-knowledge, SI=Social Intelligence

The analysis of simultaneous multiple regression for factors affecting principals' authentic leadership practices were shown in Table 5.

Table 5 Simultaneous Multiple Regression Analysis for Factors Affecting Principals' Authentic Leadership Practices (N=66)

Variables	B	Std.Error	Beta
Psychological Capital	.717	.215	.395**
Self-leadership	.103	.226	.242*
Self-knowledge	.536	.190	.288**
Social Intelligence	.112	.170	.016
Constant	2.764	.242	
Note. $R = .76$, $R^2 = .56$, $F(8,57) = 2.977$			
** $p < .01$ * $p < .05$			

The Regression Equation is:

$$\text{Authentic Leadership} = 2.764 + .717PC + .103SL + .536SK + .112SI$$

The beta coefficients were presented in Table 5. PC, SL and SK significantly predict when all four variables were included. The adjusted R squared value was .56 ($R=.76$). This indicates that 56% of the variance of principals' authentic leadership was explained.

According to the beta weights, "Psychological Capital (Confidence, Hope, Resiliency and Optimism)" ($\beta = .395$, $p<.001$) appears to be the best predictor of principals' authentic leadership. Also, "Self-leadership" ($\beta = .242$, $p<.01$) appears to be the second predictor and "Self-knowledge" ($\beta = .242$, $p<.05$) appears to be the third predictor of principals' authentic leadership. On the other hand, another variable appears to be important for authentic leadership of principals.

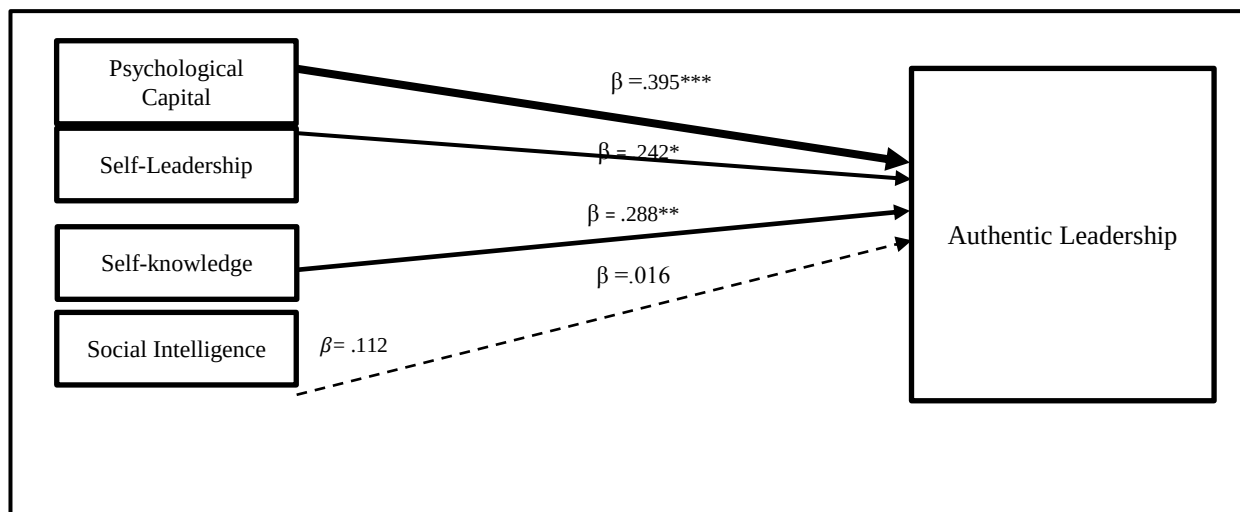


Figure2. Factors Affecting Authentic Leadership of Principals

- Predicting on Authentic Leadership of Principals (Statistically Significant)
 -----→ Predicting on Authentic Leadership of Principals (Not Significant)

Conclusion and Discussion

Regarding **the levels of principals' authentic leadership practices**, the principals' practices were found with high level in the eight dimensions of authentic leadership. It was also found that the level of the overall authentic leadership practices of the principals was high. Furthermore, no principal possessed low level, 51 (77.27%) of the principals possessed high level and 15 (22.73%) possessed moderate level of authentic leadership practices. So it can be realized that most of the principals had high level of authentic leadership practices in their schools.

With regard to the investigation of principals' **psychological capital**, it was found that the principals' level of psychological capital was high (mean=3.09). As the result of investigation of the principals' **self-leadership**, the principals had high level of self-leadership (mean=3.14). Concerning with the results of the examination of principals' **self-knowledge and social intelligence**, it was found that the principals had high level of self-knowledge (mean=3.23) and moderate level of social intelligence (mean=2.99).

According to the results of finding the factors affecting authentic leadership of principals, it was found that principals' authentic leadership was significantly predicted by psychological capital (confidence, hope, optimism, and resilience), self-leadership and self-knowledge when four variables were included. According to the beta weight, it is likely to be concluded that psychological capital was the most striking, self-knowledge was the second and self-leadership was third.

Discussion

Self-awareness

According to Khin Zaw (2001), the professions are essentially occupations which have developed a heightened self-consciousness and an acute awareness of social distinctiveness. The findings of this study revealed that the level of the sampled principals' practices in self-awareness category of authentic leadership were high. The research finding of Cropanzano and Mitchell (2005) gives insights for this study that employees are willing to reciprocate positively when they perceived that their high self-aware superiors treat them sincerely. Therefore, the researcher would like to suggest that the school leaders should make self-reflection almost all the time to have consciousness of their core values, emotions, strengths and weaknesses in leading the subordinates.

Balanced Processing

The sampled principals' balanced processing practices were found as high level practices according to the quantitative results. This finding seems to be consistent with Darvish and Razaei (2011) that self-awareness and balanced processing behaviors of leaders significantly contributed to high team commitment, job satisfaction and work engagement of followers. From the researcher point of view, it is extremely important that the school principals should avoid discrimination between the subordinates, empower them as well as School Board to participate in the process of decision-making by asking about their attitudes and opinions.

Internalized Moral Perspective

According to the maxim of Kant (as cited in Khin Zaw, 2001), each person should act in all situations as he believes the moral principle within him and all others would tell him to act. The finding of the study revealed that the principals' practices level was high in the dimension of internalized moral perspective. It would be suggested as a crucial factor that the school administrators should have consistency between their internal values, beliefs and their real conduct even though it had the situations of facing some dilemmas in order to win the authentic trust of followers.

Relational Transparency

When leaders were transparent, followers earned respect for them, and utilized transparency as they developed their own heightened authenticity (Meacham, 2007). Leaders who transparently and positively interacted with followers created the opportunity for mutually beneficial positive social exchanges and this built trust and integrity within the leader-follower relationship. It is importantly suggested by the researcher that the principals should establish transparent relationship with the staff to earn trust and respect of followers by showing their authentic image (disclosing their ideas and beliefs concerning social and organizational issues).

Demonstrating Self-discipline

The result showed that the level of principals' practices for demonstrating self-discipline was high. As the consistent finding, Sigma Assessment Systems (2017) explored that leaders who are high on self-discipline are not easily distracted, and can maintain concentration despite other priorities or requirements for their attention. From the researcher point of view, principals should work with good habits to become disciplined leaders to stand as exemplary leaders in front of their subordinates.

Empowering Others to Lead

The finding indicated that the level of principals' practices for empowering others to lead was high. Participation in decision-making process, collaborating on a meaningful project by

staff, is related to individual cognitions of empowerment and consequently, positively related to increased satisfaction, greater motivation and engagement and more innovative and creative behavior (Spreitzer, 1996). Thus, it is importantly suggested that school principals should foster empowering their teachers in leadership duties for different roles as well as making their own decisions about professional advancement and everyday practice.

Courage

The quantitative finding indicated that the level of principals' practices in the dimension of courage was high. This finding was supported by the conceptualization of Zauderer (1992, cited in Yanginlar et al., 2013) that moral leaders distinguish right from wrong, seek justice, take responsibility, encourage commitments, show courage to stand up for what is right, encourage and develop others. Thus, it is really important that the school leaders should pursue and utilize courage-related characteristics for solving difficult problems for better results.

Integrity and Humility

In the quantitative result, the level of principals' practices was high. In addition, the school leaders who had the mind of integrity and humility undeniably earned the love and respect of their followers and possessed better achievements. Humility enables leaders to be aware of the limits of their knowledge avoid being overly opinionated in order to act as an example and accumulate social capital (Chiu et al., 2012). From the researcher point of view, it is crucial for school leaders to have moral integrity and humility in communicating with their subordinates to achieve mutual respect between them.

Additionally, the study investigated *the levels of school principals' psychological capital, self-leadership, self-knowledge, social intelligence*. Firstly, the principals had high level of psychological capital in the quantitative study. The leader's authentic leadership style is related with the psychological capital which enables the leader to encourage the involvement and participation of followers in the decision-making process, which enhances the trust to the leader. The leaders will highly value honest and realistic relationships with their followers when they are highly authentic (Chen & Yang, 2017).

Self-leading individuals tend to leave if the organization does not share their standards or values. Peus et al. (2012) proposed that followers' perceptions about authentic leadership is directly related gaining the leader's self-knowledge. Moreover, the findings highlighted that high level of self-knowledge were found in the sampled principals.

Albrecht (2009, as cited in Boateng, 2018) stated that individuals with social intelligence have and outstanding personality of attracting others and demonstrate a genuine interest in their fellow workmates. Based on the results of findings, the school principals also had moderate level of social intelligence. Hence, it will need a better understanding of the environment and how this environment can be manipulated to fit the organizational purpose in order to work effectively as an authentic leader.

Suggestions

The following suggestions are based on the analyses of the research findings.

- All teachers and Board members should be allowed to involve in the decision-making process of important school affairs at meetings.
- Teachers should be treated equally and opportunities to express their ideas and perspectives should be provided by school principals.
- School principals should behave in accordance with leadership ethics, staff rules and laws in leading their organizations.

- The attitudes and beliefs of school principals should be transparently expressed to the subordinates and members of School Board.
- Teachers should be provided chances to lead by themselves at various activities of the school such as class and subject deans, leaders in sport teams, religious groups and other volunteer organizations.
- School principals should approach and solve all challenges and difficulties without fear, decisively and consciously relating to various roles of the school.
- School principals should not change their moral standpoint on important issues.
- School principals should actively participate in social activities at school.
- The responsible officers in education field should implement the training programme for school leaders which support the improvement of leaders' psychological capital, self-leadership and self-knowledge abilities which are the essentials to become authentic leaders.

Acknowledgements

We would like to offer special 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 official permission to do this research. Moreover, we wish to express our profound gratitude to all principals and participants of this study.

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AN INVESTIGATION INTO ORGANIZATIONAL HEALTH OF BASIC EDUCATION HIGH SCHOOLS

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Abstract

This study was attempted to investigate the level of organizational health of Basic Education High Schools perceived by teachers and to explore the differences in organizational health of Basic Education High Schools in terms of school related factors. Quantitative and qualitative research method were used in this study. A total of 190 teachers were selected as subjects from 6 Basic Education High Schools in Myaungmya Township, Ayeyarwaddy Region, using the cluster sampling method. The Cronbach's alpha for overall items in organizational health of Basic Education High Schools was 0.92. To analyze the collected data, descriptive statistics, Independent Sample *t*-test, One- way ANOVA were used in this study. It was found that out of 6 Basic Education High Schools, the level of organizational health of school A was slightly below average with the standardized scores (SdS=476), that of school B was average with the standardized scores (SdS=494), that of school C was above average with the standardized scores (SdS=538), that of school D was average with the standardized scores (SdS=503), that of school E is slightly above average with the standardized scores (SdS=515) and that of school F was below average with the standardized scores (SdS=465). There was no statistically significant difference in organizational health index in terms of school grade and school size.

Key words: organizational health

Introduction

An educational institution is often viewed as a social system in which each member plays a vital role in implementing the policies of the organization for meeting the common goals and purposes. If any of the members of the social system are left out of the process, disharmony will be present, resulting in a weakening of the organizational health of the institution (Hoy, Tarter, & Kottkamp, 1991).

In educational settings, that is, a school, university or an institute, organizational health has been termed as school health. Healthy organizations not only cope successfully with their environments, but they focus their energy on major objectives. Schools can best fulfil their onerous duties only if they happen to be a healthy and dynamic organization. Socially, a healthy organization is a place where people willingly go to work and take pride in their workplace. Teachers and students want an educational environment in which interpersonal relations are trusting and healthy.

Significance of the Study

School is regarded as a social system in which the principals, teachers and students take part. The schools need to be organizational healthy schools to adapt these educational reforms. This study will focus on the organizational health of schools. This study will give some suggestions about how administrators can use the results of the study to change and improve schools. Administrators can use the notion of organizational health as an organizing framework, a diagnostic tool, and a guide to action.

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Moreover, this study provides a comprehensive and informative idea of a school's well-being. The administrators can become aware of the importance of regularly measuring the health of their organization.

Research Objectives

1. To investigate the level of organizational health of Basic Education High Schools perceived by teachers
2. To explore the differences in organizational health of Basic Education High Schools in terms of school related factors.

Research Questions

1. What is the level of organizational health of Basic Education High Schools perceived by teachers?
2. Is there any difference organizational health of Basic Education High Schools in terms of school related factors?

Limitations of the study

In this study, organizational health of Basic Education High Schools in Myaungmya Township is investigated. This study is geographically restricted to Myaungmya Township, one of the townships of Ayeyarwady Region. The participants are teachers from Basic Education High Schools of Myaungmya Township.

Theoretical Framework of the Study

The following Theoretical framework leads to the research work. The study of organizational health will be based on Social System Theory (Parsons, 1960). A society is made up of individuals. A number of different types of individuals live in society. They may have a common culture or may belong to different sets of cultures. According to Parsons (1960), if all individuals in society belong to the same culture, they form a social system. Besides the commonness of culture, it is necessary for a social system that the social actions of various members of a society should be well-coordinated and should not so conflict as to destroy the social harmony. In an advanced society, certain institutions do the work of systematization of these social actions. School organization is also a small society in which superintendents, administrators, teachers, students, and parents are working together for the success of the school.

The organizational health of basic education high schools was investigated on the following dimensions defined by Hoy, Tarter and Kottkamp (1991), Hoy and Tarter (1997) and World Health Organization (2007).

- **Institutional integrity:** Institutional integrity is the school's ability to adapt to its environment and cope in ways that maintain the soundness of its educational programs. Schools with integrity are protected from unreasonable community and parental demands.
- **Principal Influence:** It is the ability of the principal to affect the decisions of superiors. Being able to persuade superiors, to get additional consideration, and unimpeded by the hierarchy are important aspects of school administration (Hoy & Feldman, 1987). The influential principal is persuasive, works effectively with the superintendent, simultaneously demonstrates independence in thought and action (Hoy, Tarter & Kottkamp, 1991).

- **Consideration:** It is the principal behaviour that is friendly, supportive, open and collegial. It presents a genuine concern on the part of the principal for the welfare of the teachers (Hoy & Feldman, 1987). Hoy, Tarter and Kottkamp (1991) stated consideration of principal as the principal looks out for the welfare of faculty members and is open to their suggestions.
- **Resource Support:** It refers to a school where adequate classroom supplies and instructional materials are available and extra materials are readily supplied if requested (Hoy & Feldman, 1987; Hoy, Tarter & Kottkamp, 1991). If extra or supplementary materials are needed or requested, they are quickly supplied. In brief, teachers have access to the materials that they need (Hoy and Forsyth, 1986).
- **Initiating Structure:** It is the principal behaviour that is both task- and achievement-oriented. Work expectations, standards of performance, and procedures are clearly articulated by the principal (Hoy & Feldman, 1987). The principal makes his or her attitudes and expectations clear to the faculty and maintains definite standards of performance (Hoy, Tarter & Kottkamp, 1991).
- **Morale:** It refers to a sense of trust, confidence, enthusiasm, and friendliness among teachers. Teachers feel good about each other and, at the same time, feel a sense of accomplishment to their jobs.
- **Academic emphasis:** Academic emphasis refers to the schools press for achievement. High but achievable academic goals are set for students; the learning environment is orderly and serious; teachers believe in their students' ability to achieve; and students work hard and respect those who do well academically (Hoy & Feldman, 1987; Hoy, Tarter & Kottkamp, 1991). Academic success is respected as a major accomplishment among students themselves. Good grades and scholarship earn praise and admiration from students as well as teachers.

Definitions of Key Term

Organizational Health: It is the ability of an organization to adapt to its environment, create balance and harmony among members and achieve its goal (Korkmaz, 2006).

Operational Definition

Organizational Health: It refers to the ability of a school to function effectively and efficiently while also promoting the academic and social-emotional development of its students and teachers. It consists of seven dimensions: institutional integrity, principal influence, consideration, initiating structure, resource support, morale and academic emphasis. In this study the level of organizational health was determined by the standardized scores converted from means scores of teachers' responses to questionnaire items. The higher the level of standardized scores of responses of teachers indicate the higher the organizational health of the school.

Methodology

Sample

For this study, 6 Basic Education High Schools were randomly selected as subjects to make up 30% of the total of 20 schools. Then, all of 190 teachers from 6 Basic Education High Schools, Myaungmya Township were selected by using cluster sampling method.

Instrumentation

In this study, the questionnaire for teachers was mainly used to collect the needed data. It was taken by the researcher based on Wayne K. Hoy's Organizational Health Inventory for Secondary Schools (1993). It consists of 44 items which could be grouped into seven dimensions: 7 items for Institutional integrity, 5 items for Initiating Structure, 5 items for Consideration, 5 items for Principal Influence, 5 items for Resource Support, 9 items for Morale and 8 items for Academic Emphasis. These items were four-point Likert scales ("1=Strongly Disagree", "2=Disagree", "3= Agree" and "4= Strongly Agree). Moreover, four open-ended questions were included in this questionnaire for qualitative study. The Cronbach's alpha for overall items in organizational health of Basic Education High Schools was 0.92.

Procedure

After receiving the permission from the Head of the Department of Educational Theory and Management and Township Education Officer (TEO), the questionnaires were distributed to the respondents in the selected schools in the 2nd week of January, 2023. After two weeks later, the distributed questionnaires were collected. The valid rate of the respondents was 100%.

Data Analysis

The data obtained from the questionnaire were analyzed by using SPSS (Statistical Package for the Social Science) software version 23. Descriptive statistics was used to calculate mean and standard deviation. Then, the level of the organizational health of each school was measured by using formulae created and applied by Hoy and Tarter (1997). Independent Sample *t* Test and One- way ANOVA were used to analyze the differences in organizational health according to school related factors.

Findings

Quantitative Findings

For investigating the level of organizational health of Basic Education High Schools, it is needed to calculate the mean values and standard deviations of organizational health of each school. The mean values of organizational health of each school were converted to standardized scores with a mean of 500 and a standard deviation of 100 by using normative data set of all selected Basic Education High Schools. Mean values and standard deviation of organizational health of all schools were expressed in Table1.

Table 1. Mean Values and Standard Deviations of Dimensions of Organizational Health (N=190)

No	Variables	Mean	SD
1	Institutional Integrity	3.38	.42
2	Initiating Structure	3.41	.67
3	Consideration	3.09	.67
4	Principal Influence	3.07	.58
5	Resource Support	3.27	.68
6	Morale	3.52	.58
7	Academic Emphasis	3.28	.57

Then, the standardized scores of organizational health of all selected Basic Education High Schools were computed by using the following formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997).

$$\begin{aligned}
 \text{Standardized scores (SdS) for Institutional Integrity (II)} &= 100(\text{II}-3.38)/0.42 + 500 \\
 \text{Standardized scores (SdS) for Initiating Structure (IS)} &= 100(\text{IS}-3.41)/0.67 + 500 \\
 \text{Standardized scores (SdS) for Consideration (C)} &= 100(\text{C}-3.09)/0.67 + 500 \\
 \text{Standardized scores (SdS) for Principal Influence (PI)} &= 100(\text{PI}-3.07)/0.58 + 500 \\
 \text{Standardized scores (SdS) for Resource Support (RS)} &= 100(\text{RS}-3.27)/0.68 + 500 \\
 \text{Standardized scores (SdS) for Morale (M)} &= 100(\text{M}-3.52)/0.58 + 500 \\
 \text{Standardized scores (SdS) for Academic Emphasis (AE)} &= 100(\text{AE}-3.28)/0.57 + 500
 \end{aligned}$$

They also stated the formula to compute the overall index of school health can be computed as follows:

$$\begin{aligned}
 \text{Organizational Health of each school} &= [(\text{SdS for II}) + (\text{SdS for IS}) + (\text{SdS for C}) \\
 &\quad + (\text{SdS for PI}) + (\text{SdS for RS}) + (\text{SdS for M}) \\
 &\quad + (\text{SdS for AE})] \text{ divided by } 7
 \end{aligned}$$

Then, the standardized scores of organizational health and organizational health indexes of selected Basic Education Schools were computed. The findings for each school were presented sequentially. The scoring directions are below 400= very low, 400-449= low, 450-475=below average, 476-489= slightly below average, 490-510= average, 511-524=slightly above average, 525-550=above average, 551-600=high and above 600=very high.

Table 2. Mean Values and Standard Deviations of Dimensions of Organizational Health of School A (N=34)

No	Variables	Mean	SD
1	Institutional Integrity	3.15	.35
2	Initiating Structure	3.28	.74
3	Consideration	3.00	.66
4	Principal Influence	2.90	.57
5	Resource Support	3.13	.80
6	Morale	3.37	.69
7	Academic Emphasis	3.26	.67

Mean values of dimensions of organizational health of school A were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table3.

Table 3. Standardized Scores (SdS) of Organizational Health of School A

No	Variables	N	SdS	Remark
1	Institutional Integrity	34	445	low
2	Initiating Structure	34	481	slightly below average
3	Consideration	34	487	slightly below average
4	Principal Influence	34	471	below average
5	Resource Support	34	479	slightly below average
6	Morale	34	474	below average
7	Academic Emphasis	34	497	average
	Organizational Health	34	476	slightly below average

According to data presented in Table 3, School A had low standardized scores in institutional integrity (SdS=445); slightly below average standardized scores in initiating structure(SdS=481), consideration(SdS=487) and resource support(SdS=479); below average standardized scores in principal influence(SdS=471) and morale(SdS=474); and average standardized scores in academic emphasis(SdS=497). The organizational health of school A is slightly below average (SdS=476).

Table 4. Mean Values and Standard Deviations of Dimensions of Organizational Health of School B (N=27)

No	Variables	Mean	SD
1	Institutional Integrity	3.34	.47
2	Initiating Structure	3.44	.83
3	Consideration	3.24	.72
4	Principal Influence	3.07	.67
5	Resource Support	3.29	.78
6	Morale	3.38	.75
7	Academic Emphasis	3.07	.68

Mean values of dimensions of organizational health of school B were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table5.

Table 5. Standardized Scores (SdS) of Organizational Health in School B

No	Variables	N	SdS	Remark
1	Institutional Integrity	27	490	average
2	Initiating Structure	27	504	average
3	Consideration	27	522	slightly above average
4	Principal Influence	27	500	average
5	Resource Support	27	503	average
6	Morale	27	476	slightly below average
7	Academic Emphasis	27	463	below average
	Organizational Health	27	494	average

According to data presented in Table 5, School B had below average standardized scores in academic emphasis (SdS=463); slightly below average standardized scores in morale(SdS=476); average standardized scores in institutional integrity(SdS=490), initiating structure(SdS=504),principal influence (SdS=500) and resource support (SdS=503); slightly above average standardized scores in consideration(SdS=522). The organizational health of school B is average (SdS=494).

Table 6. Mean Values and Standard Deviations of Dimensions of Organizational Health of School C (N=31)

No	Variables	Mean	SD
1	Institutional Integrity	3.34	.35
2	Initiating Structure	3.75	.32

No	Variables	Mean	SD
3	Consideration	3.57	.42
4	Principal Influence	3.38	.51
5	Resource Support	3.43	.47
6	Morale	3.71	.35
7	Academic Emphasis	3.53	.31

Mean values of dimensions of organizational health of school C were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table7.

