

STUDENT TEACHERS' PERCEPTIONS ON REFLECTIVE JOURNAL WRITING AND THEIR CRITICAL THINKING SKILLS

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Abstract

The purpose of this study was to examine the perceptions of students teachers, regarding learning outcomes associated with reflective journal writing and their critical thinking skills in Education Degree Colleges of Ayeyarwady, Yangon and Bago (East) Regions. This study was also to evaluate and determine the reflective thinking and critical thinking skills of student teachers. Reflective journal writing is used extensively in teacher training program curriculum, specifically those preparing to become teachers with reflective and critical thinking skills. The original Reflective Journaling Instrument developed by McMullan (2006) and Maloney et al. (2013) that was adapted by Genua in 2019 was used in this study. The study was performed with the participation of 669 (male = 331 and female = 338) student teachers enrolled in the seven selected Education Degree College from three regions in (2022-2023) Academic Year. Participants were selected by using simple random sampling method. The independent sample *t*-test and Tukey HSD multiple comparison results showed that reflective thinking skills as well as perceptions on reflective journal writing do not depend on gender but depend on EDCs. This means that student teachers in each EDC have different perceptions on reflective journal writing. In the comparison of student teachers' critical thinking skills by gender and by EDCs, there were significant differences. This means that student teachers' critical thinking skills depend on gender and EDC. The result of the value of Pearson product-moment showed a significant correlation. Reflective journal writing and critical thinking skills were positively correlated. This means that reflective journal writing in teacher education develop student teachers' critical thinking skills. Therefore, this study can provide some innovations and self-assessment habits for nurturing program of effective teachers to create an educated nation in the 21st century.

Keywords: Perception, Reflective Journals, Critical Thinking

Introduction

Reflective journals are affective to improve teaching and learning. They have been used for many years in other countries. To promote autonomy, reflective journals becomes powerful tools and also to improve students' learning by the results of many studies. In Myanmar, reflective journal writing has begun with new curriculum after 2019- 2020 Academic Year.

The ability to reflect on one's learning is a fundamental skill necessary for lifelong learning (Ryan, 2015). Therefore, encouraging students to engage in reflective practices has been acknowledged as an essential goal in higher education for effectively preparing students for their subsequent professional experiences (Adie & Tangen, 2015). While the potential of reflective practices to engender lasting and effective changes in students' lives is widely recognized (Waggoner-Denton, 2018), a somewhat opaque landscape emerges in terms of identifying the dimensionality of reflection and the potential connection between using reflective writing and subsequent adoption of reflective practice into students' personal or professional lives (Griggs et al., 2018). Indeed, while some previous investigation has explored the issues of measuring reflection and assessing student reflective journal (RJ) writing (Kember et al., 2008), a widely

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accepted method for identifying and assessing reflection does not exist (Waggoner-Denton, 2018).

Critical thinking is the ability to transfer knowledge learned from certain disciplines to other cognitive areas (Bronson, 2008). It involves not only the acquisition of information, but also active learning, problem solving, joint decision making, and the utilization of information (Kim, 2009). Critical thinking involves both a process and a product (Garrison, Anderson, & Archer, 2001). The scientific research have shown that students active and open to learning for their mind and bodies by the acquisition of critical thinking. Science applications, in particular, involve processes such as problem finding, problem solving, critical thinking, exploration, and investigation (Gomes, 2005).

The reflective and critical thinking skills are crucial for student teachers to identify their interested areas and abilities while they are learning in teacher education. To assess student teachers' thinking skills, effective means must be identified and utilized. Ensuring that student teachers –there is a significant positive impact on teacher training because of the acquisition of necessary reflective and critical thinking skills to the teachers of the future. In this context, the aim of this study is to investigate student teachers' perceptions on reflective journal writing and their critical thinking skills.

Purposes of the Study

The main purpose of the present study is

to investigate student teachers' perceptions on reflective journal writing and their critical thinking skills .

The specific objectives are

- to explore the perceptions on reflective journal writing of student teachers by gender and Education Degree Colleges,
- to examine the critical thinking skills of student teachers by gender and Education Degree Colleges, and
- to observe the relationship between student teachers' perceptions on reflective journal writing and their critical thinking skills.

Definitions of Key Terms

Perception. Perception is a process of actions for acquiring information. (Ghadirian, Ayub & Salehi ,2018)

Reflective journals. Reflective journals were defined as “written documents that students create as they think about various concepts, events, or interactions over a period of time for the purposes of gaining insights into self-awareness and learning” (Thorpe, 2004, p. 328).