Table 7. Standardized Scores (SdS) of Organizational Health in School C

No	Variables	N	SdS	Remark
1	Institutional Integrity	31	490	average
2	Initiating Structure	31	551	high
3	Consideration	31	572	high
4	Principal Influence	31	553	high
5	Resource Support	31	524	slightly above average
6	Morale	31	533	above average
7	Academic Emphasis	31	544	above average
	Organizational Health	31	538	above average

According to data presented in Table 7, School C had average standardized scores in institutional integrity (SdS=490); slightly above average standardized scores in resource support(SdS=524); above average standardized scores in morale(SdS=533) and academic emphasis(SdS=544); high standardized scores in initiating structure(SdS=551), consideration(SdS=572) and principal influence(SdS=553). The organizational health of school C is above average (SdS=538).

Table 8. Mean Values and Standard Deviations of Dimensions of Organizational Health in School D (N=40)

No	Variables	Mean	SD
1	Institutional Integrity	3.45	.46
2	Initiating Structure	3.45	.78
3	Consideration	3.12	.66
4	Principal Influence	3.03	.52
5	Resource Support	3.32	.75
6	Morale	3.51	.68
7	Academic Emphasis	3.24	.67

Mean values of dimensions of organizational health of school D were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table9.

Table 9. Standardized Scores (SdM) of Organizational Health in School D

No	Variables	N	SdS	Remark
1	Institutional Integrity	40	517	slightly above average
2	Initiating Structure	40	506	average
3	Consideration	40	504	average
4	Principal Influence	40	493	average
5	Resource Support	40	507	average
6	Morale	40	498	average
7	Academic Emphasis	40	493	average
	Organizational Health	40	503	average

According to data presented in Table 9, School D had average standardized scores in initiating structure (SdS=506), consideration (SdS=505), principal influence (SdS=493), resource support (SdS=507), morale (SdS=498) and academic emphasis (SdS=493); slightly above average standardized scores in institutional integrity (SdS=517). The organizational health of school D is average (SdS=503).

Table10. Mean Values and Standard Deviations of Dimensions of Organizational Health of School E (N=33)

No	Variables	Mean	SD
1	Institutional Integrity	3.66	.25
2	Initiating Structure	3.54	.29
3	Consideration	2.61	.69
4	Principal Influence	3.13	.49
5	Resource Support	3.53	.46
6	Morale	3.68	.28
7	Academic Emphasis	3.38	.41

Mean values of dimensions of organizational health of school E were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table11.

Table 11. Standardized Scores (SdS) of Organizational Health in School E

No	Variables	N	SdS	Remark
1	Institutional Integrity	33	567	high
2	Initiating Structure	33	519	slightly above average
3	Consideration	33	428	low
4	Principal Influence	33	510	average
5	Resource Support	33	538	above average
6	Morale	33	528	above average
7	Academic Emphasis	33	518	slightly above average
	Organizational Health	33	515	slightly above average

According to data presented in Table 11, School E had low standardized scores in consideration (SdS=428); average standardized scores in principal influence (SdS=510); slightly

above average standardized scores in initiating structures (SdS=519) and academic emphasis (SdS=518); above average standardized scores in resource support (SdS=538) and morale (SdS=528); high standardized scores in institutional integrity (SdS=567). The organizational health of school E is slightly above average (SdS=515).

Table 12. Mean Values and Standard Deviations of Dimensions of Organizational Health of School F (N=25)

No	Variables	Mean	SD
1	Institutional Integrity	3.29	.46
2	Initiating Structure	2.90	.55
3	Consideration	3.01	.43
4	Principal Influence	2.87	.60
5	Resource Support	2.79	.47
6	Morale	3.42	.46
7	Academic Emphasis	3.20	.42

Mean values of dimensions of organizational health of school F were computed to standardized scores by using the formulae created and applied by Hoy, Tarter and Kottkamp (1991) and Hoy and Tarter (1997) were presented in Table13.

Table 13. Standardized Scores (SdS) of Organizational Health in School F

No	Variables	N	SdS	Remark
1	Institutional Integrity	25	479	slightly below average
2	Initiating Structure	25	424	low
3	Consideration	25	488	slightly below average
4	Principal Influence	25	466	below average
5	Resource Support	25	430	low
6	Morale	25	483	slightly below average
7	Academic Emphasis	25	486	slightly below average
	Organizational Health	25	465	below average

According to data presented in Table 13, School F had low standardized scores in initiating structure (SdS=424) and resource support(SdS=430); below average standardized scores in principal influence(SdS=466); slightly below average standardized scores in institutional integrity(SdS=479), consideration(SdS=488), morale(SdS=483) and academic emphasis(SdS=486).

The organizational health indexes of selected schools were summarized in Figure1.

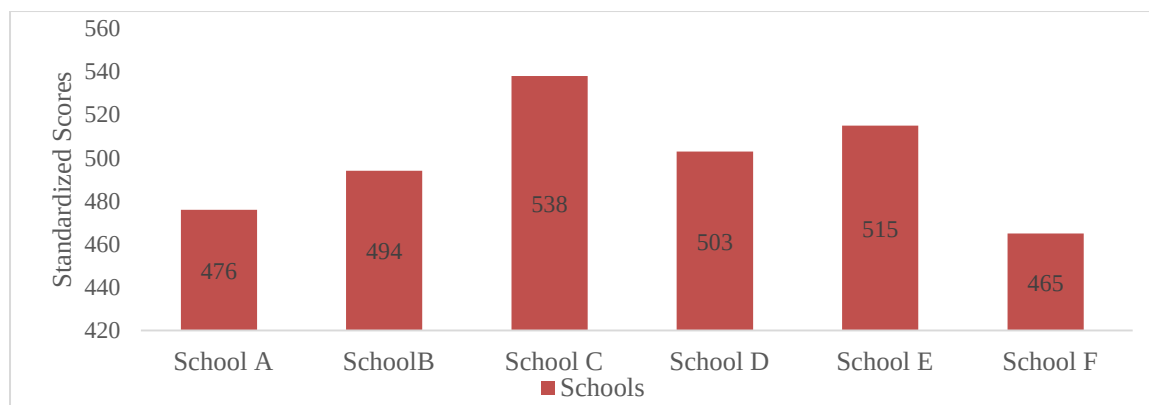


Figure 1. Standardized Scores of Organizational Health Index of Basic Education High Schools

According to organizational health index of Basic Education High Schools shown in figure1, it can be noted that out of six Basic Education High Schools, organizational health of school F was below average; that of School A was slightly below average; that of School B and School D were average; that of School E was slightly above average and that of School C is above average.

Variations of Organizational Health Index of Basic Education High Schools According to School Related Factors

Selected Basic Education High Schools were divided into groups to their school grade (Grade A and Grade C) and school size (N2, N3 and N4) to examine how these groups differ in organizational health index.

To analyze and evaluate organizational health of school grouped by school grade, Independent Sample *t* Test was conducted.

Table 14. Independent Samples *t* Test Result Showing Organizational Health of Schools Grouped by School Grade (N=190)

Variables	School Grade	SdS	<i>df</i>	<i>t</i>	<i>p</i>
Organizational Health Index	Grade A	503	188	0.955	ns
	Grade C	490			

Note: * $p < 0.05$, ** $p < 0.01$ n.s = no significance

According to *t* test results, it indicated that the overall organizational health index of grade A schools did not statistically and significantly differ from Grade C schools.

Then, one-way ANOVA test was performed to find the variations of organizational health index among three types of school size.

Table 15. One-Way ANOVA Result Showing Organizational Health of Schools Grouped by School Size

Variables	School Size	No. of Schools	N	SdS	<i>F</i>	<i>p</i>
Organizational Health Index	N2	3	83	499	1.612	ns
	N3	2	73	509		
	N4	1	34	473		

Note-N2=501-900 students, N3= 901-1200 students, N4=1201-1500 students, * $p < 0.05$, n.s = no significant

According to the ANOVA result Table 15, the organizational health index of school size did not significantly differ from each other.

Qualitative Findings

In the section of qualitative findings, the responses to open-ended questions are presented. All the teachers were asked four open-ended questions to investigate teachers' perception of organizational health of Basic Education High Schools. Various responses for open-ended questions are described as follows.

Question 1 is "Is there undue pressure from parents and superiors on teachers. In such situation, how does the principal stand up and solve the problem on the part of the teachers? If so, give example".

91% of teachers (n=172) responded that there was no undue pressure from parents and superiors on teachers. 9% of teachers (n=18) responded that they felt some undue pressure from parents and superiors. In such situation, principal find out the source of problem and solve according to rules and regulations.

Question 2 is "What kind of support do parents give to the school?"

30% of teachers (n=57) responded that parents were actively participate and give necessary support in school's ceremonies and activities. 20% of teachers (n=38) responded that parents donate in nutrition program. 13% of teachers (n=25) responded that parents give support for school infrastructures and necessary teaching aids. Other teachers (n=57, 30%) responded that parents are interested in schools' activities and their children education. So, they give necessary support for schools. But, 7% of teachers (n=13) responded that some parents did not attend the meeting and they did not interest in school activities.

Question 3 is "Are you satisfied with your work at the school? Why?"

98% of teachers (n=186) responded that they are satisfied with their work at the school. 55% of teachers (n=104) satisfied for their principal leadership such as supportive, fairness, collegiality and consideration. 31% of teachers (n=59) satisfied for their colleagues such as intimacy and citizenship behaviour. 7% of teachers (n=13) satisfied for their students' behaviour such as high academic emphasis, respect teacher and follow discipline. 5% of teacher (n=10) satisfied for their safety environment and easy to go from their home. 2% of teachers (n=4) responded that they are unsatisfied with their work at the school because of the inadequate teaching staff and some parents do not demonstrate appreciation for their hard works.

Question 4 is "Suggest and discuss what needs to be done to improve your school".To improve school

- cooperation with parents, teachers and students (n= 63,33%)
- collegiality between principal and teachers and among teachers (n=59 ,31%)
- effective community support (n= 28,15%)
- high academic emphasis (n=19, 10%)
- high support for needed resources and adequate staff and maintain infrastructures (n=22, 11%)

Conclusion and Discussion

According to research question (1), the level of organizational health of each school was investigated. The results showed that the level of organizational health of **School A** is slightly below average. This school had low standardized scores in ***institutional integrity***. Therefore, it can be interpreted that the teachers feel pressures from the community. This school had below average standardized scores in ***principal influence and morale***. Therefore, it can be interpreted that the principal is impeded by the superiors and they do not demonstrate independence in thought and action. Some of the teachers in this schools are indifferent to each other and they are cool and aloof to each other. This school had slightly below average standardized scores in ***initiating structure, consideration and resource support***. Therefore, it can be interpreted that the principal in such school did not make his or her attitudes and expectations clear to the teachers and they did not maintain definite standards of performance and had a few friendly, supportive, collegial behaviour. Such school had inadequate classroom supplies and instructional materials. This school had average standardized scores in ***academic emphasis***. Therefore, it can be interpreted that the school press for achievement and students in this school were work hard and respect those who do well academically.

In this study, the level of organizational health of **School B** is average. This school had below average standardized scores in ***academic emphasis***. Therefore, it can be interpreted that the school needs to more press for achievement. This school had slightly below average standardized scores in ***morale***. Therefore, it can be interpreted that in such school some of the teachers in these schools are indifferent to each other and they are cool and aloof to each other. This school had average standardized scores in ***institutional integrity, initiating structure, principal influence and resource support***. Therefore, it can be interpreted that the school is able to cope successfully with destructive outside forces and teachers are protected from unreasonable community and parental demands, the principal had the ability to affect the action of superior and the school had adequate classroom supplies and instructional materials. This school had slightly above average standardized scores in ***consideration***. Therefore, it can be interpreted that the principal had friendly, supportive, collegial behaviour and also consider the welfare of his teachers. In such situation, the school needs to set high standards for academic performance. Moreover, academic achievement is recognized and acknowledged by the school. To get teachers' intimacy within the school, principal needs to allocate the tasks with teams and organize charity group to support community.

In this study, the level of organizational health of **School C** is above average and so, it is higher than that of other five schools. This school had average standardized scores in ***institutional integrity***. Therefore, it can be interpreted that the school is able to cope successfully with destructive outside forces and teachers are protected from unreasonable community and parental demands. This school had slightly above average standardized scores in ***resource support***. Therefore, it can be interpreted that the school had adequate classroom supplies and instructional materials. This school had above average standardized scores in ***morale and academic emphasis***. Therefore, it can be interpreted that the teachers in this school had a feeling of trust and confidence among the staff and they also accomplished their job with enthusiasm. Moreover, the school press for achievement and students in this school were work hard and respect those who do

well academically. This school had high standardized scores in **initiating structure, consideration and principal influence**. Therefore, it can be interpreted that the principal has friendly, supportive, collegial behaviour and ability to affect the action of superior. Moreover, the qualitative findings from the teachers of School C responded that they are satisfied with their work at that school because of their principal leadership, their colleague intimacy and their students' behaviour such as respect teacher and follow discipline.

In this study, the level of organizational health of **school D** is average. This school had average standardized scores in **initiating structure, consideration, principal influence, resource support, morale and academic emphasis** and slightly above average standardized scores in **institutional integrity**. Therefore, it can be interpreted that the principal has such behaviours as task and achievement - oriented behaviour, friendly, supportive, collegial behaviour and ability to affect the action of superior, the school had adequate classroom supplies and instructional materials, the teachers in this school had a feeling of trust and confidence among the staff and they also accomplished their job with enthusiasm. Moreover, the school press for achievement and students in this school were work hard and respect those who do well academically and the school is able to cope successfully with destructive outside forces and teachers are protected from unreasonable community and parental demands.

In this study, the level of organizational health of **school E** is slightly above average. It had low standardized scores in **consideration** dimension. Therefore, it can be interpreted that the principal had a few friendly, supportive, collegial behaviour. The principal also made unilateral decision. In such situation, principal needs to treat all teachers as his or her equal. He /She puts suggestions made by the teachers into operation and He/She look out for the personal welfare of the teachers. **Other dimensions** are high, above average, slightly above average and average standardized scores. Therefore, it can be interpreted that the school is able to cope successfully with destructive outside forces and teachers are protected from unreasonable community and parental demands. The principal has task - oriented behaviour and ability to affect the action of superior, the school had adequate classroom supplies and instructional materials, the teachers in this school had a feeling of trust and confidence among the staff and they also accomplished their job with enthusiasm. Moreover, the school press for achievement and students in this school were work hard and respect those who do well academically. According to qualitative findings, it was found that teachers from School E responded that to improve their school, collegiality between principal and teachers should be constructed.

In this study, the level of organizational health of **school F** is below average and so, it is lower than that of other five schools. This school had low standardized scores in **initiating structure and resource support**. Therefore, it can be interpreted that the principal in such schools did not make his/her attitudes and expectations clear to the teachers and he/she did not maintain definite standards of performance. Such school had inadequate classroom supplies and instructional materials. This school had below average standardized scores in **principal influence**. Therefore, it can be interpreted that the principal is impeded by the superiors and he/she do not demonstrate independence in thought and action. This school had slightly below average standardized scores in **institutional integrity, consideration, morale and academic emphasis**. Therefore, it can be interpreted that the school is vulnerable to outside pressures and the teachers

feel pressures from the community. The principal had a few friendly, supportive, collegial behaviour. Some of the teachers in these schools are indifferent to each other and they are cool and aloof to each other and the schools need to more press for achievement. Also in qualitative study, the teachers from School F responded that they are unsatisfied with their work at the school because there were inadequate teaching staff and instructional materials. Moreover, they responded that to improve their school, cooperation with parents, teachers and students, collegiality between principal and teachers and among teachers and effective community support are needed.

According to research question (2), while investigating the variations of organizational health of Basic Education High Schools in terms of school related factors, it was found that, there was no statistically significant difference in organizational health index between grade A schools and grade C schools. But, the standardized score in organizational health of grade A school was higher than that of grade C schools. Therefore, it can be interpreted that, the organizational health index of each selected schools obtained from this study is consistent with the school grade assigned by the regional education office.

According to the school size, there are three types of schools, N2 schools (501- 900 students), N3 schools (901-1200students) and N4 schools (1201-1500 students). Teacher-students ratio in N2 school is 1:28, that of N3 school is 1:27 and that N4 school is 1:44. And then, there was no statistically significant difference in organizational health index of schools grouped by school size.

In sum, according to the standardized scores, there was no school that had very high and high level of organizational health. To get these levels, it is not only the responsibility of principal but also for the harmonious responsibility of teachers, students, parents and community. According to Dr. Khin Zaw (2001), “our society cannot achieve greatness unless individuals at all levels of ability accept the need for high standards of performance and strive to achieve those standards within the limits possible for them (p.91).” Since school is a small society, to achieve greatness in school, individuals at all levels of ability accept the need for high standards of performance and strive to achieve those standards as much as they can.

Suggestions

Based on the analyses of research findings, the following suggestions would like to be given for enhancing organizational health of schools.

For Principals -

- Principal should take responsibility in buffering role and need to solve the problem according to rules and regulation.
- Teachers should be protected from unreasonable community and parental demands.
- Principal should develop a comprehensive vision and mission statements that guide the direction of the school.
- The personal welfare of the teachers should be looked out by the principal.
- Principal should find ways to get adequate classroom supplies and instructional materials.

For teachers-

- Teachers should support to colleagues who may be struggling, whether it may be emotional support or practical assistant.
- Teachers should collaborate with other teachers.
- Teachers should teach their students to respect each other.
- Teachers should focus on students learning.

For students-

- Students should practice good study habits.
- Students should be respectful to their teachers and follow school disciplines.

For parents and community-

- Parents should respect to the teachers and demonstrate appreciation for their hard work.
- Parents should cooperate with teachers.
- For improving students learning, parent should attend parent- teacher conferences in order to discuss about their children's progress and provide necessary support.
- Community should actively participate in school developmental process.

Need for Further Research

This study investigated the organizational health of Basic Education High Schools, Myaungmya Township, Ayeyarwaddy Region. There is need for further research to investigate in other states or regions. Further study should be made in Primary and Middle schools. Moreover, in Myanmar, the role of the private schools is increasingly demand. So, further studies should be made not only in public schools but also in private schools. It is also needed to examine the relationships of organizational health of schools and other variables such as, students' achievement, teachers' commitment, teacher efficacy etc. And then, if the research methods can include in-depth interviews and field observation, the data obtained will be more diversified.

Acknowledgements

Firstly, we would like to express our gratitude to Dr. Kay Thwe Hlaing, (Rector, Yangon University of Education), Dr. May Myat Thu, Dr. Khin Khin Oo and Dr. Nyo Nyo Lwin, (Pro-Rectors, YUOE) for their permission to do this research. Secondly, respectful thanks go to Dr. Khin Mar Ni (Professor and Head, Department of Educational Theory and Management, YUOE) for her valuable advice.

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RELATIONSHIP BETWEEN SCHOOL PRINCIPALS' TRANSFORMATIONAL LEADERSHIP PRACTICES AND COLLECTIVE TEACHER EFFICACY

Yu Yu San¹ and Su Chan Myae²

Abstract

The general objective of this study is to study the relationship between school principals' transformational leadership practices and collective teacher efficacy in Basic Education Primary Schools in Patheingyi Township. In this study, sample size of 161 respondents from (21) Basic Education Primary Schools were selected by using cluster sampling. The questionnaires and open-ended questions were developed based on the literature review, Leithwood and Sun's (2012) dimensions of principals' transformational leadership practices and Barr's (2002) dimensions of collective teacher efficacy. Five-point Likert-scales were employed. The internal consistencies (Cronbach's alpha) were (0.97) for the instruments of transformational leadership practices and (0.95) for the instruments of collective teacher efficacy. Descriptive statistics, One-way ANOVA, Independent Sample *t*-Test and Pearson-correlation were used to analyze the quantitative data. The level of principals' transformational leadership practices in this study was moderately high. There were no significant differences in these practices grouped in terms of principals' personal factors. However, there were significant differences in three dimensions except setting direction and overall transformational leadership practices according to their academic qualification. Overall collective teacher efficacy was high level. Among the dimensions of teacher collective efficacy, student discipline was also high but instructional strategies was moderately high. In qualitative findings, teachers did not believe in instructional strategies (N=10, 6.21%) because of lower staffing level, weakness in lesson plan and new curriculum reform. There were no significant differences grouped in terms of teachers' personal factors. The results of Pearson-correlation indicated that there were significant and positive relationships between principals' transformational leadership practices and collective teacher efficacy. The results of qualitative study were consistent with the findings of quantitative study.

Key words: Transformational leadership, Collective teacher efficacy

Introduction

Education plays a central role in reducing poverty and inequity, strengthening the community, expediting economic development and building national unity (Ministry of Education, 2016). Therefore, Myanmar government reformed the implementing long-term and short-term plans including a new National Education Strategic Plan (NESP) during the period 2016-2021. This new education reform required a new vision and new teaching methods, which in turn required powerful and inspiring leadership that can motivate and engage all teachers in the change process. Moreover, the important factor is collective teacher efficacy which refers to teachers' collective belief in their capacity to influence student learning that can motivate teachers to be part of the school improvement process (Bandura, 1997).

Therefore, the collective efficacy refers to the exercise of the action in the ambit of the group, being comprehended as the shared beliefs by the body of teachers to produce effects over determined actions (Bandura, 1997). Transformational leadership model was suitable for this study because improving teaching capacity is the starting point of transformational leadership (Liu et al., 2019). Collective teacher efficacy levels may be influenced by school administrators' transformational leadership (Kurt et al., 2012). Transformational leadership contributes to teachers' positive beliefs about themselves, and such beliefs are the foundation of collective teacher efficacy (Goddard et al., 2015). Transformational leadership is also effective in motivating and engaging teachers in change processes (Leithwood & Sun, 2012; Liu et al., 2019; Ross & Gray, 2006). Therefore, it has been assumed that transformational leadership could emerge in the context of curriculum reform and strengthen teachers' collective capacity beliefs.

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Objectives of the Study

The general objective is to study the relationship between school principals' transformational leadership practices and collective teacher efficacy.

The specific objectives are as follow:

- (1) To investigate the extent of school principals' transformational leadership practices
- (2) To find out the variations of school principals' transformational leadership practices in terms of principals' personal factors
- (3) To investigate the level of collective teacher efficacy
- (4) To find out the variations of collective teacher efficacy in terms of teachers' personal factors
- (5) To investigate the relationship between school principals' transformational leadership practices and collective teacher efficacy

Research Questions

- (1) What is the level of school principals' transformational leadership practices?
- (2) Are there any variations of school principals' transformational leadership practices in terms of principals' personal factors?
- (3) What is the level of collective teacher efficacy?
- (4) Are there any variations of collective teacher efficacy in terms of teachers' personal factors?
- (5) Is there any significant relationship between school principals' transformational leadership practices and collective teacher efficacy?

Definition of the Key Terms

Transformational Leadership is defined as the influence process of transforming the values and priorities of the followers and motivating them to perform beyond their expectations (Yukl, 1998).

Collective Teacher Efficacy refers to teachers' beliefs about the ability both of the team and of the faculty of teachers at the school to have positive effects on students (Goddard, 2001).

Theoretical Framework

In this study, transformational leadership practices of school principals were investigated with four dimensions of transformational leadership model developed by Leithwood and Sun (2012). They are:

Setting Direction: Leithwood et al. (1999) and Mascal (2003) noted that 'setting directions' included building a school vision, establishing school goals, and creating high performance expectations. Setting a clear vision is paramount to organizational success (Leithwood et al., 2006). A critical aspect of leadership is helping a group to develop shared understandings about the organization and its activities and goals that can undergird a sense of purpose or vision (Hallinger & Heck, 2002).

Developing People: Leithwood et al. (1999) contended that 'developing people' concerns building capacity among teachers, which can be conceptualized as three core leadership practices: providing individualized support, creating intellectual stimulation, and modelling best practices and organizational values. The ability to engage in practices that help develop people depends on leaders' knowledge of the "technical core" of schooling often invoked by the term "instructional leadership." This process is facilitated when the transforming leader attends to the followers' needs (Leithwood & Jantzi, 2005).

Redesigning the Organization: This third category focuses on the creation of conditions to facilitate second-order change, which includes the establishment of essential organizational routines, systems, and structures that enhance the collaborative culture and collective learning (Leithwood & Jantzi, 1990, 2005). Leithwood and Jantzi (2006) classified these dimensions as developing a collaborative school culture, creating structures and policies to foster participation in school decisions, and creating productive community relationships. Successful schools have strong functional cultures that include values, symbols, beliefs, and shared meanings among all stakeholders (Leithwood et al., 1999; Schein, 1985; Sergiovanni, 2007).

Improving the Instructional Program: This includes leadership practices such as establishing effective staffing practices, providing instructional support, monitoring school activities, and buffering staff from excessive and distracting external demands. Staffing a school means finding teachers whose interests and abilities are a match with school vision and goals that ensure the provision of instructional support to enhance the student achievement (Leithwood et al., 2006).

In this study, collective teacher efficacy is investigated with two dimensions based on teacher collective efficacy developed by Barr (2002). They are:

Student Discipline: Student discipline is a faculty's collective capability to manage student behavior. This means that the perception of teachers in a school of how well the efforts of the faculty as a whole manage student behavior and discipline (Chen, 2009; Hung et al., 2012; & Tschannen-Moran & Barr, 2004). Schools with high collective efficacy, teachers believe to construct rules for promoting students' learning, to follow school rules, to control their behavior and to teach proper etiquette with their faculty (Chiang et al., 2016).

Instructional Strategies: Instructional strategies are a faculty's collective capability to promote student learning. This means that the perception of teachers in a school of efforts of the faculty as a whole promote student learning (Chen, 2009; Hung et al., 2012; Tschannen-Moran & Barr, 2004). A greater sense of collective efficacy leads teachers to help students master content. They can help students think critically and promote deep understanding. All of teachers use multiple teaching methods and assessments for promoting student learning. Moreover, they can adopt individualized instruction after evaluation and can create the effective teaching methods for students (Chiang et al., 2016).

Review of Related Literature

The primary focus of the transformational leadership is the advancement of the organization. This was accomplished through the leader's capacity to foster a sense of efficacy and hope among the followers to attain the established goals of the organization. Bass (1990; 1997) and Yammarino (1994) posits that transformational leadership contains the following four set of behaviors referred to as the four I's to assist in building follower commitment to organizational goals: (a) Idealized Influence (Charisma): Leader articulates a vision and fosters a sense of pride among the organization's members and earns their respect and trust; (b) Inspirational Motivation: Leader sets high standards for members, but offers encouragement and hopefulness for the achievement of set goals; (c) Intellectual Stimulation: Leaders encourages the contribution of ideas and the participation in the decision making process; and (d) Individualized Consideration: Leader offers individualized attention to members and considers their needs, capabilities and desires.

Goddard et al (2000) identified the four sources integral to the development of collective teacher efficacy (CTE) as mastery experience, vicarious experience, social persuasion, and

affective states. Like teacher efficacy, collective teacher efficacy was described as cyclical, with positive outcomes leading to higher collective teacher efficacy. Barr (2002) proposed two other dimensions of collective teacher efficacy; student discipline and instructional strategies. Student discipline is a faculty's collective capability to manage student behavior. Instructional strategies are a faculty's collective capability to promote student learning.

The link between collective efficacy and principal transformational leadership is of growing interest in the literature as a means to chart the indirect effects of leadership on student achievement through a leader's direct effects on efficacy beliefs (Kurt et al., 2012). Demir's (2008) study of 66 elementary schools in Turkey focused on the direct relationship between transformational leadership practices with collective efficacy and the indirect relationship of transformational leadership with collective teacher efficacy through teacher self-efficacy and the collaborative nature of the school culture. Dumay and Galand's (2012) hypothesized that school principals play an important role in the interpretation of performance information for teachers, which would influence teacher collective efficacy beliefs. Transformational leadership was found to be significantly and positively related to collective efficacy.

Methodology

Research Method

In this study, both quantitative and qualitative methods were used to collect the required data. In quantitative study, questionnaire survey was used and in qualitative study, open-ended questions were used to explain the survey responses.

Population and Sample

Participants for this study were selected from Patheingyi Township. Cluster sampling method was used to collect the participants who were teachers of (21) Basic Education Primary schools in January, 2022-2023 academic years. All of participants were selected (161) primary teachers from randomly selected of (21) school clusters.

Validity and Reliability

In order to obtain the content validity of the questionnaire, instrument was reviewed by (12) experts who have sound knowledge and experience from the Department of Educational Theory, Yangon University of Education. To measure the reliability of the questionnaire, a pilot test was conducted with (30) primary teachers. The internal consistency (Cronbach's alpha) of the instruments was (0.97). Specifically, the internal consistency was (0.97) for transformational leadership instruments and (0.95) for the instruments of collective teacher efficacy. Therefore, the questionnaire was reliable to use for this study.

Data Analysis

The data obtained from questionnaire survey were analyzed by using the Statistical Package for Social Science (SPSS) version 26 as it is widely used in quantitative research. Descriptive statistics, Independent Sample *t* Test, One-way ANOVA and Pearson-correlation were used to analyze the quantitative data.

Findings

Quantitative Findings

Principals' transformational leadership practices were investigated in four dimensions. According to Table 1 for **research question (1)**, the mean value for overall principals' transformational leadership practices showed by teachers was 4.17, principals conducted them ***moderately high level***.

Table 1 Mean Values and Standard Deviation for the Levels of Principals' Transformational Leadership Practices (N=161)

Dimensions of Transformational Leadership Practices	Mean	SD	Level
Setting Directions	4.14	.37	Moderately high
Developing People	4.19	.41	Moderately high
Redesigning the Organization	4.20	.39	Moderately high
Improving the Instructional Program	4.13	.42	Moderately high
Transformational Leadership Practices	4.17	.37	Moderately high

Scoring Direction: 1.00-1.80=Low 1.81-2.60=Moderately low 2.61-3.40=Average 3.41-4.20=Moderately high 4.21-5.00=High

For investigating the variations for **research question (2)**, principals' transformational leadership practices grouped in terms of principals' personal factors were considered in this study. First of all, according to *t*-Test results, there were no significance differences not only in overall principals' instructional supervision practices but also in the dimensions between the groups of gender in table 2, age in table 3 and administrative services in table 4.

Table 2 Independent Samples *t* Test Result Showing Mean Values of Principals' Transformational Leadership Practices Grouped by Gender (N=161)

Variables	Gender	N ₁	N ₂	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Setting Direction	Male	5	6	4.11	.34	-.943	159	ns
	Female	16	155	4.16	.38			
Developing People	Male	5	6	4.15	.38	-.983	159	ns
	Female	16	155	4.21	.43			
Redesigning the Organization	Male	5	6	4.19	.40	-.336	159	ns
	Female	16	155	4.21	.39			
Improving the Instructional Program	Male	5	6	4.11	.36	-.565	159	ns
	Female	16	155	4.15	.45			
Transformational Leadership Practices	Male	5	6	4.14	.33	-.739	159	ns
	Female	16	155	4.18	.39			

ns=no significance, N₁ = number of principals, N₂ = number of teachers
Scoring Direction: 1.00-1.80=Low 1.81-2.60=Moderately low 2.61-3.40=Average 3.41-4.20=Moderately high 4.21-5.00=High

Table 3 Independent Samples *t* Test Result Showing Mean Values of Principals' Transformational Leadership Practices Grouped by Age (N=161)

Variables	Age Groups	N ₁	N ₂	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Setting Direction	Below 50 years	3	85	4.16	.32	.175	159	ns
	51 and above	18	76	4.14	.37			
Developing People	Below 50 years	3	85	4.17	.33	-.112	159	ns
	51 and above	18	76	4.18	.41			
Redesigning the Organization	Below 50 years	3	85	4.15	.31	-.554	159	ns
	51 and above	18	76	4.20	.39			
Improving the Instructional Program	Below 50 years	3	85	4.13	.31	.008	159	ns
	51 and above	18	76	4.13	.42			

Variables	Age Groups	N ₁	N ₂	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Transformational Leadership Practices	Below 50 years	3	85	4.15	.31	-.147	159	ns
	51 and above	18	76	4.16	.37			

ns=no significance,

N₁ = number of principals,N₂ = number of teachers

Scoring Direction:

1.00-1.80=Low

1.81-2.60=Moderately low

2.61-3.40=Average

3.41-4.20=Moderately high

4.21-5.00=High

Table 4 Independent Samples *t* Test Results Showing Principals' Transformational Leadership Practices Grouped by Administrative Services (N=161)

Variables	Administrative Services	N ₁	N ₂	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Setting Direction	under 10 years	1	52	4.16	.51	.309	159	ns
	11 years and above	20	109	4.13	.34			
Developing People	under 10 years	1	52	4.13	.47	-.550	159	ns
	11 years and above	20	109	4.19	.40			
Redesigning the Organization	under 10 years	1	52	4.08	.44	-1.269	159	ns
	11 years and above	20	109	4.21	.38			
Improving the Instructional Program	under 10 years	1	52	3.95	.45	-1.848	159	ns
	11 years and above	20	109	4.15	.40			
Transformational Leadership Practices	under 10 years	1	52	4.07	.42	-1.046	159	ns
	11 years and above	20	109	4.17	.36			

ns=no significance,

N₁ = number of principals,N₂ = number of teachers

Scoring Direction:

1.00-1.80=Low

1.81-2.60=Moderately low

2.61-3.40=Average

3.41-4.20=Moderately high

4.21-5.00=High

According to one-way ANOVA the results, there were significant differences not only in principals' transformational leadership practices ($df=2$, $F=6.39$, $p<0.01$) but also in the dimensions of developing people ($df=2$, $F=4.24$, $p<0.05$), redesigning the organization ($df=2$, $F=8.56$, $p<0.001$) and improving the instructional program ($df=2$, $F=7.60$, $p<0.001$) grouped by their course training shown in Table 5.

Table 5 One-Way ANOVA Result Showing Mean Values of Principals' Transformational Leadership Practices Grouped by Course Training (N=161)

Variables		Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Setting Direction	Between Groups	.44	2	.220	1.654	ns
	Within Groups	20.99	158	.133		
	Total	21.43	160			
Developing People	Between Groups	1.36	2	.681	4.235	.016*
	Within Groups	25.39	158	.161		
	Total	26.75	160			
Redesigning the Organization	Between Groups	2.39	2	1.196	8.563	.000***
	Within Groups	22.07	158	.140		
	Total	24.46	160			
Improving the Instructional Program	Between Groups	2.43	2	1.216	7.597	.001***
	Within Groups	25.28	158	.160		
	Total	27.71	160			

Variables		Sum of Squares	df	Mean Square	F	p
Transformational Leadership Practices	Between Groups	1.62	2	.814	6.391	.002**
	Within Groups	20.11	158	.127		
	Total	21.74	160			

*p<.05, **p<.01, ***p<.001, ns=no significance

Next, by using one way analysis variance, further detailed analysis and computation were undertaken. To find what particular principals' transformational leadership practices had great difference, the Tukey HSD multiple comparison results for principals' transformational leadership practices in two dimensions. According to Table 6, there were significant differences in developing people between principals who attended Diploma in Teacher Education (DTed) or Diploma in Teacher Education Competency (DTEC) and principals who attended Elementary or Secondary Correspondence Course (ECC/SCC) ($p<0.05$). And, there were significant differences in redesigning the organization among principals who attended DTed/DTEC, ECC/SCC ($p<0.01$) and Preservice Primary Teacher Training (PPTT) ($p<0.01$).

Table 6 The Results of Tukey HSD Multiple Comparison of Principals' Transformational Leadership Practices Grouped by Course Training (N=161)

Dependent Variable	(I) Course Training	(J) Course Training	Mean Difference (I-J)	Std. Error	p
Developing People	DTed/DTEC	ECC/SCC	-.17115	.07343	.054*
Redesigning the Organization	DTed/DTEC	ECC/SCC	-.22813*	.06846	.003**
		PPTT	-.63438*	.19600	.004**

*p<.05, **p<.01

According to Table 7, it presents the Games-Howell multiple comparison results that there were significant differences in improving the instructional program between DTed/DTEC and ECC/SCC ($p<0.001$). And, there were significant differences in overall practices of transformational leadership between DTed/DTEC and ECC/SCC ($p<0.01$).

Table 7 The Results of Games-Howell Multiple Comparison of Principals' Transformational Leadership Practices Grouped by Course Training (N=161)

Dependent Variable	(I) Course Training	(J) Course Training	Mean Difference (I-J)	Std. Error	p
Improving the Instructional Program	DTed/DTEC	ECC/SCC	-.25097	.06147	.000***
Transformational Leadership Practices	DTed/DTEC	ECC/SCC	-.19225	.05710	.003**

p<.01, *p<.001

For **research question (3)**, collective teacher efficacy was investigated in two dimensions such as (1) student discipline and (2) instructional strategies. The descriptive statistics for collective teacher efficacy show the mean values, standard deviation and the levels in Table 8.

Table 8 Mean Values and Standard Deviation for the Levels of Collective Teacher Efficacy (N=161)

Dimensions of Collective Teacher Efficacy	Mean	SD	Level
Student Discipline	4.24	.40	High
Instructional Strategies	4.19	.38	Moderately high
Collective Teacher Efficacy	4.21	.37	High

Scoring Direction: 1.00-1.80=Low 1.81-2.60=Moderately low 2.61-3.40=Average 3.41-4.20=Moderately high 4.21-5.00=High

According to Table 8, the mean values for overall collective teacher efficacy and student discipline of collective teacher efficacy were between 4.21 and 5.00 and that they perceived **high level**. However, the mean value of instructional strategies of collective teacher efficacy was 4.19 and that it perceived **moderately high level**.

Investigating the variations for **research question (4)**, the differences in collective teacher efficacy in terms of teachers' personal factors such as gender, age, course training and services were considered in this study. There were no significant differences between any groups in terms of teachers' personal factors.

For **research question (5)**, Pearson-product Moment Correlation was used to determine whether there was significant relationship between principals' transformational leadership practices and collective teacher efficacy. Table 9 indicated that there were correlations between principals' transformational leadership practices and collective teacher efficacy.

Table 9 Relationship between Principals' Transformational Leadership Practices and Collective Teacher Efficacy (N=161)

	Transformational Leadership Practices	Collective Teacher Efficacy
Transformational Leadership Practices	1	.588**
Collective Teacher Efficacy	.588**	1

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

Qualitative Research Findings

In open-ended question (1) for setting direction of transformational leadership practices, teachers responded that their principals negotiated and collaborated with teachers, School Board of Trustees, Parents Teachers Association, and Staff to make consensus decisions (N=153, 95.03%). Moreover, principals explained group goals to acceptance the whole staff in order to discuss teachers' different perceptions so that they will adopt a consensus decision and if necessary, they precisely participated in making a decision (N=21, 13.04%).

In question (2) for developing people of transformational leadership practices, teachers responded that principals provided money, materials, advise in order to improve teaching practices and they are trying to understand teachers' feelings and difficulties to support duties and opportunities individually (N=90, 61.49%). Principals encouraged teachers to confer with each other by holding the conferences in school in order to create collaborative culture of teaching-learning processes (N=60, 37.26%). In schools, principals encouraged teachers to consider new ideas for teaching methods, evaluation and class control by sharing the better ways

to improve teaching-learning processes (N=20, 12.42%) in carrying out developing people in their schools.

In the third question for redesigning the organization of transformational leadership practices, teachers responded that principals encouraged parents to negotiate, participate and discuss widely in the school improvement efforts in order to be clear and open (N=96, 59.62%). Principals encouraged collaborative culture among the staff in solving the problem (N=67, 41.62%). Principals oversaw without bias in problem solving, giving responsibilities, and adopting discipline fairly to promote morale (N=9, 5.59%). Some teachers (N=3, 1.86%) responded that their principals buffered the interference of teaching process from community.

In last question for improving the instructional program of transformational leadership practices, teachers responded that principals took responsibilities for problem solving, providing the needs for teaching aids and references books (N=126, 78.27%). Principals sent teachers to course and held the conferences in school for encouraging creativity in teaching aids and methods which were flexible with lessons and environment (N=54, 33.54%). Then, principals supervised the records of achievement, lesson planning and library (N=18, 11.18%). Moreover, only one of the teachers responded that his principal celebrated the ceremonies of competence (N=1, 0.62%).

Moreover, the teachers were asked with two open-ended questions about collective teacher efficacy. Various responses for open-ended questions are described as follows.

In open-ended question (1) for student discipline of collective teacher efficacy, they believed that students obeyed their adopted disciplinary rules in daily actions and behaviors (N=91, 56.52%). Students were attending class regularly, interesting in discussion (N=27, 16.77%). Teachers in their schools can admonish students with others in order to obey the rules (N=14, 8.70%) and they are model of actions (N=16, 9.94%). Some teachers (N=7, 4.35%) little believed in student discipline because students did not obey in cleaning discipline. Teachers (N=13, 8.78%) did not believe in student discipline because of the weakness of students.

In open-ended question (2) for instructional strategies of collective teacher efficacy, they have many teaching experiences and can use multiple teaching methods with the needs of real life in order to make interesting and participating in teaching (N=124, 77.02%). They can teach all improvement of students according to their strengths and weakness (8.70%). Teachers can collaborate for improving instructional strategies (N=7, 4.35%). Teachers did not believe in instructional strategies (N=10, 6.21%) because of lower staffing level, more absent students, weakness in lesson plan and new curriculum reform.

Discussion and Conclusion

Principals, as a transformational leader, should empower teachers to achieve the collective task of school through the development of self-efficacy (Demir, 2008). The objective of this study was to determine the relationship between transformational leadership practices (independent variable) and collective teacher efficacy (dependent variable).

According the findings for **research question (1)**, the overall mean value of principals' transformational leadership practices was 4.17 and so principals conducted at **moderately high level**. The result of the descriptive statistics showed that majority of principals had a positive perception of practicing transformational leadership and they seemed to have a moderately high level on their perception. The result of this study confirmed the study of Salleh and Saidova (2013) where principals had a positive perception of practicing transformational leadership but

they seemed to have an average level on their perception in the study of primary schools, Malaysia. In qualitative findings, only (21) teachers answered that their principals explained group goals to get a consensus decision. And only (12) teachers answered that principals adopted discipline and gave responsibilities without any bias when they redesigned the organization. Therefore, the school principals had a positive attitude and moderately high level toward the importance of practicing of four dimensions of transformational leadership in the primary schools of Patheingyi Township.

For **research question (2)**, according to teachers' perceptions on principals' transformational leadership practices grouped by gender, the result of the t-test analysis showed that there was no significant difference between male and female principals in their practicing transformational leadership. This finding contradicts with three studies reported by Chmer (2020) in which female managers were more likely to be rated by their followers more transformational than were their male counterparts. However, this study may be explained the same by the groups of gender in the principals' transformational leadership practices.

According to the groups of principals' age, there were no significance differences in this result. This result is consistent with the findings of Salleh and Saidova (2013) that there was no significant difference of respondents' perceptions of practices according to age. Therefore, this study may be explained the same in the principals' transformational leadership practices according to their age groups.

According to the groups of principals' administrative services, although there were no significance differences in this result, there were significance differences in results between principals in the groups of principals' administrative services (Chmer, 2020) where there were differences between principals with more than 10 years of experience and other principals as seen from the teachers' perspectives because the principals with more experience are more likely to be adept at dealing with different kinds of people in the workplace. In this study may be explained the same by the groups of administrative services in the principals' transformational leadership practices.

However, when principals grouped by course training, there were significant differences in the dimensions except setting direction and overall transformational leadership practices. As the results, principals who attended DTED/DTEC were less in practicing transformational leadership practices than teachers who attended ECC/SCC and PPTT. The most experienced principals know more clearly which practices will best improve and develop their schools and teachers (Al-Quran, 2016; Al-Ghamdi, 2011). Therefore, it seems that teachers who attended ECC/SCC and PPTT are more likely to recognize a teacher's nature and try to meet the teacher's needs and support his/her professional growth.

Regarding to the level of collective teacher efficacy for **research question (3)**, the mean values for overall collective teacher efficacy and student discipline were high level. The role of an elementary school teacher incorporates authority and dignity. In addition, elementary school teachers must promote personal development and foster normative behavior in their students while providing them with the tools to navigate social and cultural situations (Hsieh et al., 2009). Therefore, elementary homeroom teachers believe that they can influence student discipline and instructional strategies.

However, the mean value of instructional strategies of collective teacher efficacy was moderately high level. According to the open-ended question, teachers believed that all of the teachers cannot teach students for the improvement according to their strengths and weakness and cannot collaborate with teachers in teaching. They did not believe in instructional strategies

(N=10, 6.21%) because of lower staffing level, weakness in lesson plan and new curriculum reform. Therefore, collective teacher efficacy was moderately high in instructional strategies.

For **research question (4)**, according to collective teacher efficacy grouped by gender, there were no significant differences between groups. In studying teachers' collective efficacy according to their age groups, there were no significant differences among groups. It is consistent with the results of Skaalvik and Skaalvik (2007). According to their services, there were no significant differences but the mean values teachers under 5 years services were **moderately high** and less efficacious than other greater experienced teachers' groups. It contrasts with the result of Skaalvik and Skaalvik (2007) that collective efficacy was negatively related to numbers of years in the teaching profession. In this study, the more teaching experiences they got, and the more efficacious they are.

According to their course training, there were no significance differences but the mean values of teachers who were attended PPTT and DTed/DTEC had more collective efficacy than teachers who attended ECC/SCC. According to the length of course, PPTT is 6.5 months and DTed/DTEC is 2 years long. Ware and Kitsantas (2007) stated that technical and administrative support of the principal associated to collective teacher efficacy. The change in curriculum followed with the evaluation and assessment process in basic education. Therefore, teachers who attended PPTT and DTed/DTEC were more efficacious than teachers who attended ECC/SCC (UNESCO STEM, 2016).

According to their positions, Assistance PAT are less services and less efficacious than Vice PAT and PAT. Collective teacher efficacy includes important implications in education because teachers with grater efficacy have greater desires for teaching and more likely to continue staying teaching position. Tschannen-Moran et al. (1998) suggested that the past experience, communication with principals, students, peers and parents can mediate the development of teachers' efficacy.

For **research question (5)**, the results of Person-product moment correlation indicated that there were significant and positive relationships between principals' transformational leadership practices and collective teacher efficacy. This finding is relevant to Cansoy (2020). Based on this finding, it can be stated that as the school principals' transformational leadership practices increase, collective teacher efficacy will increase. On the other hand, it can be stated that as the school principals' transformational leadership behavior decreases, collective teacher efficacy will decrease. It means that if principals by serving as appropriate transformational leadership practices and making trust and respect between the followers will increase the level of collective teacher efficacy.

This finding is similar with findings of a previous study conducted by Ross and Gray (2006). The notion that principals practicing instructional and transformational leadership types in their schools are likely to contribute to the teachers' increased belief in their capacity to overcome problems and enhance student learning outcomes. Another study carried out in school contexts have shown that transformational leadership is positively related to collective teacher efficacy (Demir, 2008; Horn-Turpin, 2009; Ross & Gray, 2006; Walumbwa et al., 2004; Ninkovic & Floric, 2018; Prelli, 2016).

The aim of this study is to study the relationship between transformational leadership practices and collective teacher efficacy in Basic Education Primary Schools. The results in this study show that principals should try to practice transformational leadership practices. To enhance the level of collective teacher efficacy, principals should create a climate of trust in their schools by respecting the school members' ideas and listening to them and as transformational

leader in their schools by considering the follower's needs, values and morals. Principals should try to build a collaborative culture in their schools and to encourage teachers to be creative and cooperative for the instructional improvement in high expectations of school success. Moreover, principals should hold the conferences to discuss and share the knowledge with the board of study so that the experienced teachers can give the suggestions for improving the instructional strategies.

Recommendation for Further Study

This study tried to investigate the relationship between the school principals' transformational leadership practices and collective teacher efficacy at Basic Education Primary Schools in Patheingyi Township. Then investigating how high school principals and middle school principals performed their transformational leadership practices will need to be done as further research. This study has explored the differences based on personal factors, so, further study recommended to examine the other demographic factors such as type of schools, location and school size. More researches can conduct to search for the other types of leadership and other dimensions of transformational leadership for implementation of the effective schools.