Critical thinking. Critical thinking is the ability to transfer knowledge learned from certain disciplines to other cognitive areas (Bronson, 2008).

Related Literature Review

Understanding the Term Perception

In human perception, human action can be affective by the positive or negative perception because of a difference in sensing that is good or not. Based on experience and feeling of ones'

perception can be changed. Perception means that individuals respond with the process of sensing by their own.

There are two types of perception; positive and negative perception (Irwneto, 2002).

(a) Positive perception describes all knowledge and endeavor to continue by using it to attain the perceived object.

(b) Negative perception describes all knowledge and be discordance to accomplish the perceived object. Thus, perceptions can affect someone positively or negatively in doing something. Based on individuals' knowledge, positive or negative perception can be changed on the perceived object.

Reflective Practice

The philosophical underpinnings for this study are also based on the assumptions of constructivism. Crotty (2012) defines constructivism as the belief that all knowledge is dependent on human practices and interaction between people. Constructivism stems from the ideas of philosopher Immanuel Kant (1724 - 1804) who stated that all understanding happens because of the interaction between the world and the mind resulting in a meaningful experience (Young & Patterson, 2007). Psychologist Jean Piaget (1896-1980) refined Kant's work regarding constructivism, demonstrating that understanding occurs through interactions with problems, previous knowledge, experiences, and beliefs and that students can be actively involved in their own learning (Young & Patterson, 2007). Vygotsky's theoretical framework regarding sociocultural theory contributes to the constructivist underpinnings because he theorized that social interactions influence thinking and interpretation of environment with individual cognition occurring (Jaramillo, 1996; Yilmaz, 2008).

Reflective Journal Writing

One of the methods promoted to track reflective practice is through journal writing which is focus to student learning (Osterman & Kottkamp, 1993). Landeen, Byrne and Brown (1995) evaluated the use of journal writing by 13 third year students in practice to assess learning needs. Results indicated that while students both struggled and learned from their experiences, journal writing was a medium that provided students with a structure to write about experiences encountered and through which they could reflect and review experiences. Sutton et al. (2007) concluded that journals are beneficial as they are a place where students can express thoughts and feelings, thus enabling self-awareness. A qualitative study conducted by Chirema (2007) examined 42 reflective journals to determine if journal writing promoted reflection on experience. Results indicated a range of positive and negative comments where some found writing experiences useful whereas others preferred to talk about an experience instead of putting it in writing. O'Connell and Dymont (2013) stated that journals facilitate student learning and personal growth because students write about experiences using critical thinking skills and self-expression.

Critical Thinking

Critical thinking and thinking critically are very important for a student teacher. For modern education, critical thinking skill is essential element in using approaches and models. This study purposes to provide with a framework on the concept of critical thinking in teaching and

learning. In day by day life environment, the world is more modernize according to technology while more complex problems. To manage the technology and to solve the problems, there is more necessary for education of new generation. In the last decades, it is accepted the critical thinking skill is very vital in learning. A general suggestion can be draw on the importance of thinking critically as a study.

Models of Critical Thinking Skills. By providing practice on evaluating and testing ideas, student gets critical thinking in a directed manner. Instructors who teach critical thinking provide students with the opportunity to understand and take charge of their learning (Murawski, 2014). Therefore, teachers who teach critical thinking should understand model concerning with critical thinking skills to teach student effectively.

Design and Procedure

Sampling. The participants of this study were Year 2 Semester 2 and Year 1 Semester 2 student teachers who enrolled in Patheingyi, Myaungmya, Bogalay, Yankin, Thingangyun, Hlegu and Taungtha Education Degree College during (2022-2023) Academic Year. A total of 669 student teachers (331 males, 338 females) participated in this study. Simple random sampling technique was used to select the sample.

Research Method. The design and method used in this study were quantitative research design and descriptive survey method.

The original Postal Questionnaire Survey was developed by McMullan (2006) and Maloney et al. (2013) was adapted to Reflective Journaling Instrument (RJI) by Genua in 2019. This researcher constructed the Reflective Journaling Instrument (RJI) as a 32-item survey which utilizes a 5-point Likert-scale. It is divided into two sections: usefulness of reflective practice, and questions related to reflective journal writing looking at student feelings, honesty, grading and embellishment. The internal consistency for overall scale of RJI was 0.86.