Acknowledgements

We would like to express sincere thanks to Dr. Kay Thwe Hlaing (Rector of Yangon University of Education), Dr. May Myat Thu (Pro-Rector of Yangon University of Education), Dr. Khin Khin Oo (Pro-Rector of Yangon University of Education), and Dr. Nyo Nyo Lwin (Pro-Rector of Yangon University of Education) for their permission to present this study. We would like to offer our note of respectful appreciation to Dr. Khin Mar Ni (Professor and Head of Department of Educational Theory and Management, Yangon University of Education) for her expert guidance, valuable advice, assistance and encouragement and long-standing commitment during research. We would like to express our heartfelt thanks to all the teachers at the Department of Educational Theory and Management, valuable and timely advice, love and help that become a good motivation to us. Moreover, our special thanks go to Librarian and staff members of the Yangon University of Education for the helpful assistance.

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A STUDY OF PRINCIPALS' LEADERSHIP STYLES ON TEACHERS' PERFORMANCE IN BASIC EDUCATION HIGH SCHOOLS

Aye Aye Myat¹ and Khin Mar Ni²

Abstract

The main aim of the research is to study the principals' leadership styles on teachers' performance. The specific aims of the research are to study the leadership style which is most commonly used by school principals, to investigate the level of performance among teachers and to identify the relationship between principals' leadership styles and teachers' performance. Quantitative method was used in this study. A total of two hundred and twenty teachers were selected as subjects from four schools in North Okkalapa Township, Yangon Region, using random sampling method. The questionnaires included items for demographic data, leadership styles and teachers' performance. Instrument was reviewed by a panel of experts. The Cronbach's alpha of the principals' leadership styles was 0.89 and the Cronbach's alpha of the teachers' performance was 0.89. Descriptive statistic and Pearson Correlation were used to analyze the data in this study. The democratic leadership style was found to be the most commonly used leadership style among principals. The total mean value of teachers' performance was high (Mean=4.05, SD=.45). There was an association between the principals' leadership styles and the teachers' performance. These findings strongly indicate that the principals' leadership styles are significantly related to teachers' performance.

Key words: Autocratic, Democratic, Laissez-Fair leadership styles, Teachers' performance

Introduction

Schools are one of the few remaining institutions to offer partnerships to families in socialization and investment through learning. School education helps people make sense of the changes as well as fostering sustainability including lifelong learning. Society's most important investment is increasingly seen to be in the education of its people. In this situation of high expectations of each country's educational provision, those leading schools have an enormous responsibility. It is no wonder that "the school improvement movement of the past 20 years has put a great emphasis on the role of the leaders". "Effective school leaders are key to large-scale, sustainable education reform" (Fullan, 2002).

Importance of the Study

Educational institutions are critical places where the next generation is educated, and school leaders bear a heavy burden of responsibility for their institutions. Leaders in educational institutions are the same as leaders in other organizations, and inevitably face the challenge of main-training the goals of institutions (Northouse. 2010. School leadership is a process of encouraging and helping teachers and learners to work enthusiastically toward realization of school objectives. Leadership style and job performance seem to go hand in hand with fulfilling their roles and functions towards teachers' job performance, head teachers adopt various leadership styles or they exhibit various behavior patterns.

Aims of the Study

The aims of the study are as follows

Main Aim

- To study the principals' leadership styles on teachers' performance in Basic Education High Schools of North Okkalapa Township, Yangon Region.

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Specific Aims

- To study the leadership style which is most commonly used by school principals
- To investigate the level of performance among teachers in selected schools
- To identify the relationship between principals' leadership styles and teachers' performance

Research Questions

1. Which leadership style is most commonly used by school principals?
2. What is the level of job performance among teachers in selected schools?
3. Is there any relationship between principals' leadership styles and teachers' performance?

Definitions of the Key Terms

Principals' Leadership Style

A principal leadership style is a leader's style of providing direction, implementing plan and motivating people (Wikipedia, November 2014).

Teachers' Performance

Teachers' performance could be described as the duties performed by a teacher as a particular period in the school system in achieving organizational goals (Oblilade, 1999, cited in Adeyemi, 2010).

Theoretical Framework

A leadership style is a leader's style of providing direction, implementing plans, and motivating people. There are many different leadership styles proposed by various authors. In 1939, Kurt Lewin conducted a classic study of leadership, and this involved three styles of leadership: autocratic, democratic and laissez-faire.

Autocratic leadership

The autocratic style is described a leader who dictated work methods, made unilateral decisions and limited employees participation (Robbins & Coulter, 2009) This leadership style is less creative, determining a permanent state of tension and discontent, resistance and decrease leaders interest of subordinates (Raus & Haita, 2011).

Democratic leadership

The democratic Leadership is a leadership style that involves people in decision-making process while the execution of the decision may be from the leader after facilitating consensus in the group.

Laissez-faire leadership

Laissez-Faire leadership Style is defined as a style of leadership where leaders refuse to make decisions, are not available when needed, and choose to take no responsibility for their lack of leadership ability (Biggerstaff, 2012).

Teachers' Performance

Teachers' performance could be described in various ways. It could be an act of accomplishing of executing a given task (Okunola, 1990). It could be also described as the ability to combine skillfully the right behavior towards the achievement of organizational goals and objective (Olaniyan, 1999). (Owoeye, 1999) asserted that variables of job performance such as effective teaching, lesson notes preparation, effective use of scheme of work, effective supervision, monitoring of students' work and disciplinary ability are virtues which teachers'

performance could be measured through twelve facts such as plan instruction, implements the lesson, motivate students, communicates lesson, demonstrates knowledge of the curriculum, sets high expectations for student achievement in accordance with needs and abilities, maximizes time on task, integrates materials and methodology, plans and uses evaluative activities, manage the classroom, interacts with students and interacts with parents and community.

Review of Related Literature

Authoritarian Leadership Style and Teachers' Performance

Research carried out by Kurt Lewin a renowned social scientist cited in authoritarian leadership style, the authoritarian leader is very personal in his praise and criticism of each member but does not actively participate with the group unless demonstrating the group. The issue of electing which members will work collaboratively almost amounts to discrimination of the members in the work place and this study tried to determine how autocratic leadership style influences job performance of teachers in Basic Education High School.

Democratic Leadership Style and Teachers' Performance

Democratic leadership style entails consulting with subordinates and the evaluation of their opinion and suggestion before decisions are made by the management (Mullins, 2005). By inference then this implies that a democratic leader can listen to complaints and needs of employees and therefore promotes job performance. Due to the consultative nature of the democratic leadership style, it is probable that this process will enhance greatly the level of shared values between the organization and its employees which enhances job performance. In participative (democratic leadership), the teachers still can gain feedback from their principal on expectations of their roles when necessary (Clark. et al. 2009). The communicative nature between principal and teachers paves way for improving job performance.

Laissez-faire Leadership Styles and Teachers' Performance

Lewin in his studies pointed out that Laissez-faire style of leadership offered little or no guidance to group members and leaves decisions making, up to group members. The laissez-faire allows independence but discourages team building and shows no concern for workers needs or welfare (Robbins and Judge, 2009).

Methodology

Research Methodology

Quantitative method was used to collect the required data in this study.

Population and Sample

For this study, 220 teachers were randomly selected from Basic Education High Schools, North Okkalapa Township. Four school were randomly chosen as the sample of this study. According to the R.V.Krejcie and D.W.Morgan (cited in Gay and Airansian, 1992), the required sample size is 217 for population of 500. So, it would be even more confident with a sample of 220.

Instrumentation

Questionnaire survey was used in this study so as to collect the required data for the research. The set of questionnaire for the teacher was developed with two main portions after thorough review of the literature. One is to examine the principals' leadership styles and the other portion was to investigate teachers' performance.

Procedure

The questionnaires were distributed to the schools on 17th January, 2017. Finally, the datas were examined to determine if the quantitative analysis complemented each other.

Data Analysis

In the quantitative analysis, the data obtained from questionnaire survey were analyzed by using the Statistical Package for the Social Sciences (SPSS) version 20 as it is widely used in quantitative research. Descriptive statistics were used to tabulate means and standard deviations for group of items. Furthermore, Pearson Correlation was conducted to analyze the data.

Findings

Quantitative Findings

The quantitative findings of Basic Education High School, North Okkalapa Township were presented in the following tables.

Table (1) Mean Values and Standard Deviations of Leadership Styles of the Principal in School (A), North Okkalapa Township N=82

Leadership Styles	Mean	SD
Autocratic Leadership Styles	3.43	.58
Democratic Leadership Styles	4.25	.65
Laissez-faire Leadership Styles	3.20	.50

1.00 – 1.49 = Never 2.50 – 3.49 = Sometimes 4.50 – 5.00 = Always

1.50 – 2.49 = Rarely 3.50 – 4.49 = Often

In table (1), the mean values and standard deviations of autocratic, democratic and laissez-faire leadership styles were 3.43, 4.25 and 3.20 respectively.

Table (2) Mean Values and Standard Deviations of Leadership Styles of the Principal in school (B), North Okkalapa Township N=41

Leadership Styles	Mean	SD
Autocratic Leadership Styles	3.43	.75
Democratic Leadership Styles	3.96	.88
Laissez-faire Leadership Styles	2.99	.52

1.00 – 1.49 = Never 2.50 – 3.49 = Sometimes 4.50 – 5.00 = Always

1.50 – 2.49 = Rarely 3.50 – 4.49 = Often

In table (2), the mean values and standard deviations of autocratic, democratic and laissez-faire leadership styles were 3.43, 3.96 and 2.99 respectively.

Table (3) Mean Values and Standard Deviations of Leadership Styles of the Principal in School (C), North Okkalapa N=50

Leadership Styles	Mean	SD
Autocratic Leadership Styles	3.50	.47
Democratic Leadership Styles	4.20	.42
Laissez-faire Leadership Styles	3.11	.41

1.00 – 1.49 = Never 2.50 – 3.49 = Sometimes 4.50 – 5.00 = Always

1.50 – 2.49 = Rarely 3.50 – 4.49 = Often

In table (3), the mean values and standard deviations of autocratic, democratic and laissez-faire leadership styles 3.50, 4.20 and 3.11 respectively.

Table (4) Mean Values and Standard Deviations of Leadership Styles of the Principal in School (D), North Okkalapa Township N=47

Leadership Styles	Mean	SD
Autocratic Leadership Styles	3.54	.68
Democratic Leadership Styles	4.24	.76
Laissez-faire Leadership Styles	3.00	.58

1.00 – 1.49 = Never 2.50 – 3.49 = Sometimes 4.50 – 5.00 = Always
 1.50 – 2.49 = Rarely 3.50 – 4.49 = Often

In table (4), the mean values and standard deviations of autocratic, democratic and laissez-faire leadership styles were 3.54, 4.24 and 3.00 respectively.

Table (5) Mean and Standards Deviations of the Degree of Perceived Job Performance of Teachers in Selected Basic Education High Schools

	Schools	N	Mean	SD
Teachers' Performance	A	82	4.17	.37
	B	41	4.04	.64
	C	50	3.95	.38
	D	47	3.97	.44
	Total	220	4.05	.45

1.00 – 1.49 = Never 2.50 – 3.49 = Sometimes 4.50 – 5.00 = Always
 1.50 – 2.49 = Rarely 3.50 – 4.49 = Often

In Table (5), the descriptive results of teachers' performance were shown. According to this table, the mean values for school, A, B, C, D were 4.17, 4.04, 3.95 and 3.97.

Table (6) Correlation between Perceived Principals' Leadership Styles and Teachers' Performance of Basic Education High School (A)

Two Groups	Teachers' Performance	Democratic Leadership Styles
Teachers' Performance	1	.622**
Democratic Leadership Style	.622**	1

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

Table (6) showed that the correlation between perceived principals' leadership styles and teachers' performance of Basic Education High School (A). Teachers' performance was significantly correlated with democratic leadership style ($r=.622$, $p<.000$).

Table (7) Correlation between Perceived Principals' Leadership Styles and Teachers' Performance of Basic Education High School (B)

Two Groups	Teachers' Performance	Democratic Leadership Styles
Teachers' Performance	1	.554**
Democratic Leadership Style	.554**	1

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

Table (7) showed that the correlation between perceived principals' leadership styles and teachers' performance of Basic Education High School (B). According to the result, teachers' performance was significantly correlated with democratic leadership style ($r=.544$, $p<.000$).

Table (8) Correlation between Perceived Principals' Leadership Styles and Teachers' Performance of Basic Education High School (C)

Two Groups	Teachers' Performance	Democratic Leadership Styles
Teachers' Performance	1	.415**
Democratic Leadership Style	.415**	1

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

Table (8) showed that the correlation between perceived principals' leadership styles and teachers' performance of Basic Education High School (C). According to the result, teachers' performance was significantly correlated with democratic leadership style ($r=.473$, $p<.003$).

Table (9) Correlation between Perceived Principals' Leadership Styles and Teachers' Performance of Basic Education High School, (D)

Two Groups	Teachers' Performance	Democratic Leadership Styles
Teachers' Performance	1	.655**
Democratic Leadership Style	.655 **	1

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

Table (9) showed that the correlation between perceived principals' leadership styles and teachers' performance of Basic Education High School (D). According to the result, teachers' performance was significantly correlated with democratic leadership style ($r=.655$, $p<.000$).

Conclusion

Based on the findings of study, the conclusion can be dawn as follow.

In school (A), teachers' performance correlated with democratic leadership style ($r=.622$). According to this data, it was found that teachers' performance strongly correlated with democratic leadership style. In school (B), teachers' performance correlated with democratic leadership style ($r=.544$). According to this data, it was found that teachers' performance moderately correlated with democratic leadership style. In school (C), teachers' performance correlated with democratic leadership style ($r=.415$). According to this data, it was found that teachers' performance moderately correlated with democratic leadership style. In school (D),

teachers' performance correlated with democratic leadership style ($r=.655$). According to this data, it was found that teachers' performance strongly correlated with democratic leadership style.

Discussion and Recommendation

In this study, it was found that the democratic leadership style was the commonest style of leadership used by principals of Basic Education High Schools, North Okkalapa.

The finding indicating significant difference in teachers job performance in schools having principals using democratic style of leadership and laissez-faire leadership style show that democratic leadership style was a better leadership style in enhancing better job performance among teachers. As such, principals should use the democratic style of leadership in some occasions. They should be autocratic in certain situations in order to increase productivity among teachers.

Acknowledgements

First and foremost, we are very grateful to Dr. Kay Thwe Hlaing , (Rector, Yangon University of Education) for her kind permission to submit this paper. We would like to offer a special acknowledgment to 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 permission successfully. We are greatly indebted to all people who have provided with precious suggestions and kind encouragement.

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RELATIONSHIP BETWEEN PRINCIPALS' LEADERSHIP COMPETENCIES AND SCHOOL CULTURE

Tin Mar Lwin¹

Abstract

This study examined the relationships between the leadership competencies of school principals and school culture at selected Education Degree Colleges in Upper Myanmar. Two hundred and twenty-eight teachers in selected Education Colleges were chosen as the sample by using the purposive sampling method. Data for the quantitative study were collected using the *Competency Approach* survey developed by Glover (2015) to measure the perceptions of teachers about the leadership competencies of school principals and the *School Culture Triage Survey* developed by Wanger (2006, as cited in Glover, 2015) to measure the perceptions of teachers about school culture. For the qualitative data, interviews were conducted with 20 teachers from four selected Education Degree Colleges in Upper Myanmar to obtain detailed information. The data was analyzed using descriptive statistics and the Pearson-product moment correlation coefficient through SPSS software. When studying the perceptions of teachers on principals' leadership competencies, generally, teachers from selected Education Degree Colleges perceived that their principals' leadership competencies were moderate, with a mean value of 3.62. In addition, this study also found that school culture was high, with a mean value of 3.72. Moreover, this study also revealed that principals' leadership competencies ($r=.586$, $p<.01$) were positively and moderately correlated with school culture at selected Education Degree Colleges. In addition, the qualitative data provided by interviews with teachers was consistent with the quantitative findings.

Keywords: principals' leadership competencies, school culture

Introduction

A school principal occupies a key position in the schooling system. Principals are primarily concerned with their school's overall mission, philosophy, working assumptions, educational program, and school design, values, and beliefs, as well as the quality and relevance of the school's broad goals and objectives. Consequently, the roles and responsibilities of school principals comprise creating a strategy to improve the learning process, identifying school best practices, and developing leadership. A school principal should be qualified and have sufficient experience in the educational sector, while at the same time having strong character. Again, school leadership needs personalities with educational backgrounds and teaching experiences (Simkins et al., 2003, as cited in Glover, 2015). As a result, the quality of education depends primarily on the way schools are managed by school principals (Mulford & Silins, 2003, as cited in Glover, 2015). Thus, a principal's leadership has a profound impact on the school site organization (Boyd et al., 2011, as cited in Glover, 2015).

On the other hand, school organizations are composed of individuals who have different socioeconomic statuses, styles of living, rules, and values. Today, successful leaders have to maintain about school culture, pay attention to the pressures of change, and holistically evaluate their organizations' environment. Specifically, the wide-angle view related to the school culture offers leaders a broader framework for a deeper

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understanding of the school climate and complex relationships within the school organization. The notion of culture is intended to explain the character of the school as it reflects deep patterns of values, beliefs, and traditions that have been composed over time (Atasoy, 2020). In other words, the school culture has an impact on the groups and individuals that associate within the school site.

The focus of this study is to examine the relationship between principals' leadership competencies and school culture at selected Education Degree Colleges in Upper Myanmar. In the wave of new initiatives and reforms in education, the practices of principal leadership and school culture at the school sites are very important to determine the best routes for achieving greater success in the school system. Thus, it is necessary to study the leadership abilities that are inherent in principal leaders and their aptitudes, which foster a positive culture at the school site for improvement in education.

Purpose of the Study

The purpose of this study is to explore principals' leadership competencies and school culture at selected Education Degree Colleges in Upper Myanmar.

Research Questions

The following research questions guide the direction of the study:

1. What are the teachers' perceptions of their principals' leadership competencies at selected Education Degree Colleges in Upper Myanmar?
2. What are the teachers' perceptions of their school culture at selected Education Degree Colleges in Upper Myanmar?
3. Is there any relationship between principals' leadership competencies and school culture as perceived by teachers at selected Education Degree Colleges in Upper Myanmar?

Scope of the Study

1. The scope of the study was limited to Education Degree Colleges located in Upper Myanmar.
2. The sample colleges were limited to the Education Degree Colleges in which the principals had at least one year of administrative service at the current education colleges.
3. The findings of this study may not be generalized to other Colleges or Universities.

Definitions of Key Terms

- **Principals' Leadership Competencies** refer to the applied skills and knowledge that enable principals to successfully perform in professional, educational, and other life contexts (Gosselin, 2017).
- **School Culture** is defined as the common values and beliefs, the signs and symbols, and the understanding shared among the members of a school (Karadag & Oztekin-Bayir, 2018, as cited in Ismail, Ali Khatibi, & Azam, 2022).

Operational Definitions

- **Principals' Leadership Competencies:** In this study, principals' leadership competencies are defined in terms of six domains: positive disposition, support social relationships, cultivate a shared belonging, focus on vision, enhance trust, and offer or accept feedback (Hargreaves & Fullan, 2012, as cited in Glover 2015).
- **School Culture:** In this study, school culture is defined in terms of three domains: professional collaboration, collegial relationships, and self-efficacy (Wanger, 2006, as cited in Glover, 2015).

Conceptual Framework of the Study

The reviewed literature on principal leadership's influence on school culture establishes that there is a connection between principal leadership and school site culture. The conceptual framework is centered on four theorists that contribute to the understanding of the purpose of this study: Schein (2004), Deal and Peterson (2009), and Christopher Wagner (2006) (as cited in Glover, 2015).

This survey assesses organizations to determine the need for mending the culture. This study will take that survey and use it concurrently with the study of principal leadership. Using the research on principal leadership competencies and school culture, this study will determine if there is a connection between the two subjects. The conceptual framework guiding this study is summarized in following Figure 1.

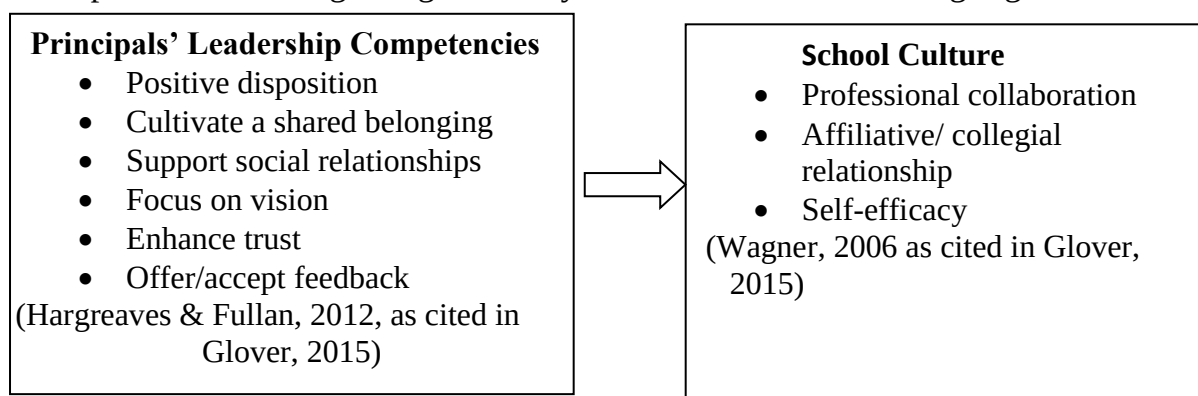


Figure 1 Conceptual Framework for Principals' Leadership Competencies and School Culture

Review of Related Literature

Leadership Competencies of School Principals

In an educational organization, school leaders (headmasters and principals) assume the responsibility of managing and leading all school people according to their respective needs. In addition, school leaders are liaison agents to realize the directives of stakeholders and policymakers such as the Ministry of Education, State Education Offices, and District Education Offices. To perform this responsibility, school leaders need to have the competence and ability to administer the school (Mahmud, 2010, as cited in Kadri, Mansor, & Nor, 2021). School principals' roles and responsibilities include

school planning, providing support for school facilities and infrastructure, and designing strategies that contribute to the quality of education (Rohrmann, 2013, as cited in Hartijasti & Afzal, 2016). Moreover, school principals have the duty to initiate change if external factors force them to do so by restructuring schools, influencing stakeholders to support the new structures, and getting teachers' commitment towards the new initiatives (Simkins et al., 2003, as cited in Hartijasti & Afzal, 2016).

Mahmood (1989, as cited in Kadri et al., 2021) described competence as an important element in school excellence because it is closely related to the initiative of administrators in setting school mission, curriculum and pedagogy knowledge, school administration skills, and relationships with external parties. Thus, every principal must be efficient and have high leadership competencies in carrying out their duties as school leaders. He needs to emphasize aspects of learning and facilitating, school improvement, and student performance and well-being (Hallinger & Murphy, 1985; Kotter, 1990; Katz, 1993; Leithwood et al., 2004; Interstate School Leaders Licensure Consortium, 2008, as cited in Kadri et al., 2021). The leadership competencies of principals need to be emphasized to ensure the effectiveness of schools.

Dimensions of Principals' Leadership Competencies

The competencies below were found in literature to positively affect a cultural organization. These competencies provide a framework for understanding the leadership of a school culture organization (Glover, 2015).

- **Positive Disposition**

Positive feelings include the feeling of appreciation for others. People want to be appreciated and valued for their efforts, especially in a school setting (Sahin, 2004, as cited in Glover, 2015). In a school organization, teachers have constant contact with the students. The principal leader can directly influence the teachers in the classroom with a positive disposition, which in turn will positively impact the students. A good leader is efficacious, which comes with positivity (Wasickso, 2007, as cited in Glover, 2015). If the principal is showing positivity to teachers, this will reflect on the students. Principals should appreciate others leadership capabilities. According to the studies of positivity by Rath and Clifton (2007, as cited in Glover, 2015), leaders who are positive and share this positive disposition with others have greater results in organizational success.