The California Critical Thinking Skills Test (CT) was developed by Facione in 1990. It includes sub-scales of Analysis, Evaluation of inference, Deduction and Induction ratiocinate (Facione, Facione, Giancarlo, & Blohm, 1998). The revised Turkish scale included 51 items associated with 6 factors and it is a 5-point Likert-scale. There are 6 subscales of the Turkish version of the California Critical Thinking Scale; Analyticity, Curiosity, Open-mindedness, Self-reliance, Search for Truth, and Systematicity. The internal consistency coefficient of the scale was 0.88.

With the permission of administrative personal of selected education degree colleges, two questionnaires were administered to student teachers in August, 2023. The participant students were also explained the purpose of the study and the importance of their participation. The questionnaires were distributed to selected EDCs. The participants took time 20 minutes to complete the questionnaires. Then, the completed questionnaires were gathered.

Data Analysis and Research Findings

After modifying the Reflective Journaling Instrument and California Critical Thinking Scale, perceptions on reflective journal writing and critical thinking skills of student teachers were examined on the student teachers from the selected Education Degree Colleges in

Ayeyarwady, Yangon and Bago (East) Region. By using the statistical analysis, findings and results were discussed in the following sections of this chapter.

Reflective Journal Writing of Student Teachers

Descriptive Analysis of Student Teachers' Reflective Journal Writing

By using the descriptive procedure with the data obtained from reflective journal writing, the mean percentage and standard deviation of reflective journal writing for the whole sample was 71.13% and 8.29 (see Table 1). This findings showed that student teachers from this study were reflective person in their writing general.

Table 1 Descriptive Statistics of Student Teachers' Reflective Journal Writing

Subscales	<i>N</i>	<i>M</i>	<i>M%</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Reflective Practice	669	28.10	80.29%	2.63	12	35
Feeling	669	31.39	69.76%	3.26	21	43
Honesty	669	21.53	71.77%	2.84	12	60
Grading	669	18.63	74.52%	2.49	9	25
Embellishment	669	17.96	71.84%	2.83	6	25
Reflective Journal Writing	669	113.81	71.13%	8.29	79	150

According to the result in Table 1, the mean percentages of each subscale for reflective journal writing of student teachers were 80.29%, 69.76%, 71.77%, 74.52% and 71.84% respectively.

Based on the descriptive statistics, it could be seen that the mean percentage of reflective practice was the highest and that of feeling was the lowest among all subscales of reflective journal writing of student teachers. The mean percentages showed that student teachers believed the process of reflective journal writing helps them to promote critical thinking skills as well as identify areas of improvement related to knowledge and skills. They also revealed that the process of reflective journal writing enhances reflective skills. This finding was consistent with the findings of Tsingos-Lucus et al. (2016).

Comparison of Student Teachers' Reflective Journal Writing by Gender

To find out the differences of reflective journal writing by gender, descriptive statistics were calculated. To make more detailed investigation on gender differences of student teachers' reflective journal writing, independent samples *t*-test was conducted (see Table 2). The mean score of male student teachers in reflective journal writing was not significantly difference that of female student teachers in reflective journal writing and its subscales.

Table 2 Means, Standard Deviations, and Independent Samples *t*-test Results of Student Teachers' Reflective Journal Writing by Gender

Subscales	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Reflective Practice	Male	331	27.99	2.972	-1.125	665	0.261
	Female	336	28.22	2.248			
Feeling	Male	331	31.39	3.270	0.044	665	0.965
	Female	338	31.38	3.256			
Honesty	Male	331	21.69	2.530	1.443	665	0.149
	Female	338	21.37	3.118			

Subscales	Gender	N	M	SD	t	df	p
Grading	Male	331	18.73	2.621	0.985	665	0.325
	Female	338	18.54	2.347			
Embellishment	Male	331	18.05	2.893	0.789	665	0.430
	Female	338	17.88	2.754			
Reflective Journal Writing	Male	331	114.06	8.737	0.782	665	0.435
	Female	335	113.56	7.826			

The result indicated that reflective thinking skills as well as perceptions on reflective journal writing were not depended on gender. This means that both of female and male student teachers had nearly the same perceptions on reflective journal writing. Both of female and male student teachers had a lot of chance to get knowledge and experience in 21st century, therefore, they were not difference in learning, teaching, thinking and other activities.

Comparison of Student Teachers' Reflective Journal Writing by Education Degree Colleges

According to mean comparison statistics, the mean scores and standard deviations of student teachers' reflective journal writing and its subscales for Education Degree Colleges were reported in Table 3. The result revealed that the mean scores of student teachers from EDC4 and EDC7 were higher in feeling than that of other EDCs and the mean scores of student teachers EDC1, EDC3, EDC4 and EDC7 were higher in Honesty than that of other EDCs, EDC4 and EDC5 were higher in Grading, EDC2, EDC3, EDC4, EDC5 and EDC7 were higher than average level in embellishment (see Table 3).

In order to obtain more detail information on the difference of student teachers' reflective journal writing and its subscales by Education Degree Colleges, one way Analysis of Variance (ANOVA) was conducted. ANOVA results indicated that there were significant differences of reflective journal writing, $F(2,665) = 4.215$, $p < .001$, reflective practice, $F(2,665) = 2.809$, $p = .010$, feeling, $F(2,665) = 2.814$, $p = .010$, grading, $F(2,665) = 4.316$, $p = .000$, and embellishment, $F(2,665) = 5.106$, $p = .000$ with respect to Education Degree Colleges.

Table 3 Means, Standard Deviations, and ANOVA Results of Student Teachers' Reflective Journal Writing by Education Degree Colleges

Subscales	EDC	N	M	SD	F	p
Reflective Practice	EDC1	99	28.04	2.25	2.809*	0.010
	EDC2	100	27.81	2.92		
	EDC3	96	28.61	2.46		
	EDC4	100	28.40	2.70		
	EDC5	83	27.77	2.82		
	EDC6	92	27.43	2.32		
	EDC7	99	28.59	2.75		
Feeling	EDC1	99	30.71	2.65	2.814*	0.010
	EDC2	100	31.37	3.52		
	EDC3	96	31.15	3.50		
	EDC4	100	31.74	3.03		

Subscales	EDC	N	M	SD	F	p
	EDC5	83	30.84	3.33		
	EDC6	92	31.20	3.38		
	EDC7	99	32.32	3.16		
Honesty	EDC1	99	21.90	2.25	1.920	0.075
	EDC2	100	21.27	2.39		
	EDC3	96	21.90	2.34		
	EDC4	100	20.99	2.44		
	EDC5	83	21.41	2.38		
	EDC6	92	21.24	2.42		
	EDC7	99	21.99	4.69		
Grading	EDC1	99	18.26	2.33	4.316***	0.000
	EDC2	100	18.02	2.40		
	EDC3	96	19.19	2.58		
	EDC4	100	18.88	2.62		
	EDC5	83	18.86	2.32		
	EDC6	92	18.03	2.65		
	EDC7	99	19.19	2.22		
Embellishment	EDC1	99	16.68	2.90	5.106***	0.000
	EDC2	100	18.03	2.67		
	EDC3	96	18.10	2.91		
	EDC4	100	18.70	2.60		
	EDC5	83	18.11	2.47		
	EDC6	92	17.82	2.98		
	EDC7	99	18.26	2.84		
Reflective Journal Writing	EDC1	99	111.91	7.32	4.215***	0.000
	EDC2	100	112.69	8.15		
	EDC3	96	115.15	8.76		
	EDC4	100	114.85	7.15		
	EDC5	83	113.14	8.19		
	EDC6	92	112.32	8.21		
	EDC7	99	116.44	9.26		

Table 4 Results of Tukey HSD Multiple Comparisons for Student Teachers' Reflective Journal Writing by Education Degree Colleges

Subscales	(I)EDC	(J)EDC	Mean Difference(I-J)	p
Feeling	EDC1	EDC7	-1.616**	0.008
	EDC5	EDC7	-1.480*	0.036
Grading	EDC2	EDC3	-1.168*	0.015

Subscales	(I)EDC	(J)EDC	Mean Difference(I-J)	<i>p</i>
	EDC2	EDC7	-1.172*	0.013
	EDC3	EDC6	1.155*	0.022
	EDC6	EDC7	-1.159*	0.020
Embellishment	EDC1	EDC2	-1.363*	0.010
	EDC1	EDC3	-1.427**	0.006
	EDC1	EDC4	-2.026***	0.000
	EDC1	EDC5	-1.432*	0.010
	EDC1	EDC7	-1.606**	0.001

Note. EDC 1 = Education Degree College 1, EDC 2 = Education Degree College 2, EDC 3 = Education Degree College 3, EDC 4 = Education Degree College 4,, EDC 5 = Education Degree College 5, EDC 6 = Education Degree College 6, EDC 7= Education Degree College 7

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

The results of Tukey HSD test indicated that the mean score of student teachers in EDC7 was significantly higher than that of student teachers in EDC1 and that of EDC7 was significantly higher than that of EDC5 in feeling. The mean score of student teachers in EDC3 and EDC7 was significantly higher than that of EDC2 in grading and that of student teachers in EDC3 was significantly higher than that of student teachers in EDC6 and also that of student teachers in EDC6 was significantly higher than that of student teachers in EDC7 in grading. The mean score of student teachers in EDC2, EDC3, EDC4, EDC5 and EDC7 was significantly higher than that of EDC1 in embellishment.