- **Cultivated a Shared Belonging**

A shared sense of belonging is a needed principal leadership competency, that has been shown to improve culture. The teacher should share participation and leadership with the principal for better connection. When a principal is making key decisions that affect the entire organization, teachers want to be involved (Margolis, 2008, as cited in Glover, 2015). Teachers are directly connected with students on a daily basis, so it is important for a principal to acknowledge their individual input on changes in school

policies so that they are connected and belong to the organization. Connection is important for culture (Sergiovanni, 2004). According to Quay and Quakia (2005, as cited in Lane, 2016), belonging means being a valued member of the school organization while maintaining individuality. This sense of belonging creates a sense of support and connectedness that increases intrinsic motivation by fostering self-confidence and community investment. Belonging can be enhanced by encouraging faculty and staff to be accepting of one another, displaying value and respect for individuals, and providing opportunities for staff to feel connected.

- **Support Social Relationships**

A principal can help develop relationships to build social support and meaning. A principal could encourage collaboration, not only does it foster relationships in the classroom, but it also helps teachers act as resources for each other. It is the responsibility of the principal to offer collaboration time and provide instances where teachers can form relationships (Mihans, 2008, as cited in Glover, 2015). These working conditions are important for school culture. Principals can foster collaboration by promoting a positive school culture (Yager, Pedersen, & Yager, 2010, as cited in Glover, 2015). Thus, relationships are important to the identity of individuals in an organization (Cooperrider, Whitney, Stavros, & Fry, 2008, as cited in Glover, 2015).

- **Focus on Vision**

Vision gives an organization purpose. Having vision is an important characteristic of a principal (J. C. Maxwell, 2013; Mitgang, 2012, as cited in Glover, 2015). When a school site has a vision, it provides an aim for the members of the organization (Kotter, 2012, as cited in Glover, 2015). A clear school vision and the values within the vision are the foundation of the school's culture. The vision has a profound effect on whether teachers and administrators value teamwork, tradition, innovation, and collaboration (Rhodes, Stevens, & Hemmings, 2011). The vision and values are vital to the success of an organization because they have a direct bearing on how the individuals in the organization respond to school operations (Schien, 2004). A positive school is dependent on the vision that is established by the leader and clearly given to the organization as a shared collaboration (Jerald, 2006, as cited in Glover, 2015).

- **Enhance Trust**

When principal leaders trust their staff and involve them in shared decision-making processes, it results in increased staff satisfaction, engagement, and morale. These opportunities can enhance the culture of trust in the school and encourage the school staff to collaborate in the improvement of school performance (Brewster & Railsback, 2003, as cited in Harris, Caldwell, & Longmuir, 2013). Principal leaders can use this culture of trust to establish a 'psychologically safe environment for staff where they can initiate and

trial new ideas and practices without fear of criticism or retribution' (O'Brien, 2011, as cited in Harris et al., 2013).

- **Offer or Accept Feedback**

Feedback is not only a positive word or comment on achievements but also open communication that allows teachers and principals to interact regarding school operations, which affects organizational culture (Ingersoll, Merrill, & May, 2012). Feedback also includes teachers and principals interacting and having the social comfort of sharing feedback about school processes (Kopkowski, 2008, as cited in Glover, 2015). Teachers feel that their work is effective when they have a sense of influence over operational outcomes. Teachers may have this influence if principals interact with them to ask them for their feedback on school processes. In essence, principal leadership is crucial for influence and sharing the role of leadership with others. When principals share leadership socially, it helps teachers feel valued (Glover, 2015).

School Culture

Every organization has a culture, a history, and an underlying set of unwritten expectations that shape everything about the school. A school's culture influences the ways people think, feel, and act; being able to understand and shape the culture is key to a school's success in promoting staff and student learning. When an organization possesses a strong culture, the culture may provide a structure to shape employee behavior without the need for a rigid bureaucracy that might adversely affect motivation (Peterson, 2002, as cited in Dogan, 2017). From this view, a strong school culture is a key component in establishing and maintaining a positive and effective relationship between employees. It also points to the importance of organizational culture for school organizations reproduction of social relations.

In other words, school culture is the set of shared values, beliefs, and norms that influence the way educators and administrators think, feel, and behave in school. School culture can have a positive impact on student effectiveness. School culture is an important element with regard to student effectiveness in schools (Dogan, 2017). Again, culture is not only a practice of understanding how to learn problem-solving processes but also the different beliefs and behaviors that members within the group exhibit (Bolman & Deal, 2008, as cited in Glover, 2015). Kezar and Eckel (2002, as cited in Dogan, 2017) found that institutional leaders are more successful when they choose strategies and tactics that are relevant and fit with the culture.

Thus, school culture should always be monitored to remain positive. If school culture is deteriorating, the school leadership needs to change the culture of the school. School culture changes may occur through centralized mandates. However, the root cause of change by centralized mandate is because of the school climate, the leadership, and the characteristics of the school with the teachers in particular (Hinde, 2004, as cited in Taahyadin, & Daud, 2018).

Elements of School Culture

Wagner (2006, as cited in Glover, 2015) developed the *School Culture Triage Survey* to determine the health of a school's culture. Wagner's research measures a school's culture based on three behaviours presented in the environment. The three behaviours are: (a) professional collaboration; (b) affiliative and collegial relationships; and (c) efficacy or self-determination. In this study, those elements were used to explore teachers' perceptions of school culture.

- **Professional Collaboration**

The first of the elements of school culture is "professional collaboration". This area examines the way groups of people on the school site come together to solve problems, work on projects, or practice daily activities. This type of cooperation at a school site is important when measuring a school site's effectiveness and successes (Glover, 2015).

Professional collaboration means teachers' collaboration with colleagues, which allows them to learn from each other's expertise, share knowledge within their professional community, and, ultimately, improve the instruction and support they can give to their students (OECD, 2020). According to Doğan and Yurtseven (2018, p. 79, as cited in Methlagl, 2022), "If teachers work in an environment or a community where reflective and collaborative practices exist and they have a shared vision that focuses on student learning, they are likely to improve instructional quality in the classroom".

- **Collegial Relationships**

The second area of culture to be explored is "affiliative and collegial relationships" (Wagner, 2006, p. 42, as cited in Glover, 2015). This discusses how well school members interact and care for each other, as well as how they feel regarded. This aspect of culture examines the human influence of interactions on a school's culture. With the variety of people on any given site, many backgrounds are dependent on one another for success. When these varying cultures are supportive of one another, Wagner's research shows that the overall school culture may be healthy.

In other words, collegial relationships mean working relationships with colleagues and how well teachers interact as part of an education team (Barth, 2006). Collegiality stimulates enthusiasm among teachers and reduces emotional stress and burnout. It also creates a sense of belonging among organizational members and makes the bonds more cohesive. Schools with a good collaborative culture and a strong atmosphere of collegiality have lower attrition rates as compared to other schools. Collegiality helps teachers cope with uncertainty and complexity, respond effectively to rapid change, and create a climate that values risk-taking and continuous improvement (Shah, 2012).

- **Self-Determination or Efficacy**

The final area of school culture that will be examined is “efficacy or self-determination” (Wagner, 2006, p. 42, as cited in Glover, 2015). This area examines the motives of the employees and their sense of worth in the organization. Having a sense of worth for an organization is not only important in terms of understanding culture but also for retaining members and determining what factors of a cultural organization are important.

In other words, teachers’ self-efficacy means their beliefs in their ability to effectively handle the tasks, obligations, and challenges related to their professional activity (Barni, Danioni, & Benevene, 2019). Teachers with a strong sense of efficacy are open to new ideas, exhibit greater enthusiasm for teaching, have greater commitment to teaching, and are more likely to remain in teaching (Shambaugh, 2008).

Methodology

Research Method

Both quantitative and qualitative methods were used to collect the information about principals’ leadership competencies and school culture at selected Education Degree Colleges in Upper Myanmar. Data were collected through questionnaires survey in quantitative study and open-ended questions and interview questions were used in qualitative study.

Population and Sample

Totally, there are 13 Education Degree Colleges in Upper Myanmar. Among them, the Colleges in which the principal and teachers had at least one year of service at the current Education Degree Colleges were chosen as the sample by using the purposive sampling method. Therefore, four Education Degree Colleges participated in this study. In this study, 228 teachers from four Education Degree Colleges participated in a quantitative study, and 20 teachers at different levels from those Education Degree Colleges participated in a qualitative study.

Instrumentation

In this study, two research instruments — the *Competency Approach* developed by Glover (2015) and the *School Culture Triage Survey (SCTS)* developed by Wagner (2006, as cited in Glover, 2015) — were utilized to collect quantitative data. Moreover, teachers from selected Education Degree Colleges in Upper Myanmar were asked to respond to 12 interview questions.

Procedure

After receiving the permission of the responsible persons, questionnaires were distributed to teachers at selected Education Degree Colleges in Upper Myanmar, and they were collected after 10 days from selected Education Colleges. Data obtained from the study were scored, and responses to open-ended questions were organized into categories. Based on the results of the responses, this study was carried out in order to

investigate the relationship between principals' leadership competencies and school culture at selected Education Degree Colleges in Upper Myanmar.

Data Analysis

The responses of teachers to the questionnaire were analyzed and evaluated using SPSS (Statistical Package for the Social Sciences). Descriptive statistics were calculated for principals' leadership competencies and the school culture perceived by teachers. According to Kabakci Yurdakul, Odahasi, Kilicer, Coklar, Birinci, and Kurt (2012, as cited in Gokdas & Torun, 2017), the decision rule for interpreting the levels of the principals' leadership competencies data and school culture data was that the mean value from 1.00 to 2.33 was defined as a very low level. Again, the mean value from 2.34 to 3.67 was defined as a moderate level; the mean value from 3.68 to 5.00 was defined as a very high level.

In addition, the Person-product moment correlation coefficient was utilized to determine the relationship between teachers' perceptions of principals' leadership competencies and school culture. Open-ended responses and interview questions were categorized and analyzed to complement findings on differences in principals' leadership competencies and school culture perceived by teachers.

Research Findings

Table 1 Mean Values and Standard Deviations for Teachers' Perceptions of Principals' Leadership Competencies at Selected Education Degree Colleges (N=228)

Education Degree Colleges		Dimensions of Principals' Leadership Competencies (PLC)						Overall PLC	Remark
		PD	CSB	SSR	FV	ET	OAF		
EDC1(n ₁ =50)	Mean	3.31	3.79	3.49	3.77	3.52	3.46	3.55	Moderate
	SD	.75	.531	.634	.54	.77	.748	.562	
EDC2(n ₂ =42)	Mean	3.74	3.77	3.64	3.69	3.71	3.74	3.72	High
	SD	.612	.639	.703	.70	.685	.767	.640	
EDC3(n ₃ =65)	Mean	3.59	3.72	3.62	3.63	3.70	3.70	3.65	Moderate
	SD	.762	.781	.807	.665	.747	.808	.724	
EDC4(n ₄ =71)	Mean	3.49	3.75	3.54	3.61	3.60	3.58	3.59	Moderate
	SD	.794	.626	.692	.618	.705	.779	.652	
Composite Means(N=228)	Mean	3.53	3.75	3.57	3.66	3.63	3.62	3.62	Moderate
	SD	.744	.655	.715	.630	.713	.780	.651	

1.00-2.33= Low level

2.34-3.67= Moderate level

3.68-5.00= High level

Note: PD=Positive Disposition

FV= Focus on Vision

CSB=Cultivated a Shared Belonging

ET= Enhance Trust

SSR= Support Social Relationships

OAF=Offer or Accept Feedback

When studying the perceptions of teachers on principals' leadership competencies at selected Education Degree Colleges as shown in Table 1, the composite mean values for four dimensions of principal leadership competencies (PD, SSR, FV, ET and OAF) were moderate levels and only one dimension of principals' leadership competencies (CSB) was at a high level in selected Education Degree Colleges. Therefore, the composite mean value for overall principal leadership competencies was at a moderate level. However, the mean value of principals' leadership competencies in EDC 2 was high among selected Education Degree Colleges.

Again, when studying the perceptions of teachers on their school culture at selected Education Degree Colleges as shown in Table 2, the composite mean values for two components of school culture (PC and CR) were at high levels, and only one component of school culture (SE) was at a moderate level. However, the composite mean value for overall school culture was at a high level. It was also found that the composite mean values for all components of school culture (PC, CR, and SE) for EDC 4 were at moderate levels among selected Education Degree Colleges.

Table 2 Mean Values and Standard Deviations for Teachers' Perceptions of School Culture at Selected Education Degree Colleges

Education Degree Colleges		Dimensions of School Culture (SC)			Overall SC	Remark
		PC	CR	SE		
EDC1 (n ₁ =50)	Mean	3.78	3.80	3.83	3.72	High
	SD	.476	.390	.343	.316	
EDC2 (n ₂ =42)	Mean	3.82	3.92	3.81	3.85	High
	SD	.563	.499	.580	.507	
EDC3 (n ₃ =65)	Mean	3.75	3.82	3.59	3.72	High
	SD	.722	.707	.752	.697	
EDC4(n ₄ =71)	Mean	3.56	3.60	3.51	3.60	Moderate
	SD	.706	.612	.766	.638	
Composite Means(N=228)	Mean	3.72	3.79	3.60	3.72	High
	SD	.643	.583	.661	.581	

1.00-2.33= Low Level

2.34-3.67= Moderate level

3.68-5.00= High level

Note: PC= Professional Collaboration

SE= Self-Efficacy

CR= Collegial Relationships

Table 3 describes the correlation between principals' leadership competencies and school culture at selected Education Degree Colleges. Based on the responses of teachers, principals' leadership competencies were positively and moderately correlated with school culture ($r=.586, p<.01$) in selected Education Degree Colleges.

Table 3 Correlation between Principals' Leadership Competencies and School Culture in Selected Education Colleges

Variables	Principals' Leadership Competencies	School Culture
Principals' Leadership Competencies	1	.586** .000
School Culture	.586** .000	1

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

According to the open-ended responses, teachers expressed that their principals had good relationships with fellow teachers and had empathy, sympathy, and ethical behaviours. Moreover, teachers presented that their principals had critical thinking and creative thinking skills to carry out the schools' tasks. In addition, teachers also stated that their principals often discussed instructional strategies with them and encouraged teachers to help each other in order to improve instructional practices.

The interview responses of teachers are as follows:

Concerning their principals' leadership qualities, all teachers replied that their principals had a great deal of knowledge and skills to manage the school and guide the teaching and learning process, and they gave them opportunities to attend workshops and in-service training in order to grow their professional development.

Concerning their principals' relationship with fellow teachers, 75% of teachers answered that their principals treated teachers warmly and solved the teachers' personal problems as their own.

Concerning their principals' appreciation for teachers' accomplishments or outstanding tasks, 70% of teachers replied that their principals appreciated dutiful teachers orally in front of people.

Concerning their principals' management of having a good relationship among teachers, all teachers responded that their principals encouraged them to collaborate with each other in doing school activities, to have mutual respect and understanding, and to have a good relationship with each other.

Concerning how their principals managed the school to be successful, all teachers responded that their principals allocated school activities to the right person for the right job and managed their implementation. In addition, they cooperated with heads of department and fellow teachers to implement the mission and vision of the school.

Concerning teachers' trust in their principals, 85% of teachers answered that they totally trusted their principals because they had good qualities such as empathy, sympathy, and skill in everything, especially in the management of school affairs.

Concerning how their principals performed if teachers' performance was poor, 85% of teachers responded that their principals gave them constructive feedback, although 15% of teachers said that their principals reprimanded those teachers.

Concerning how their principals got teachers' advice about school activities, 20% of teachers answered that their principals consulted only the heads of departments about school activities such as establishing school discipline, holding sports competitions, and exam affairs, but 80% of teachers said that their principals asked for their advice relating to keeping the school environment clean, teaching aid competitions, religious ceremonies, academic competitions, and the teaching and learning process.

Concerning how teachers collaborated with each other in the teaching process and professional development activities, 55% of teachers answered that they frequently met and discussed teaching strategies, observed each other's teaching, and provided constructive feedback to each other. In addition, 45% of teachers said that the new teachers learned the teaching styles of experienced teachers and discussed their difficulties with their colleagues.

Concerning how teachers communicated with each other at school, all teachers answered that they communicated with each other as friendly and openly as family members.

Concerning how teachers helped if their colleagues had difficulties, all teachers replied that they taught the students if their colleagues were absent or ill instead of them and provided advice and money if their colleagues encountered social difficulty.

Concerning whether teachers had autonomy in their teaching or not, all teachers responded that they had autonomy in their teaching, such as giving assignments, using suitable teaching methods, making teaching aids, and assessing the students' understanding of the lessons.

Discussion and Conclusion

The main purpose of this research is to examine the relationship between principals' leadership competencies and school culture in the selected Education Degree Colleges in Upper Myanmar. In order to study the principals' leadership competencies and school culture, questionnaire surveys were carried out to collect data. The Competency Approach by Glover (2015) and the School Culture Triage Survey by Wagner (2006, as cited in Glover, 2015), were employed in order to obtain the necessary information. The principals' leadership competencies involved 22 items, and the school culture survey consisted of 16 items. The researcher surveyed two hundred and twenty-eight teachers at the selected Education Degree Colleges in Upper Myanmar. Descriptive statistics were conducted to study the teachers' perceptions of their principals' leadership competencies and school culture in selected Education Degree Colleges.

Research question one examined teachers' perceptions of their principals' leadership competencies in selected Education Degree Colleges. When examining the

teachers' perceptions of their principals' leadership competencies, teachers from selected Education Degree Colleges rated the level of their principals' leadership competencies as moderate. In other words, principals from selected Education Degree Colleges possessed a moderate level of leadership competencies such as a positive disposition, supporting social relationships, cultivating a sense of shared belonging, focusing on vision, enhancing trust, and offering or accepting feedback. Based on the qualitative findings, teachers from selected Education Colleges perceived that their principals had a great deal of knowledge, empathy, sympathy, and skills in managing school and office affairs. In addition, they gave teachers opportunities to attend workshops and in-service trainings and treated them warmly. Moreover, their principals appreciated teachers for working hard and gave them constructive feedback if necessary. In this study, it was found that quantitative and qualitative findings were consistent.

Research question two examined the teachers' perceptions of their school's culture. When examining teachers' perceptions of their school culture, teachers from selected Education Degree Colleges rated their school culture as high. In other words, teachers from selected Education Degree Colleges had high practices of collegial relationships, professional collaboration, and self-efficacy. Again, teacher responses of qualitative findings pointed out that they collaborated with each other in the teaching process and professional development activities, frequently met and discussed teaching strategies, observed each other's teaching, and provided constructive feedback to each other if necessary. In addition, they communicated with each other in a friendly and open manner. Moreover, teachers in the selected Education Colleges work together effectively. Therefore, their school culture promoted professional collaboration, collegial relationships, and the self-efficacy of teachers. In this study, quantitative and qualitative findings were complementary.

Research question three studied the relationship between principals' leadership competencies and school culture in selected Education Degree Colleges in Upper Myanmar. According to the findings, there was a positive and moderate relationship between principals' leadership competencies and school culture. This finding was congruent with the findings of Glover's (2015) and Lane's (2016) studies, which showed that there was a significant positive correlation between principal leadership competencies and school culture. Thus, this study's findings were complementary to previous research. In other words, the more the level of principals' leadership competencies increases, the more the level of school culture also increases.

Suggestions

Developing the leadership competencies of principals is crucial for a school to achieve effectiveness, as it enhances the quality of school management and promotes educational outcomes. The Ministry of Education should give training to school principals on educational leadership. Only then will principals become the effective

leaders in schools and gain a better understanding of how to lead depending on the environmental context of the school organization. If so, principals' leadership competencies will have a positive impact on their school culture. Thus, it is important that the Ministry of Education should provide in-service training for educational leaders in order to create, shape, and maintain a positive school culture.

Acknowledgements

I would like to offer my respectful gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education), Dr. Khin Hnin Yee (Pro-rector, Sagaing University of Education), Dr. Cho Kyi Than (Pro-rector, Sagaing University of Education), Dr. Zin Nwe Than (Professor and Head, Department of Educational Theory and Management), and Daw Swe Swe Nwe Htun (Associate Professor and Head, Department of English, Sagaing University of Education) for their help and support. In addition, I intend to express my thanks to all principals and teachers who participated and supported the completion of this study.

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AN EXPLORATORY STUDY OF BEGINNING TEACHERS' PERCEPTIONS ON TEACHER PROFESSIONALISM

Ei Khaing Win¹, Zin Nwe Than² and Khaing Khin Kyaw³

Abstract

The aim of this study is to explore the beginning teachers' perceptions on teacher professionalism in seven selected townships in Mandalay Region. The questionnaire survey was constructed based on the models of Dr. Kornhauser (1962), Hall (1968), Hargreaves and Goodson (1996), Tichenor and Tichenor (2009), and the OECD (2016). It included 68 items, which had five subscales: subject and pedagogical knowledge, commitment, autonomy, ethics, relationships, and work responsibilities beyond the classroom. A four-point Likert scale was used in this study. Although the questionnaires were distributed to 423 beginning teachers from the selected townships, the responses of 407 beginning teachers were collected for the study. After collecting the data, descriptive statistics, an independent samples *t*-test, one way ANOVA, and post-hoc multiple comparison tests were calculated to analyze the data. The findings showed that the beginning teachers' perceptions on teacher professionalism were high. It was found that there was a significant difference in perceptions of beginning teachers in the dimension of autonomy according to their gender and in the dimension of subject and pedagogical knowledge according to their teaching subjects. However, no significant differences were found in beginning teachers' perceptions on teacher professionalism according to their age, position, academic qualification, and professional training. The information gained from the responses to three open-ended questions was complementary to the quantitative findings.

Keywords: Beginning Teachers, Teacher Professionalism

Introduction

Beginning teachers are newcomers to the school community and the teaching profession. They should be provided with assistance from everyone in the educational environment for coping with the pressures and challenges of an increasingly demanding society. According to Sozen (2018), beginning teachers mostly face the challenge of such feelings as belongingness and being appreciated by their school principals, colleagues, and students.

Furthermore, according to Arends and Phurutse (2009, as cited in Domingo, 2013), support for beginning teachers is a major factor in determining whether such teachers stay in the profession for any length of time. In the absence of support, a high number of beginning teachers have difficulties in their school environment and develop burnout symptoms. Therefore, there is a need to enhance beginning teachers' professionalism for their career development because professionalism is one of the key elements in their professional lives.

Significance of the Study

The role and part of beginning teachers play an extremely critical role in the teaching profession. In reality, there would be differences between beginning teachers' expectations of the teaching profession and the realities they faced in the classroom. The general complaint of beginning teachers mostly results from inconsistency between their expectations from pre-service training and the outcomes of the actual teaching experience (Anhorn, 2008, as cited in Barokah, 2020). Furthermore, beginning teachers usually feel shocked when dealing with the actual situation in schools. At this time, teachers will seek out a guide that can help build their self-professionalism. If they fail, they will have a negative attitude towards the profession.

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A deeper understanding of the term teacher professionalism in teaching can give teachers confidence in performing their tasks. Teachers who have professionalism in their souls will always strive to produce professional work (Ariff, Mansor, & Yusof, 2016). With a better understanding of beginning teachers' professionalism from this study, school principals, educational leaders, and experienced teachers can take into account the fact that they take part in leading roles in motivating and giving support to beginning teachers for improving their professionalism. Moreover, this study intends to provide valuable research findings about the challenges that beginning teachers face in their schools. The information in this study can offer valuable information concerning how to enhance beginning teachers' professionalism. For all of these reasons, the researcher aims to explore the perceptions of beginning teachers about teacher professionalism.

Purpose of the Study

The general objective of the study is to investigate beginning teachers' perceptions on teacher professionalism.

The specific objectives of the study are:

- To explore the perceptions of beginning teachers on teacher professionalism,
- To find out a significant difference in beginning teachers' perceptions on teacher professionalism according to their gender,
- to investigate a significant difference in beginning teachers' perceptions on teacher professionalism according to their age,
- To explore a significant difference in beginning teachers' perceptions on teacher professionalism according to their position,
- To find out a significant difference in beginning teachers' perceptions on teacher professionalism according to their teaching subjects,
- To explore a significant difference in beginning teachers' perceptions on teacher professionalism according to their academic qualifications
- To investigate a significant difference in beginning teachers' perceptions on teacher professionalism according to their professional training.

Research Questions

The following research questions guide the direction of the study:

- What are the perceptions of beginning teachers on teacher professionalism?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their gender?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their age?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their position?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their teaching subjects?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their academic qualifications?
- Is there a significant difference in beginning teachers' perceptions on teacher professionalism according to their professional training?

Scope of the Study

The participants of the study were limited to beginning teachers who had less than three years of teaching experience after entering the teaching profession from selected seven townships in Mandalay Region during the 2021–2022 academic year.

Definition of Key Terms

The terms used throughout the current study are defined for clarifying and understanding in the following.

- **Teacher Professionalism:** Teacher professionalism is a teacher's ability to perform and enrich effective classroom practices, create an environment appropriate for learning in the classroom, and improve their professional knowledge and skills with the aim of providing students with richer learning experiences (Day, 2007, as cited in Hargreaves, 2000). In this study, teacher professionalism refers to subject and pedagogical knowledge, commitment, autonomy, ethics, work responsibilities, and relationships beyond the classroom that beginning teachers must have in order to be professional teachers.

- **Beginning Teachers:** Beginning teachers refer to new teachers who have trained and worked for between one and three years (Ariff, Mansor, & Yusof, 2016).

Theoretical Framework of the Study

The theoretical framework for exploring novice teachers' professionalism in this study was based on five models of teacher professionalism developed by Dr. Kornhauser (1962), Hall (1968), Hargreaves and Goodson (1996), Tichenor and Tichenor (2009), and the OECD (2016). According to Dr. Kornhauser (1962, as cited in Khin Zaw, 2001), the features of professions are the characteristics of expertise, autonomy, commitment, and responsibility.

According to Hall (1968, as cited in Chan & Chan, 2007), there were five major attitudes that comprise an important part of professional work. They are (1) the use of the professional organization as a major reference, (2) a belief in service to the public, (3) a belief in self-regulation, including peer evaluations, (4) a sense of calling to the field, and (5) a feeling that one ought to be able to make their own decisions regarding their work.

According to Hargreaves and Goodson (1996, as cited in Hargreaves, 2000), professionalism is expressed by the following central dimensions: (1) their skills and theoretical/specialist knowledge; (2) their adherence to a professional code of conduct and self-regulation; (3) their relationship with the clients based on trust; (4) their autonomy; and (5) their altruism directed towards the public good.

According to Tichenor and Tichenor (2009), there are four dimensions of teacher professionalism: (1) the teacher's character; (2) subject and pedagogical knowledge; (3) the teacher's commitment to change and continuous improvement; and (4) the teacher's work responsibilities and relationships outside the classroom. According to the OECD (2016, as cited in Rhodes, 2017), teacher professionalism is discussed with reference to autonomy, collaboration with colleagues, and professional knowledge. Based on these five models, beginning teachers' professionalism was investigated with five dimensions in the following Figure 1.

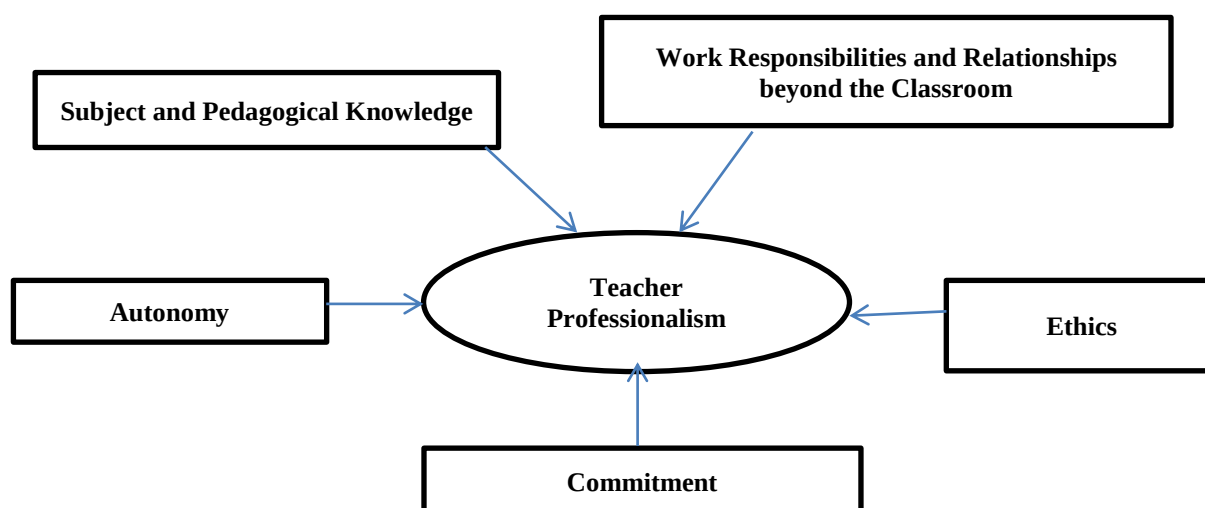


Figure 1. Conceptual Framework of the Study

Review of Related Literature

Profession, Professionalization, Professionalism

According to Hoyle and John (1995, as cited in Bukhatir, 2018), being a professional has three main points of emphasis: knowledge, autonomy and responsibility. In addition, the profession is a different category in a work and professionalism is a process in which a group of professionals who are pursuing, developing, acquiring and retaining the profession characteristics (Hargreaves, 2000). Again, professionalization is related to promoting the material and ideal interests of an occupational group (Goodson, 2000), and so it includes the attempt to gain professional associated with professions whereas professionalism focuses on the question of what qualifications and acquired capacities, what competence is required for the successful exercise of an occupation (Englund, 1996, as cited in Ariff, Mansor & Yusof, 2016).

Dimensions of the Study

The five dimensions of this study were based on the models of teacher professionalism developed by Dr. Kornhauser (1962), Hall (1968), Hargreaves and Goodson (1996), Tichenor and Tichenor (2009), and the OECD (2016). These dimensions of teacher professionalism are explained in detail as follows:

Dimension 1: Subject and Pedagogical Knowledge

With regard to *subject knowledge*, beginning teachers should focus on teaching the main concepts in the subjects they teach, try to link the lessons to real-life experiences in their teaching, learn the objectives of teaching subjects, understand how particular lessons are organized in the subjects they teach and how academic subjects are linked to other subjects, read empirical research studies, and use different kinds of reference books related to the subjects they teach. In *pedagogical knowledge*, they should understand how to plan the lesson, try to teach the lesson by linking the students' prior knowledge, understand learning theories, adapt to the diverse interests, abilities, and developmental needs of students, arrange different learning activities, use different teaching methods, use teaching aids for effective teaching, explain classroom rules and procedures, and use classroom assessment techniques during and after teaching a lesson in their classes.

Dimension 2: Commitment

Beginning teachers need to commit to their profession. Their commitment involves *commitment to school, commitment to students, commitment to teaching profession, and commitment to a professional learning base*. In their *commitment to school*, they should make an effort to meet the goals and values of the school, work hard for the school they serve, and feel as if the school's problems are their own. In their *commitment to students*, they should contribute to improving their students' quality of life, attempt to individualize learning and assessment, and give extra hours to teach the lesson for slow learners. In *commitment to the teaching profession*, they should have a desire to continue teaching without economic needs and a willingness to remain within their profession, although it is stressful work. They should not remain unwilling in their jobs because of their financial conditions and responsibilities for their families. In *commitment to a professional learning base*, they should attend conferences, workshops, and seminars for professional development, understand current trends in education, continue education to participate in further studies, take their jobs seriously and want to do them well, as well as engage in action research or small-scale research to improve their own teaching practices.

Dimension 3: Autonomy

Concerning autonomy, beginning teachers should have the freedom to learn, study, and teach and to be creative in their teaching. Among the subject matter contents taught in class, they should select *which lessons will be focused mainly on teaching their students*. Furthermore, *the goals and objectives of teaching a lesson, classroom procedures, the teaching learning materials, teaching methods and strategies, the scheduling of time, student learning activities, evaluation and assessment activities, as well as standards of behavior*, should be selected by themselves. They should not have too much interference in their work by the school principal and higher authorities.

Dimension 4: Ethics

As regard to ethics, beginning teachers should *respect* to principal, colleagues and students, *raise the morality* of their students by giving examples of good ethical behaviors of ideal persons in their surroundings, *treat their students fairly*, have a professional relationship with students and not let it get too casual and familiar, *put the welfare of students* before personal interests, *behave in an ethical manner* in and out of school in order to make sure the best ethical example for students, *arrive on time* to school and class, *be punctual* in their jobs, *avoid to discuss confidential information* related to the school with the laymen and students (e.g. examination matters) and *prepare the exam questions carefully* and *evaluate their students' performance without personal bias*. They should *not accept any illegal or immoral gifts* from their students, *push their personal beliefs on students*, or take advantage of their positions in any way.

Dimension 5: Work Responsibilities and Relationships beyond the Classroom

With regard to *work responsibilities and relationships beyond the classroom*, beginning teachers should build positive *communication with their students* to understand their students' behaviors by thinking back on their personal experiences as students, share teaching philosophies, ideas, and experiences with colleagues to seek their advice and feedback, focus on *cooperation with colleagues* rather than competition, consult with mentors and experienced teachers for needed emotional support, and have a close *relationship with their headmasters* to consult on their difficulties. Similarly, they should *participate actively in such activities as networking* with respective subject organizations within the school and with teachers in other

schools for sharing knowledge and experiences; associations such as the school council, parent-teacher association, and school board of trustees for school improvement; and school activities according to the educational calendar. In *collaborating with parents and community*, they should establish friendly relationships with them, give advice to parents and community if they are needed, inform school activities with parents and community, and participate actively in social activities for the improvement of the town or village they serve.

Methodology

Research Method

The required data for the study was collected using the descriptive research method.

Participants

The target population of the study was 423 beginning teachers from selected seven townships in Mandalay Region by using purposive sampling method.

Research Instruments

The questionnaire included demographic data and items for investigating the perceptions of beginning teachers about teacher professionalism. There are 68 items that were constructed on the basis of models developed by Dr. Kornhauser (1962), Hall (1968), Hargreaves and Goodson (1996), Tichenor and Tichenor (2009), and the OECD (2016). The questionnaire was rated on a four-point Likert scale: “strongly disagree (1),” “disagree (2),” “agree (3)” and “strongly agree (4)”. Three open-ended questions were asked at the end of the questionnaire. The *first question* asked beginning teachers to give their opinions on how a professional teacher should conduct themselves to enhance their professionalism. Then the *second question* asked beginning teachers to mention the challenges they face in their professional work. Finally, the *third question* asked them to give comments on how their principals support them in order to improve their professionalism.

Data Collection Procedures

The related literature was analyzed to construct the questionnaire instrument. The advice and guidance were taken from the expert, who had special knowledge and experience in the field of the study. The pilot study was conducted with 90 beginning teachers who had less than three years of teaching services from Basic Education Schools in Pakokku, Chauk, and Netmauk Townships in Magway Region in the last week of September 2022. One week after distribution, the questionnaires were collected. The valid response rate was 98% in the pilot study. In order to measure the reliability of the instrument, the Pearson product-moment correlation method (**Average Item Total Correlation**) was used for internal consistency reliability. The average coefficient of correlation for investigating beginning teachers’ perceptions of teacher professionalism was 0.824.

And then, the researcher asked for permissions from the responsible persons for the main study. After getting permissions, the questionnaires were distributed to 423 beginning teachers from selected seven townships in Mandalay Region to complete on November 22, 2022. After lasting one week, they were collected. The responses of 407 beginning teachers were obtained for the study. The response rate was 96.13%. Based on the results of the responses, the study was conducted to investigate the perceptions of beginning teachers about their professionalism.

Data Analysis

Descriptive statistics, independent samples *t*-test, one-way ANOVA, and post-hoc multiple comparison tests (Tukey HSD and Games-Howell) were used in analyzing the data to

determine if gender, age, position, teaching subjects, and professional qualification caused a difference in their professionalism. The mean value from 1.00 to 1.75 was identified as “low level,” the mean value from 1.76 to 2.50 was identified as “moderately low level,” the mean value from 2.51 to 3.25 was identified as “moderately high level,” and the mean value from 3.26 to 4.00 was identified as “high level.” Responses of beginning teachers to three open-ended questions were used in analyzing the data.

Research Findings

The purpose of the study was to investigate beginning teachers’ perceptions of teacher professionalism. The data were analyzed in terms of mean values, standard deviation, independent samples *t*-test, ANOVA, and post-hoc multiple comparisons (Turkey and Games-Howell). The findings were presented as follows:

Table 1: Mean Values of Beginning Teachers’ Perceptions of Teacher Professionalism

Dimensions of Teacher Professionalism	Mean	SD	Remark
Subject and Pedagogical Knowledge	3.42	.33	High
Commitment	3.39	.36	High
Autonomy	3.25	.41	Moderately High
Ethics	3.52	.38	High
Relationships and Work Responsibilities beyond the Classroom	3.38	.38	High
Overall Teacher Professionalism	3.40	.32	High

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Table 1 shows the mean values of beginning teachers’ perceptions of teacher professionalism. According to Table 1, it was found that beginning teachers’ perception of the “autonomy” dimension was moderately high because the mean value was 3.25. Again, the mean value for “overall teacher professionalism” was 3.40 (SD = 0.32). Moreover, it was found that the mean value of beginning teachers’ perceptions of the “ethics” dimension was the highest among the dimensions of teacher professionalism.

Differences in Beginning Teachers’ Perceptions on Teacher Professionalism according to Demographic Information

In order to study whether there were significant differences in beginning teachers’ perceptions of teacher professionalism based on their demographic information from selected townships in Mandalay Region or not, independent samples *t*-test, one-way ANOVA, and post-hoc multiple comparisons tests (Tukey HSD or Games-Howell) were employed to analyze the data.

Table 2 describes the mean values of beginning teachers’ perceptions of teacher professionalism according to their gender.

Table 2: Mean Values and Independent Samples *t* Test Results for Teacher Professionalism Grouped by Gender

Variables	Gender	<i>N</i>	Mean (SD)	<i>t</i>	<i>df</i>	<i>p</i>
Subject and Pedagogical Knowledge	male	71	3.42(.33)	-.237	102.51	ns
	female	336	3.43(.33)			
Commitment	male	71	3.37(.31)	-.613	115.69	ns
	female	336	3.39(.37)			

Variables	Gender	N	Mean (SD)	t	df	p
Autonomy	male	71	3.15(.44)	-2.179	96.00	.032*
	female	336	3.28(.40)			
Ethics	male	71	3.50(.35)	-.517	108.22	ns
	female	336	3.53(.38)			
Relationships beyond the Classroom	male	71	3.38(.38)	-.205	101.35	ns
	female	336	3.38(.41)			
Overall Teacher Professionalism	male	71	3.37(.29)	-.929	108.76	ns
	female	336	3.41(.32)			

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Note. ns=no significance * $p < .05$

According to Table 2, the mean value of female beginning teachers' perceptions of "overall teacher professionalism" was slightly higher than that of male beginning teachers. Moreover, a statistically significant difference was found between the group of male beginning teachers and that of female beginning teachers in the "autonomy" dimension of teacher professionalism ($t = -2.179$, $df = 96.00$, $p = 0.032$).

Table 3: Mean Values and ANOVA Results for Teacher Professionalism Grouped by Age

Variables	Age	N	Mean (SD)	F	p
Subject and Pedagogical Knowledge	Under 25	128	3.41 (.32)	.803	ns
	25-30	226	3.42 (.34)		
	Above 30	53	3.47 (.33)		
Commitment	Under 25	128	3.35 (.34)	1.674	ns
	25-30	226	3.40 (.36)		
	Above 30	53	3.46 (.37)		
Autonomy	Under 25	128	3.29 (.40)	.579	ns
	25-30	226	3.24 (.43)		
	Above 30	53	3.24 (.38)		
Ethics	Under 25	128	3.51 (.36)	.769	ns
	25-30	226	3.51 (.39)		
	Above 30	53	3.58 (.37)		
Relationships beyond the Classroom	Under 25	128	3.36 (.36)	.714	ns
	25-30	226	3.38 (.39)		
	Above 30	53	3.44 (.38)		
Overall Teacher Professionalism	Under 25	128	3.39 (.30)	.617	ns
	25-30	226	3.40 (.33)		
	Above 30	53	3.44 (.32)		

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Note. ns=no significance

Table 3 shows the mean values and ANOVA results for teacher professionalism perceived by beginning teachers according to their age. According to Table 3, the mean value of the group of beginning teachers who were above 30 years old in "overall teacher professionalism" was slightly higher than that of the other groups of beginning teachers but there was no significant difference in each dimension of teacher professionalism among beginning teachers' age groups.

Table 4: Mean Values and ANOVA Results for Teacher Professionalism Grouped by Position

Variables	Position	N	Mean (SD)	F	p
Subject and Pedagogical Knowledge	Assistant Primary Teacher	252	3.42 (.33)	.575	ns
	Assistant Junior Teacher	45	3.47 (.32)		
	Senior Assistant Teacher	110	3.42 (.33)		
Commitment	Assistant Primary Teacher	252	3.38 (.37)	.529	ns
	Assistant Junior Teacher	45	3.43 (.34)		
	Senior Assistant Teacher	110	3.40 (.34)		
Autonomy	Assistant Primary Teacher	252	3.25 (.42)	.054	ns
	Assistant Junior Teacher	45	3.27 (.41)		
	Senior Assistant Teacher	110	3.27 (.40)		
Ethics	Assistant Primary Teacher	252	3.50 (.39)	1.708	ns
	Assistant Junior Teacher	45	3.55 (.35)		
	Senior Assistant Teacher	110	3.58 (.35)		
Relationships beyond the Classroom	Assistant Primary Teacher	252	3.40 (.37)	.383	ns
	Assistant Junior Teacher	45	3.36 (.35)		
	Senior Assistant Teacher	110	3.36 (.37)		
Overall Teacher Professionalism	Assistant Primary Teacher	252	3.39 (.33)	.213	ns
	Assistant Junior Teacher	45	3.42 (.30)		
	Senior Assistant Teacher	110	3.41 (.30)		

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Note. ns=no significance

In Table 4, it was found that the mean value of the group of assistant junior beginning teachers in “overall teacher professionalism” was slightly higher than that of the other groups of novice teachers. However, there was no significant difference among the groups of positions in each dimension of teacher professionalism.

Table 5: Mean Values and ANOVA Results for Teacher Professionalism Grouped by Teaching Subjects

Variables	Teaching Subjects	N	Mean (SD)	F	p
Subject and Pedagogical Knowledge	Art subjects	113	3.41(.30)	5.234	.006**
	Science subjects	99	3.35(.34)		
	Art and Science subjects	195	3.48(.34)		
Commitment	Art subjects	113	3.37(.36)	.349	ns
	Science subjects	99	3.38(.33)		
	Art and Science subjects	195	3.40(.37)		
Autonomy	Art subjects	113	3.24(.41)	.498	ns
	Science subjects	99	3.24(.36)		
	Art and Science subjects	195	3.28(.44)		
Ethics	Art subjects	113	3.50(.40)	.287	ns
	Science subjects	99	3.54(.35)		
	Art and Science subjects	195	3.53(.38)		
Relationships beyond the Classroom	Art subjects	113	3.36(.37)	2.331	ns
	Science subjects	99	3.33(.36)		
	Art and Science subjects	195	3.42(.39)		
Overall Teacher Professionalism	Art subjects	113	3.38(.32)	1.323	ns
	Science subjects	99	3.37(.29)		
	Art and Science subjects	195	3.43(.33)		

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Note. ns=no significance **p<.01

In addition, according to the findings shown in Table 5, the mean value of beginning teachers who taught art and science subjects was the highest among three groups, and there was only a statistically significant difference among beginning teachers' teaching subjects groups in "Subject and Pedagogical Knowledge" ($F(2,404) = 5.234, p < 0.01$).

In order to find out which particular groups had significant differences, a post-hoc multiple comparisons test (Games-Howell) was conducted. The following Table 6 points out the results of multiple comparisons of beginning teachers' perceptions on subject and pedagogical knowledge according to their teaching subjects.

Table 6: The Result of Multiple Comparisons for Subject and Pedagogical Knowledge Dimension Grouped by Teaching Subjects

Variables	Teaching Subjects (I)	Teaching Subjects (J)	Mean Difference (I-J)	p
Subject and Pedagogical Knowledge	Art and Science subjects	Science Subjects	0.126	.005*

*The mean difference is significant at the 0.05 level.

According to Table 6, there was a statistically significant difference was found between the group of beginning teachers who taught art and science subjects and the group of beginning teachers who taught science subjects in the dimensions of "subject and pedagogical knowledge".

Table 7: Mean Values and ANOVA Results for Teacher Professionalism Grouped by Academic Qualifications

Variables	Professional Qualifications	N	Mean (SD)	F	P
Subject and Pedagogical Knowledge	Undergraduate	52	3.38 (.31)	1.231	ns
	BA/BSc/BEd	287	3.44 (.33)		
	MA/MSc	68	3.39 (.34)		
Commitment	Undergraduate	52	3.31 (.39)	1.778	ns
	BA/BSc/BEd	287	3.40 (.35)		
	MA/MSc	68	3.43 (.35)		
Autonomy	Undergraduate	52	3.22 (.39)	.254	ns
	BA/BSc/BEd	287	3.26 (.43)		
	MA/MSc	68	3.26 (.37)		
Ethics	Undergraduate	52	3.45 (.39)	1.422	ns
	BA/BSc/BEd	287	3.52 (.37)		
	MA/MSc	68	3.57 (.38)		
Relationships beyond the Classroom	Undergraduate	52	3.35 (.39)	.400	ns
	BA/BSc/BEd	287	3.39 (.38)		
	MA/MSc	68	3.36 (.38)		
Overall Teacher Professionalism	Undergraduate	52	3.34 (.32)	.846	ns
	BA/BSc/BEd	287	3.40 (.32)		
	MA/MSc	68	3.40 (.31)		

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

According to Table 7, the mean values of all groups of beginning teachers were at high levels in "overall teacher professionalism," and there was no statistically significant difference among them.

Table 8: Mean Values and ANOVA Results for Teacher Professionalism Grouped by Professional Training

Variables	Professional Training	N	Mean (SD)	F	P
Subject and Pedagogical Knowledge	DTed/BEd	109	3.45 (.32)	.118	.899
	PPTT/PGDMA/SRC	234	3.42 (.32)		
	Township-based	64	3.43 (.30)		
	Teacher Training				
Commitment	DTed/BEd	109	3.44 (.36)	.494	.610
	PPTT/PGDMA/SRC	234	3.38 (.34)		
	Township-based	64	3.39 (.31)		
	Teacher Training				
Autonomy	DTed/BEd	109	3.32 (.42)	1.715	.181
	PPTT/PGDMA/SRC	234	3.21 (.39)		
	No Township-based	64	3.20 (.35)		
	Teacher Training				
Ethics	DTed/BEd	109	3.55 (.38)	0.16	.984
	PPTT/PGDMA/SRC	234	3.51 (.36)		
	Township-based	64	3.49 (.34)		
	Teacher Training				
Relationships beyond the Classroom	DTed/BEd	109	3.39 (.38)	.071	.931
	PPTT/PGDMA/SRC	234	3.38 (.37)		
	Township-based	64	3.28 (.28)		
	Teacher Training				
Overall Teacher Professionalism	DTed/BEd	109	3.39 (.32)	.325	.723
	PPTT/PGDMA/SRC	234	3.38 (.29)		
	Township-based	64	3.36 (.24)		
	Teacher Training				

1.00-1.75 = Low 1.76-2.50 = Moderately Low 2.51-3.25 = Moderately High 3.26-4.00 = High

Note. ns=no significance

Note: BEd = Bachelor of Education DTed= Diploma in Teacher Education

PPTT= Pre-Primary Teacher Training

PGDMA= Post-graduate Diploma in Multimedia Arts

SRC= Special Refresher Course (one month)

As illustrated in Table 8, the mean values of all groups of novice teachers were at high levels in “overall teacher professionalism.” It was also found that there was no statistically significant difference among all groups of novice teachers according to their professional training in “overall teacher professionalism.”

Open-ended Responses

The responses to three open-ended questions were collected at the end of the questionnaire. The *first question* asked beginning teachers to give their comments on how a professional teacher should conduct themselves to enhance their professionalism. Among respondents, 21 (5.16%) beginning teachers did not answer that question, while 386 (94.84%) teachers responded to the question.

According to beginning teachers’ responses, 135 (34.97%) beginning teachers said that a professional teacher should behave in an ethical manner in and out of school, arrive on time to school and class, and work hard for the school as much as we can.”

Additionally, 62 (16.06%) beginning teachers responded that a professional teacher should use different learning activities, teaching methods, and teaching aids in accordance with the lesson objectives and should adapt students’ interests, needs and abilities.”

Besides, 87 (21.38%) beginning teachers answered that a professional teacher should read different kinds of reference books related to the subjects they teach. Moreover, a professional teacher must be a lifelong learner by participating in continuous professional development programs.

Similarly, 64 (16.58%) beginning teachers gave the response that a professional teacher should understand current trends in education, such as new curriculum implementation.

Furthermore, 38 (9.84%) beginning teachers responded that a professional teacher should apply the experiences and knowledge learned from their professional training and professional development workshops to his or her teaching practices and learn well other teachers' explanations in subject-matter refresher courses in order to get new knowledge and experiences.

The **second question** asked beginning teachers to mention the challenges they face in their professional work. Among the respondents, 251 (61.67%) beginning teachers answered the question, and 156 (38.33%) did not answer the question.

Among respondents, 82 (32.67%) beginning teachers reported that they had challenges in curriculum delivery. They struggled with preparing for the lessons, making the lesson interesting and explaining some lessons in new curriculum reforms. Therefore, they needed guidance and support in planning and teaching the lessons."

Besides, 44 (17.53%) beginning teachers answered that they were facing the challenges of classroom management in solving the behavioral as well as emotional problems of students in our classrooms."

Additionally, 67 (21.38%) beginning teachers answered that they were facing the challenges of managing the physical resources. They didn't get suitable teaching aids for the lessons and electronic media such as TV, computer, projector, and audio-visual materials sufficiently. Moreover, they didn't have sufficient reference books, educational magazines, journals and articles in order to learn new ideas and concepts as their instructional aids. They also had no laboratory classrooms for doing practical activities in science subjects.

Additionally, 58 (23.11%) beginning teachers responded that they were facing the challenges of managing time. They had teaching many different subjects in classes, and so they had difficulties to teach them well in the allocated time as there were insufficient teachers in our school."

Finally, the **third question** asked them to give comments on how their principals support them in order to improve their professional development. Among respondents, 109 (26.78%) beginning teachers did not answer that question, while 298 (73.21%) beginning teachers responded to the question.

According to teachers' responses, 56 (18.79%) beginning teachers said that their principals encouraged them to attend workshops, seminars, conferences, and professional development courses at the local and central level."

Furthermore, 103 (34.56%) beginning teachers answered that their principals encouraged to have a close relationship between new teachers and experienced teachers in order to get needed emotional support. In addition, they asked experienced teachers to help new teachers when they had difficulties."

Additionally, 112 (37.58%) beginning teachers gave the responses that their principals encouraged them to collaborate with other colleagues and students from their schools in performing their school activities"

Besides, 27 (9.06%) beginning teachers replied that their principals gave them the opportunity to talk and share their knowledge and experiences in school assemblies."

Discussion and Conclusion

The purpose of this study was to explore beginning teachers' perceptions of teacher professionalism. **Research question one** investigated the perceptions of beginning teachers about teacher professionalism. It was found that the mean value of beginning teachers' perceptions on autonomy dimension was moderately high. Moreover, it was found that the mean value of beginning teachers' perception of the dimension of "ethics" was the highest among the other dimensions of teacher professionalism. This finding of the study is similar with the assumption of Hargreaves (2003, as cited in Hassan, Musa, Gengatharan, & Sabri, 2021), which revealed that firm value, together with belief and ethical spirit, has become an integral part of teacher professionalism. Moreover, this finding is also consistent with the assumption of Killen (2016, as cited in Hassan, Musa, Gengatharan, & Sabri, 2021) which stated that teachers need to accept the ethics of a teacher as a guide to enable them to succeed in the profession.

For **research question two**, the findings showed that the mean value of female beginning teachers' perceptions of teacher professionalism was higher than that of male beginning teachers' perceptions of teacher professionalism according to their gender. Therefore, it can be assumed that female beginning teachers had higher perceptions of teacher professionalism than male beginning teachers. These findings of the study are in line with the assumptions of Ingersoll and Merrill (2010, as cited in Swezey & Finn, 2014), which stated that the teaching profession is increasingly dominated by females, and they said that with the increased role of females, examining the effect of gender offers the potential factor for new insights into how teachers perceive various aspects of teacher professionalism. Moreover, the findings showed that there was a significant difference in the dimension of autonomy between those gender groups.

Research question three examined the mean values of beginning teachers' perceptions on teacher professionalism according to their age. It was found that the mean values of beginning teachers' perceptions on teacher professionalism were high in overall teacher professionalism according to their age. Moreover, it was also found that the mean value of perceptions of beginning teachers who were above 30 years old was slightly higher than that of the other groups of beginning teachers in overall teacher professionalism. However, according to ANOVA results, there were no significant differences in all dimensions of teacher professionalism and overall teacher professionalism among those age groups.

The findings of **research question four** also showed that the mean values of beginning teachers' perceptions of teacher professionalism were high in all dimensions of teacher professionalism according to their position. Moreover, it was also found that the mean value of perceptions of primary beginning teachers on the dimension of autonomy was moderately high according to their position. According to ANOVA results, the findings showed that there was no significant difference in all dimensions of teacher professionalism and overall teacher professionalism among those position groups.

In the findings of **research question five**, it was found that the mean values of beginning teachers' perceptions of teacher professionalism were high in overall teacher professionalism according to their teaching subjects. Moreover, it can be seen that the mean values of perceptions of beginning teachers who taught art subjects and beginning teachers who taught science subjects were moderately high in the dimension of autonomy according to their teaching subjects. According to ANOVA results, it could be found that there was a statistically significant difference among those groups in the dimensions of subject and pedagogical knowledge. Moreover, as a result of the Multiple Comparisons Test (Game-Howell), the group of teachers

who taught art and science subjects significantly differed with the group of teachers who taught science subjects in the dimensions of subject and pedagogical knowledge. This finding was identical with the finding of Munawar, Sattar & Gull (2020), in which they found that there was no significant difference between those groups according to their teaching subjects.

In **research question six**, it was found that the mean values of perceptions of teacher professionalism were high in all dimensions of teacher professionalism according to their professional qualifications. Moreover, it can be assumed that the mean value of perceptions of beginning teachers who were undergraduates in the dimension of autonomy was moderately high. According to ANOVA results, the findings showed that there was no significant difference in all dimensions of teacher professionalism and overall teacher professionalism among those groups. This finding is not identical with the findings of Toh, Diong, Boo & Chia (1996), which revealed that there was a significant relationship between professional qualification and teacher professionalism in their studies.

Research question seven examined the mean values of beginning teachers' perceptions on teacher professionalism according to their professional training. It was found that the mean values of beginning teachers' perceptions on teacher professionalism were high in overall teacher professionalism according to their training. Moreover, it was also found that the mean value of perceptions of beginning teachers who attended DTED/BED was slightly higher than the other groups of beginning teachers in overall teacher professionalism. Among those three groups, the mean value of perceptions of beginning teachers who had attended township-based teacher training was the lowest. This finding follows the conceptualization of Ulyik, Smith & Helleve (2009) that beginning teachers could experience difficulties in adapting to the school culture, either due to the lack of support of relevant training, or by teaching subjects that they did not receive training for. However, according to ANOVA results, there were no significant differences in all dimensions of teacher professionalism and overall teacher professionalism among those groups.

Moreover, the responses to three open-ended questions were supported by the quantitative studies. Furthermore, the findings would provide useful information about the challenges beginning teachers encounter in their schools and their school principals' support. To sum up, beginning teachers who have less than three years of teaching experience need to improve their professionalism by getting the help and support of more experienced teachers and their school principals, because the first years of teaching are the most challenging years for them.

Suggestions

Beginning teachers should

- be given freedom to exercise their own judgement in their teaching by applying their specialized knowledge and skills learnt from teacher training.
- conduct action research and read findings from the action research in order to examine their own knowledge, skills and values.

Experienced teachers should

- give instructional and emotional support to prevent beginning teachers' under-confidence.
- collaborate with beginning teachers in school activities by giving guidance.

School principals should

- promote interaction between experienced and beginning teachers in order to share feedback for improving their practices.
- assign beginning teachers' jobs after giving effective school-based induction program.

- encourage beginning teachers to be able to read many educational books, journals and magazines and educational research papers as possible as they can.
- promote good communication between teachers and parents for carrying out school activities together.
- need to encourage beginning teachers for participating in continuous professional development programs.
- encourage beginning teachers to conduct action research by exercising their creative talents.
- organize and gather to get to know each other and form a healthy social relationship among colleagues.

Policy makers should

- assign their jobs after giving initial teacher training and preparation.
- implement effective teacher induction program for beginning teachers.
- manage effective subject-matter refresher courses, workshops, seminars and conferences at the district and township level in accordance with the objectives of conducting training.
- supply ICT materials for multimedia classrooms and materials for science laboratory sufficiently.

Recommendations for Further Study

This study was geographically restricted to Mandalay Region. As further research, it is necessary to explore the perceptions of beginning teachers with larger sample from other states and divisions to represent the whole country. Although the participants were beginning teachers who have less than three years of teaching services in this study, further research could explore teachers who have at least five years of teaching experiences in order to get larger sample. Moreover, the researcher asked the perceptions of beginning teachers to know their principals' support and excluded the school principals to be research participants. Therefore, it is suggested to conduct further research with the research participants of beginning teachers and their school principals.

Acknowledgements

We would like to offer our respectful gratitude to Dr. Myat Myat Thaw (Rector, Sagaing University of Education) for her valuable guidance and support for this paper. Similarly, we would like to acknowledge to Daw Swe Swe Nwe Tun (Professor and Head of Department, Department of English, Sagaing University of Education) for her meaningful suggestions. Moreover, we would give special thanks to the township education officers, school principals and the participant teachers from selected townships in Mandalay Region for their willingness to help in this study.

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CURRENT PRACTICES OF BASIC EDUCATION HIGH SCHOOL PRINCIPALS AS INSTRUCTIONAL LEADERS

Aye Aye Myint Lay¹

Abstract

This study aimed to investigate the practices of basic education high school principals as instructional leaders in selected basic education high schools. Mixed-method research design was used in this study. For quantitative study, two research instruments, questionnaire (1) for principals and questionnaire (2) for senior teachers, including seven instructional leadership practices developed by Chell (2002), were used to collect data. Survey data were collected from 131 participants (5 principals and 126 teachers), and 10 participants were interviewed. Descriptive statistics, one-way ANOVA and Post Hoc Multiple Comparison Tests (Turkey HSD) were used to analyze the data in this study. Analysis of principals' instructional leadership rated by principals themselves revealed that principals from high schools in Monywa township practised positive school climate, group development, and school and community involvement mostly as their important instructional leadership practices. On the other hand, teachers' perceptions of their principals' instructional leadership practices indicated that the principals most frequently practiced positive school climate, group development, and curriculum implementation. There were significant differences in instructional leadership practices among selected high schools. This study suggests that good instructional leadership requires collaboration with colleagues to solve instructional problems.

Keywords: Instructional leader, Instructional leadership, School principal

Introduction

Education is the most important factor for producing qualified human resources, which is vital for the progress of every country. The need for education has now become as fundamental and crucial as the need for food. Moreover, the demand for education is of unprecedented dimensions and strength. For the continual fulfilment of the demand, school is the key component of the whole educational process. The school occupies a very important position in the life of the child and makes major contributions to the growth and development of the school child. Like any other organization, schools need strong leadership to succeed or achieve their set goals and objectives; hence, leadership and management are needed for an effective school.

Marzano (2003) has argued that leadership is the most crucial component of any school reform, and it may be the most crucial component of successful school reform. However, Heck, Larsen and Marcoulides (1990) opine that the behaviors and practices of the head teacher have an indirect impact on students' achievement: In managing the work structure of the school, principals do not affect the achievement of individual students in the same manner that teachers do, that is, through direct classroom instruction. Nonetheless, principals have the responsibilities of making decisions about how to set school goals and organize classrooms for instruction. In fact, principals' leadership can influence in creating a conducive learning environment for students. Therefore, principals' good leadership practices can contribute to students' academic achievement and school excellence.

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Significance of the Study

In the 21st century, one of the main focus areas in education has been the ongoing demand for increased accountability to promote student achievement. National and state expectations require schools to ensure that all students achieve mastery of curriculum objectives, and local schools focus on implementing those requirements to the best of their ability. As a result, leading instructional efforts in a school has evolved into a primary role for school principals.

Strong instructional leadership by the school principal is essential for achieving academic excellence. Thus, it is the principal who should forge a partnership with teachers with the primary goal of the improvement of teaching and learning processes (Hoy & Miskel, 2006). Instructional leadership is a series of behaviors that is designed to affect classroom instruction. In this regard, principals are responsible for informing teachers about new educational strategies, technologies and tools that apply to effective instruction (Davies, 2003, cited in Abdullah, 2009).

Nowadays, every school needs effective instructional leaders who are well-prepared and capable of leading the changes in instructions that will result in higher levels of achievement for all students. Many principals understand that they should take instructional leadership responsibilities, but it is rare to practice effective instructional leadership in daily life (Chell, 1995). By investigating the current practices of basic education high school principals as instructional leaders, certain measures of improvement in education will be explored. In this way, this research may be helpful for the effective continuous development of instructional leadership skills of principals and for upgrading the quality of education.

Purpose of the Study

The main purpose of the study is

- to investigate practices of basic education high school principals as instructional leaders based on supervision of instruction, staff development, curriculum implementation, group development, action research, positive school climate, and school and community involvement.

The specific objectives of the study are as follows:

- To investigate the principals' self-reported instructional leadership practices
- To explore the instructional leadership practices of principals as perceived by teachers
- To find out whether there is any difference in the perceptions of principals' instructional leadership between principals and teachers
- To examine whether there is any significant difference in instructional leadership practices among the selected schools

Research Questions

This study deals with the following research questions:

1. What are the most important instructional leadership practices rated by principals themselves?
2. What are the most important instructional leadership practices indicated by teachers?
3. What differences are there in the perceptions of principals' instructional leadership between principals and teachers?
4. Is there any significant difference in instructional leadership practices among the selected schools?

Definitions of Key Terms

- **Instructional Leader:** Instructional leader is one who involve themselves in setting clear goals, allocating resources to instruction, managing the curriculum, monitoring lesson plans and evaluating teachers to promote growth in student learning (Flath, 1989).
- **Instructional Leadership:** Instructional leadership is simply behavior influencing (particularly encouraging) student achievement (Weisman & Goesling, 2000).
- **School Principal:** School principals are school leaders who have been entrusted with the responsibilities of heading the schools for the purpose of achieving the set objectives and goals. They are instructional supervisors who influence teachers' instructional activities for improvement of academic achievement (Samoei, 2014).

Theoretical Framework

The primary goal of instructional leadership is to improve student learning. The principal has the responsibility of instructional leadership to shape and create schools where students continue to learn. Glickman (1990) offers many suggestions for becoming a successful instructional leader. Using his works as the base and including other research findings, effective instructional leadership is comprised of seven major practices such as supervision of instruction, staff development, curriculum implementation, group development, action research, positive school climate, and school and community involvement (Chell, 2002).

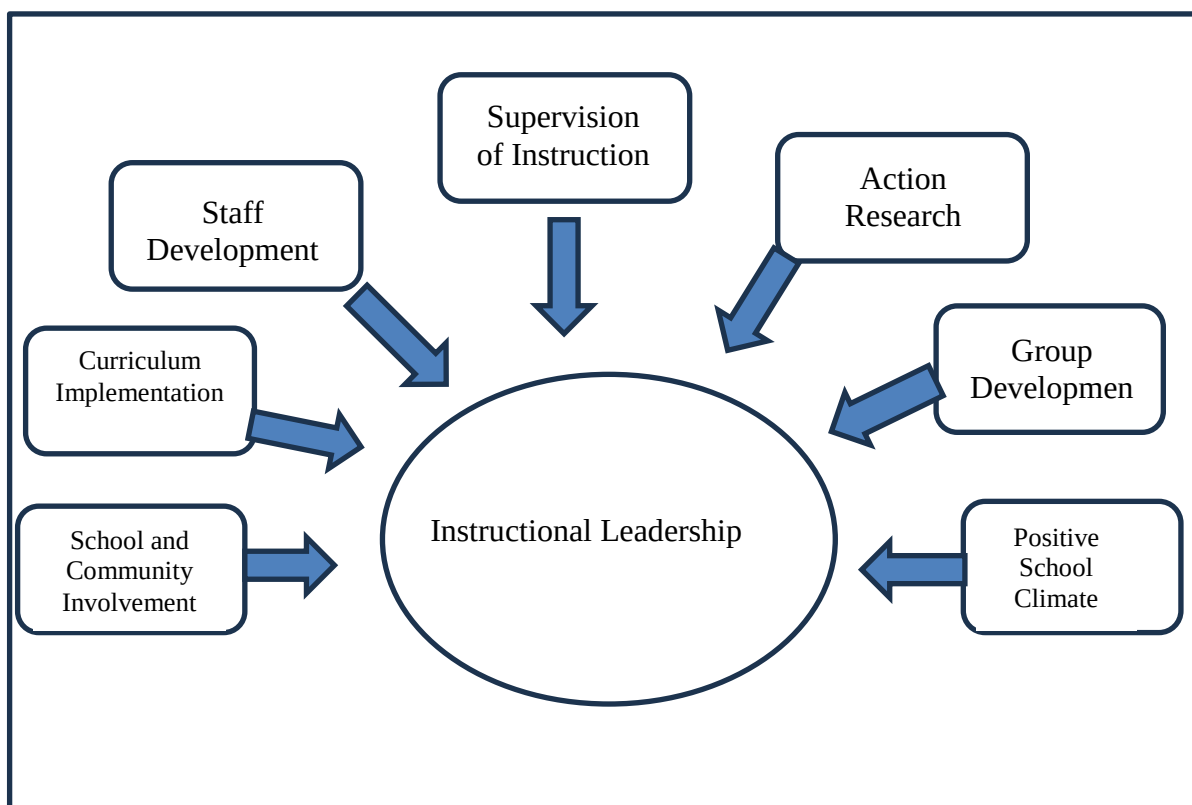


Figure 1 Model of Instructional Leadership

Source: Chell (2002).

(1) Supervision of Instruction

Supervision is one way of assisting teachers in enhancing their instruction. Glickman's (1990) model of clinical supervision offers a comprehensive framework that includes (a) teacher pre-conferencing (b) classroom observation techniques (c) analysis or interpretation of observation based on directives or interpersonal interactions (d) a post-conference for corrective measures, and (e) critique.

(2) Staff Development

Principals can use purposeful in-service training to improve teachers' instruction. On the other hand, teachers must always be learning as education is a lifetime endeavor. Some of the ways that teachers can continue their learning are school in-service days, workshops, university courses, staff meetings, school visits, conferences, travel, and professional reading.

(3) Curriculum Implementation

The curriculum of the school consists of educational objectives, knowledge, learning experiences and evaluation. Instructional focus has shifted from being passive and teacher-directed to being active, transactional, and student-centered. The nature of interpersonal interactions has changed. As a result, interpersonal relationships between teacher and students can increase empowerment, divergent contacts and cooperation of students.

(4) Group Development

Having collaborative skills with teams to solve educational issues is one of the principals' instructional leadership practices. This principal's leadership abilities involve an understanding of effective groups and group leadership styles. Moreover, addressing problematic members and settling issues are also important.

(5) Action Research

In school context, teachers conduct action research to examine their teaching methods with the main goal of enhancing their instruction. According to Glickman (1990), it involves defining objectives, planning—which includes schedules, tasks, required resources, and data to be gathered—evaluating—which entails gathering, analyzing, and interpreting the data—and, lastly, adjusting or changing the initial objectives.

(6) Positive School Climate

The principal plays a pivotal role in fostering an environment that facilitates the learning of students. Buffie (1989) asserts that in order to create a positive school climate, the principal and staff must work together to identify supportive elements and those that inhibit a positive climate.

(7) School and Community Involvement

Schools exist in the centre of every community. The principal must take an important role in fostering the relationships between the school and the community that are mutually beneficial. There are numerous ways that the community can support a school's learning environment. For example, in finding volunteers to assist at school events, selecting speakers for the classroom, serving as a mentor. Furthermore, research has shown that when parents show interest in their children's education and take an active role in it, student achievement increases. The principal may consult with parents and community groups before making decisions. Parents should be encouraged to take on leadership roles and participants in school activities should be invited.

Methods

Research Method: In this study, mixed-method research design was used. As quantitative approach, survey research design was used and as research instrument, a questionnaire based on Chell's instructional leadership tasks (2002) was used in order to gather the required data. As qualitative approach, semi-structured interview was conducted to capture phenomenon related to instructional leadership in schools.

Sample: For survey research, the sample comprised five Basic Education High Schools in Monywa Township. A total of 5 principals and 126 teachers were selected from six Basic Education High Schools in Monywa Township. Moreover, ten teachers from selected high schools were selected as participants and engaged in the semi-structured interview process.

Instruments: The survey questionnaire was developed for principals and for teachers after studying Chell's (2002) instructional leadership tasks. The questionnaire measures seven dimensions: supervision of instruction, staff development, curriculum implementation, group development, action research, positive school climate, school and community involvement. Each of the seven dimensions is measured using seven items. It included questions regarding background information and the current instructional leadership practices with 49 items where answers could be given on a 5-point Likert scale, including (1) never, (2) rarely, (3) sometimes, (4) often, (5) always.

The researcher conducted semi-structured interviews with 10 participants who wish to participate in exploring the most important instructional leadership practices. The interview took between 20 and 30 minutes, with eight questions.

Procedure: After the permission had been received from the responsible person, questionnaires were distributed in selected Basic Education High Schools in Monywa Township, Sagaing Region. All the questionnaires were collected after two weeks and were completely answered.

The interview data were audiotaped and transcribed verbatim. Transcripts were reviewed and analyzed into the new emerging themes emerged from the data related to instructional leadership practices.

Data Analysis: Descriptive statistics was used in order to know the mean and standard deviation and one-way ANOVA was conducted to test significant differences among schools on instructional leadership practices.

Ethical Considerations: Firstly, the researcher ensured that the participants were aware the research purpose. Participation in the research was voluntary, and withdrawal was possible at any time if they should feel insecurity and uneasy.

Findings

Quantitative Research Findings

The purpose of the study was to investigate practices of basic education high school principals as instructional leaders. The data were analyzed in terms of mean values and ANOVA, Post Hoc Multiple Comparisons (Turkey HSD). The findings were presented in the following.

Table 1 shows the mean scores for principals' instructional leadership practices rated by principals themselves. According to the principals' ratings, among five selected high schools, it was found that "positive school climate", "group development" and "school and community involvement" were the most important instructional leadership practices performed by principals.

Table 1: Mean Values for Principals' Instructional Leadership Practices Rated by Principals

Instructional Leadership Practices	Schools					Total
	A	B	C	D	E	
Supervision of instruction	4.57	4.71	4.71	4.14	4.57	4.54
Staff Development	4.57	4.14	4.57	5.00	4.43	4.54
Curriculum Implementation	4.71	5	4.14	4.71	4.71	4.66
Group Development	4.71	4.71	4.43	5.00	5.00	4.77
Action Research	5.00	4.57	4.29	5.00	4.86	4.74
Positive School Climate	4.86	4.86	5.00	5.00	5.00	4.94
School and Community Involvement	4.29	5.00	4.57	5.00	5.00	4.77
Overall	4.67	4.71	4.53	4.84	4.79	4.71

Scoring Direction: 1.00-1.49= low 2.50-3.49=satisfactory 4.50-5.00= high
 1.5-2.49=moderately low 3.50-4.49= moderately high

Table 2 shows the mean scores for principals' instructional leadership practices rated by teachers. According to the teachers' ratings, among five selected high schools, it was found that creating "positive school climate", "group development" and "curriculum implementation" were the most important instructional leadership practices performed by principals.

Table 2: Mean Values for Principals' Instructional Leadership Practices Rated by Teachers

Instructional Leadership Practices	Schools					Total
	A	B	C	D	E	
Supervision of instruction	4.33	4.38	3.69	3.84	3.82	4.03
Staff Development	4.42	4.40	3.75	3.93	3.91	4.10
Curriculum Implementation	4.79	4.55	3.84	4.23	3.98	4.29
Group Development	4.72	4.60	3.67	4.41	4.22	4.37
Action Research	4.47	4.41	3.63	4.24	3.85	4.15
Positive School Climate	4.69	4.65	4.39	4.56	4.51	4.57
School and Community Involvement	4.47	4.24	4.01	4.14	3.96	4.16
Overall	4.56	4.46	3.85	4.19	4.04	4.33

Scoring Direction: 1.00-1.49= low 2.50-3.49=satisfactory 4.50-5.00= high
 1.5-2.49=moderately low 3.50-4.49= moderately high

Figure 2 demonstrates the perceptions of principal and teachers from School A about instructional leadership practices. The principal's perception showed that "action research" was the most important instructional leadership practice. However, "curriculum implementation" was the most important instructional leadership practice of principal from the perceptions of teachers.

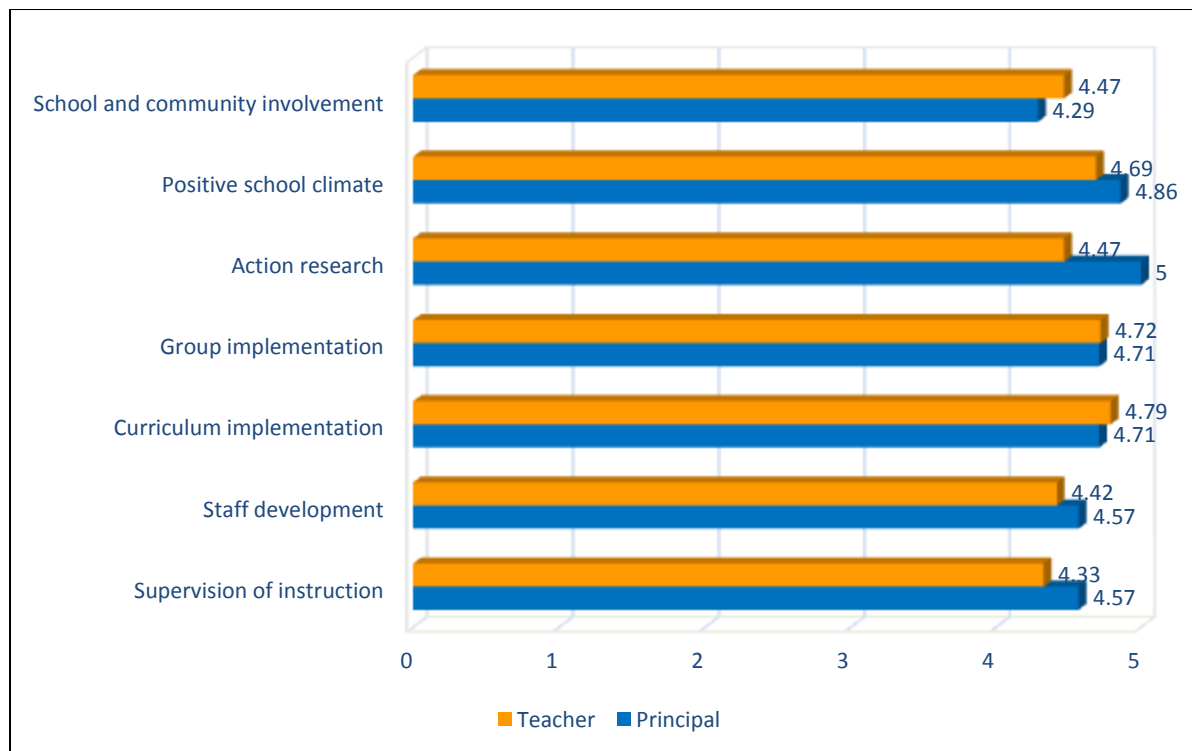


Figure 2: Mean Values of Instructional Leadership Practices rated by the principal and the teachers for School A

Figure 3 shows the perceptions of principal and teachers from School B about instructional leadership practices. According to the principal's perception, "curriculum implementation" and school and community involvement" were the most important instructional leadership practices. However, "positive school climate" was the most important instructional leadership practice of principal from the perceptions of teachers.

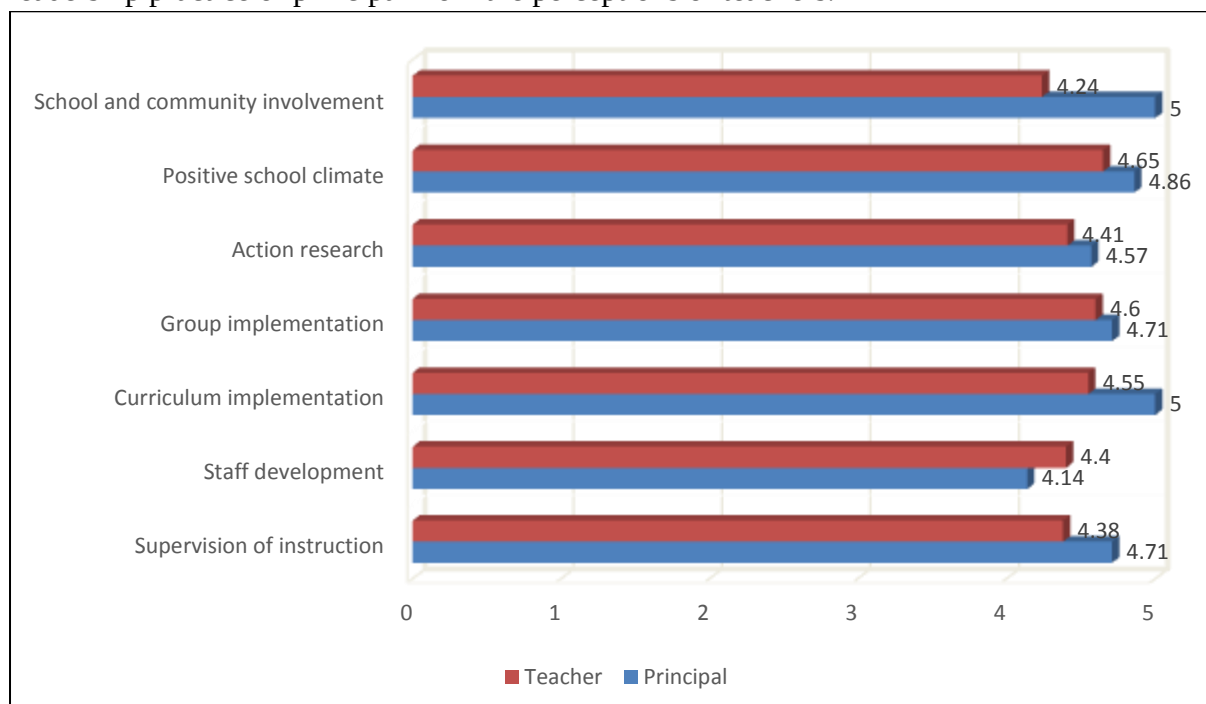


Figure 3: Mean Values of Instructional Leadership Practices rated by the principal and the teachers for School B

Figure 4 demonstrates the perceptions of principal and teachers from School C about instructional leadership practices. The principal's perception showed that "positive school climate" was the most important instructional leadership practice. Similarly, "positive school climate" was the most important instructional leadership practice of principal from the perceptions of teachers.

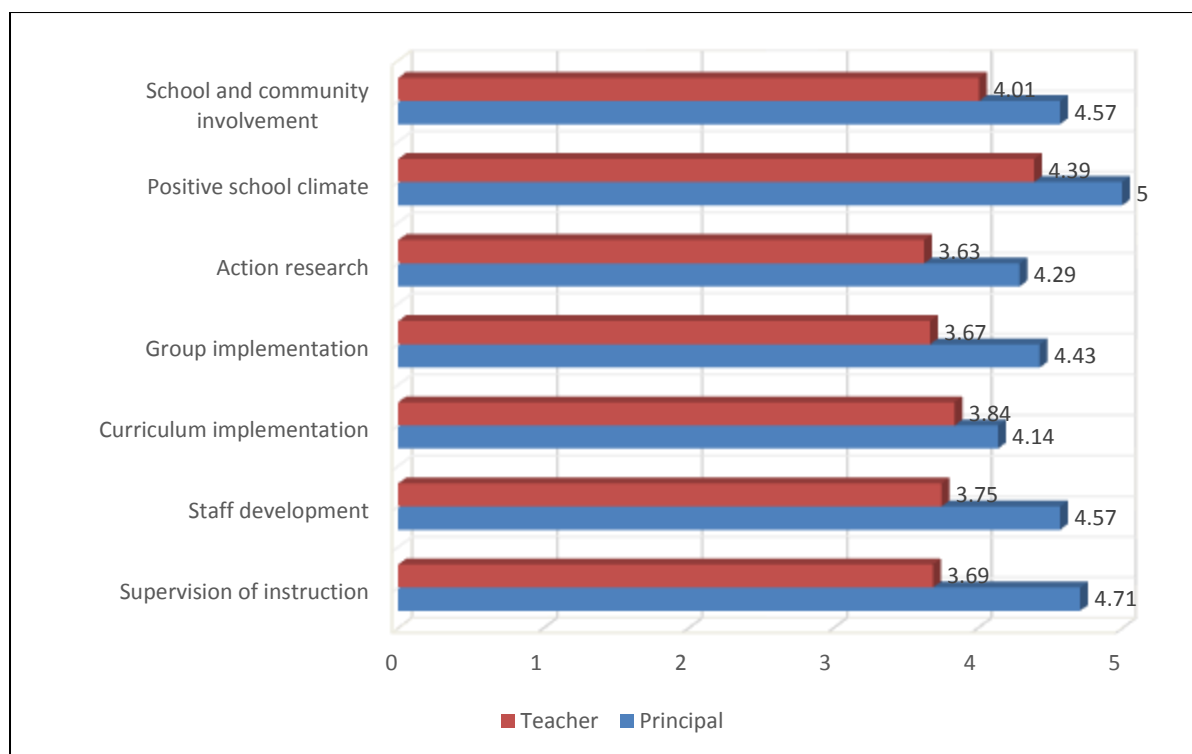


Figure 4: Mean Values of Instructional Leadership Practices rated by the principal and the teachers for School C

Figure 5 shows the perceptions of principal and teachers from School D about instructional leadership practices. According to the principal's self-perception, "group development", "action research", "positive school climate", and "school and community involvement" were the most important instructional leadership practices. But "positive school climate" was the most important instructional leadership practice of principal from the perceptions of teachers.

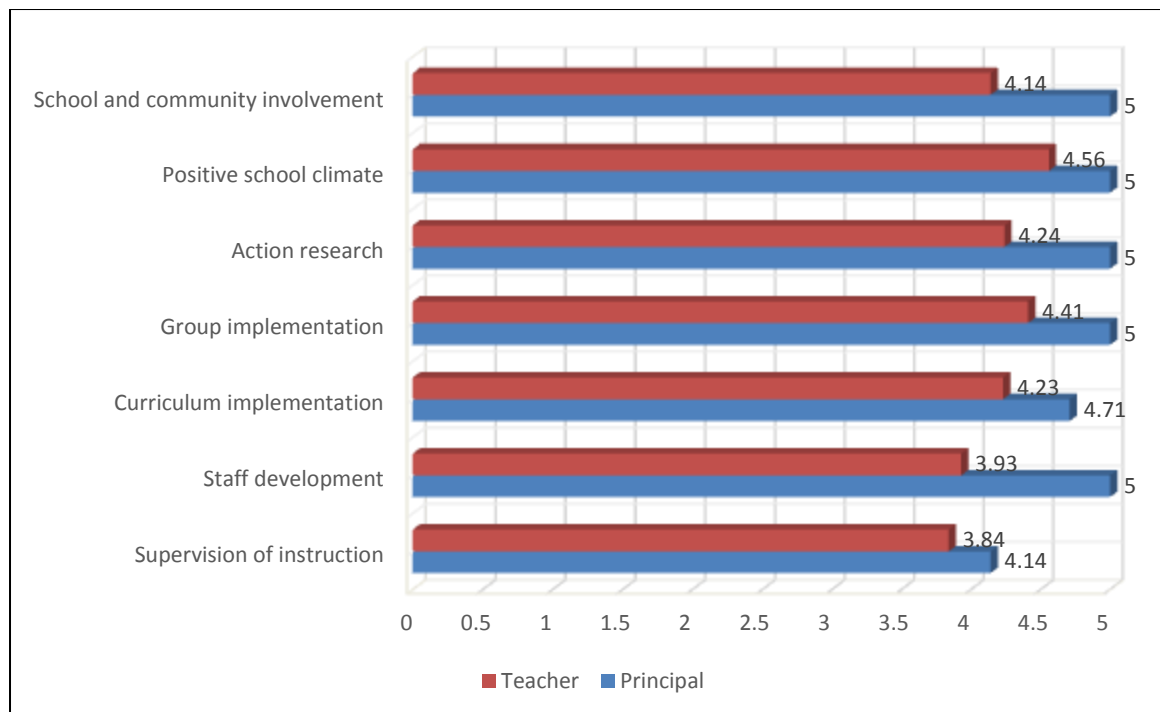


Figure 5: Mean Values of Instructional Leadership Practices rated by the principal and the teachers for School D

Figure 6 demonstrates the perceptions of principal and teachers from School E about instructional leadership practices. The principal's perception showed that "group development", "action research", positive school climate" and "school and community involvement" were the most important instructional leadership practices. Likewise, "positive school climate" was the most important instructional leadership practice of principal from the perceptions of teachers.

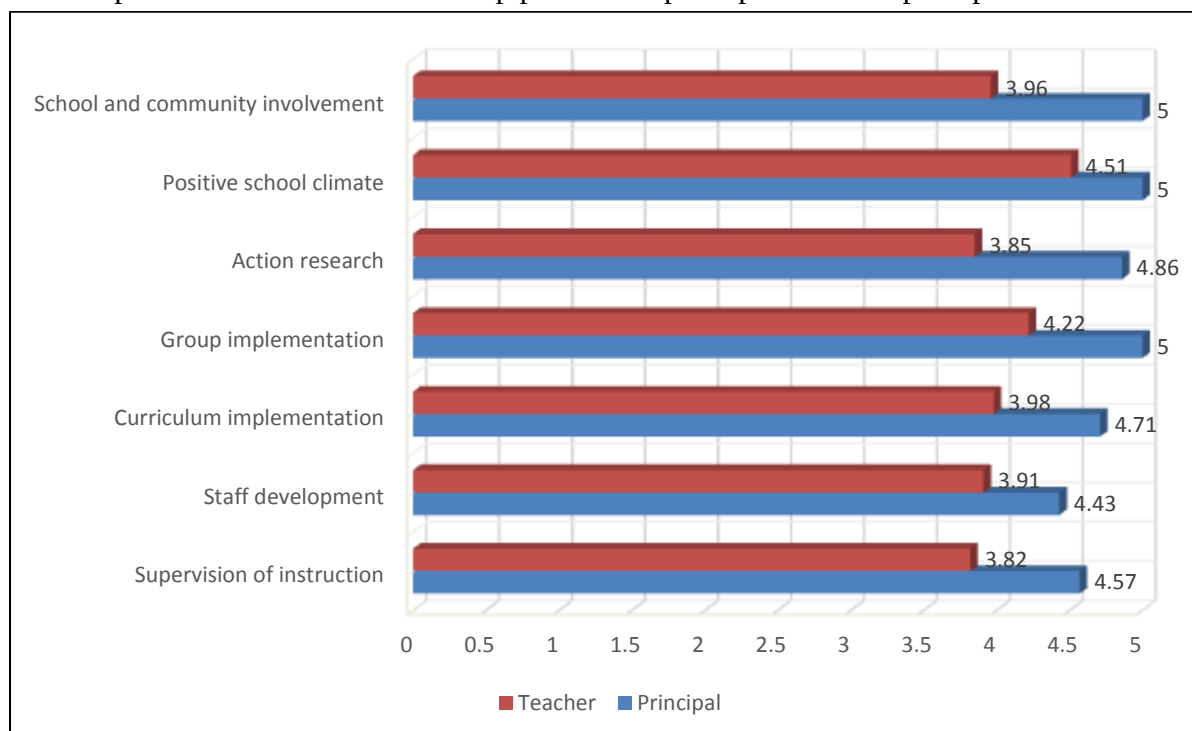


Figure 6: Mean Values of Instructional Leadership Practices rated by the principal and the teachers for School E

Table 3: Comparison of Mean Values for Dimensions of Principals' Instructional Leadership Practices Rated by Principals themselves and Teachers in Selected Basic Education High Schools

Instructional Leadership Practices	Principal (n=5)	Teacher (n=126)	Mean Difference
Supervision of instruction	4.54	4.03	0.51
Staff Development	4.54	4.10	0.44
Curriculum Implementation	4.66	4.29	0.37
Group Development	4.77	4.37	0.40
Action Research	4.74	4.15	0.59
Positive School Climate	4.94	4.57	0.37
School and Community Involvement	4.77	4.16	0.61
Overall	4.71	4.33	0.38

Scoring Direction: 1.00-1.49= low 2.50-3.49=satisfactory 4.50-5.00= high
 1.5-2.49=moderately low 3.50-4.49= moderately high

Table 3 describes the comparison of mean values for dimensions of principals' instructional leadership practices rated by principals themselves and teachers in selected basic education high schools. When studying the mean values of "Overall instructional leadership practices", it was found that principals' ratings were higher than teachers' ratings.

Next, a one-way ANOVA was conducted to test the differences among schools on instructional leadership practices. The results showed that there was a significant difference among the schools ($p<.001$) (See Table 4).

Table 4: ANOVA Table on Instructional Leadership Practices in the Schools

Instructional Leadership Practices	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6.885	4	1.721	6.891	.000***
Within Groups	31.469	126	.250		
Total	38.354	130			

In order to find out which particular schools had the greatest differences, Post Hoc Multiple Comparisons Test (Turkey HSD) was conducted. The following Table 5 points out the results of multiple comparisons of instructional leadership practices among the selected schools.

In Table 5, there were statistically significant differences in instructional leadership practices between School A and School C and between School A and School E. Moreover, there were statistically significant differences in instructional leadership practices between School B and School C and between School B and School E.

Table 5: The Results of Multiple Comparison for Principals' Instructional Leadership Practices in the Schools

(I) selected high schools	(J) selected high schools	Mean Difference (I-J)	p
A	B	.094	.961
A	C	.702	.000***
A	D	.364	.290
A	E	.519	.002*
B	C	.609	.001*
B	D	.271	.131
B	E	.416	.009**
C	D	.338	.200
C	E	.183	.751
D	E	.155	.757

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

Qualitative research findings

Positive School Climate

Data from interviews revealed that creating “positive school climate” and “group development” were the most important instructional leadership practices performed by principals. One of the teachers reported that the principal occasionally manages the improvement of teaching and learning process. To obtain high student achievement, the principal encourages teachers to use modern teaching methods and good teaching aids. On the other side, another teacher reported the financial difficulties in preparing teaching aids at schools.

One big problem of our school is lack of teaching and learning materials. Although the principal encourages to conduct practical exercises, teachers are always complaining about insufficient teaching and learning materials. (T 2)

Regarding the evaluation of teacher's performance, one teacher explained that the principal allocates subjects according to teachers' specialization and visits the classroom to evaluate the teaching and learning process.

The leadership of this school is doing well in terms of instructional leadership. The small problem some teachers are not comfortable with someone being in class or outside while teaching is in progress. My principal introduces the reward and punishment system in spite of using authority. I like my principal's administration for curriculum implementation and co-curricular activities. He tries to organize people and encourage them to participate in school improvement activities. (T 8)

Principals also have a duty to check schemes of work, records of work and other professional documents. When principals interact with teachers through these activities, teaching and learning is improved because problems and weaknesses are identified and addressed. (T 5)

Group Development

According to the interview results, the principal emphasizes group development for school effectiveness. The principal utilizes a more nondirective leadership approach. In the view

of the experienced teacher, the principal allows teachers to participate in the decision-making process for the improvement of the school. In case of resolving conflict, the principal tries to gather a greater pool of information from the members.

The right decision can only be made from all points of view. To prevent adversarial, my principal tries to guide many individuals in a school toward a collective accomplishment (e.g., intensive in-service programs, in setting formal school standards for student behavior, and in determining a safe school environment, etc.).

Discussion and Conclusion

In the instructional leadership practices of selected high school principals, there were consistencies as well as discrepancies in what principals and teachers perceived to be important in terms of instructional leadership practices among selected high schools. According to the results of principals' self-reported practices, principals from Basic Education High Schools in Monywa Township practiced "positive school climate", "group development" and "school and community involvement" mostly as their important instructional leadership practices. On the other hand, from the perceptions of teachers, principals practiced "positive school climate", "group development", and "curriculum implementation" mostly.

When studying instructional leadership practices of selected school principals, it was found that the leadership practices of School A principal were higher than those of other selected schools in six practices: staff development, curriculum implementation, group development, action research, positive school climate, school and community involvement according to the perceptions of teachers. Moreover, supervision of instruction is the least practised by the principals. By supervising teachers' instruction, improvement will occur of excellence in teachers' knowledge, attitude, and skills. Similar result was highlighted in a previous study by Sekhu (2011).

According to the qualitative findings, the principal needs to offer extra help for instructional effectiveness and evaluate teachers' performance on instruction. Liu et al. (2016) noted that principals should provide more support for academic content areas about which they are more knowledgeable. Moreover, they should give innovative ideas and suggestions related to teaching strategies and instructional materials to be effective teaching-learning process. In practice, the principal should observe and evaluate lessons in a classroom and share ideas for improvement.

This study found that principals in selected schools promote positive school climate focusing on specific leadership functions such as protecting instructional time, incentive for teachers, opportunities for professional development and incentives for learning are essential. Moreover, the principal can create opportunities for teachers to learn and grow individually or professionally to improve student outcomes. This is in line with the findings of Leech, Smith, and Green (2005), the importance of creating positive school climate in fostering student achievement. In this sense, future principals should be instructional leaders who possess the requisite skills, capacities, and commitment to lead. Furthermore, school principal should be the individual who raises academic standards, improves academic achievement for all students and provides support and assistance to teachers.

This will be of great assistance to newly appointed principals in adopting the most suitable and effective styles in administering their respective schools towards excellence and to produce citizens who are well-rounded and skillful. It will be useful for principals seeking to implement educational strategies designed to increase academic achievement in low and non-performing schools.

Further research in the area of principal leadership practices needs to be extended to the schools in other states, regions and the country as a whole. In addition, it is also necessary to conduct research focusing on the role of instructional leadership at private schools.

Acknowledgments

First and foremost, I would like to express my 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), Dr. Zin Nwe Than (Professor and Head, Department of Educational Theory and Management, Sagaing University of Education) and Daw Swe Swe Nwe Htun (Associate Professor and Head of Department of English, Sagaing University of Education) for their valuable advice and support for this paper. I would also like to thank the participants from selected high schools from Monywa Township who involved in this study for their cooperation.

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