This means that student teachers in each Education Degree Colleges have different perceptions on reflective journal writing. Especially, student teachers from EDC1 did not try to embellish when they were writing reflective journal. This means that they worked according to the instructions of teacher educators in respective subjects. They had no pressure to write reflective journal writing and expressed freely their feeling because of very close and familiar with teacher educators.

Critical Thinking Skills of Student Teachers

Descriptive Analysis of Student Teachers' Critical Thinking Skills

To identify critical thinking skills of student teachers, descriptive statistics were conducted and the results were shown in Table 5.

Table 5 Descriptive Statistics of Student Teachers' Critical Thinking Skills

Subscales	<i>N</i>	<i>M</i>	<i>M%</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Analyticity	669	21.40	72.00%	2.20	14	30
Curiosity	669	34.11	75.80%	3.30	23	45
Open-mindedness	669	18.30	61.00%	2.90	7	28
Self-reliance	669	50.26	67.01%	4.89	36	76
Search for Truth	669	32.80	72.89%	3.09	22	43

Subscales	<i>N</i>	<i>M</i>	<i>M%</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
Systematicity	669	20.44	68.13%	2.17	14	29
Critical Thinking Skills	669	177.32	69.54%	12.61	142	223

According to the result in Table 5, the mean percentage of critical thinking of the whole sample was 69.54% and the mean percentages of each subscale for critical thinking of student teachers were 72.00%, 75.80%, 61.00 %, 67.01%, 72.89%, 68.13% and respectively.

Based on the descriptive statistics, it could be seen that the mean percentage of curiosity was the highest and that of open-mindedness was the lowest among all subscales of critical thinking of student teachers and most of the student teachers were with them of critical thinking skills.

Comparison of Student Teachers' Critical Thinking Skills by Gender

To find out the difference of critical thinking skills by gender, descriptive statistics were calculated. The mean score of male student teachers was higher than that of female student teachers in critical thinking skills and its subscales. To make more detailed investigation on gender differences of student teachers' critical thinking skills, the independent samples *t*-test was conducted (see Table 6).

Table 6 Means, Standard Deviations, and Independent Samples *t*-test Results of Student Teachers' Critical Thinking Skills by Gender

Subscales	Gender	<i>N</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>df</i>	<i>p</i>
Analyticity	Male	331	21.60	2.15	2.378*	665	0.018
	Female	338	21.20	2.24			
Curiosity	Male	331	34.67	3.29	4.415***	665	0.000
	Female	338	33.56	3.22			
Open-mindedness	Male	331	18.79	2.92	4.344***	665	0.000
	Female	338	17.83	2.82			
Self-reliance	Male	331	51.56	4.74	7.052***	665	0.000
	Female	338	48.99	4.70			
Search for Truth	Male	331	32.96	3.23	1.270	665	0.205
	Female	338	32.65	2.95			
Systematicity	Male	331	20.73	2.21	3.461**	665	0.001
	Female	338	20.15	2.10			
Critical Thinking Skills	Male	331	180.31	12.38	6.255***	665	0.000
	Female	338	174.38	12.15			

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

The result of independent samples *t*-test stated that there were significant differences on critical thinking skills and its subscales, $t(665) = 6.255$, $p < .001$, analyticity, $t(665) = 2.378$, $p = .018$, curiosity, $t(665) = 4.415$, $p = .000$, open-mindedness, $t(665) = 4.344$, $p = .000$, self-reliance, $t(665) = 7.052$, $p = .000$, systematicity and $t(665) = 3.461$, $p = .001$ by gender (see Table 6). The results indicated that the mean scores of male student teachers were significantly

higher than that of female student teachers in critical thinking skills and its subscales except search for truth.

It is undeniable that males tend to be better at describing ideas than females (Piaw, 2014). In estimating the causes of problems, males are stronger than females. It is in line with the study. Males can identify information specific and systematically. To precise the result, they focus more in one direction than females. The capacity and function of left-brain support to be rational for males. The left-brain supports critical thinking abilities, while the right brain supports creative thinking skills (Rosnawati, 2009). Because of the brain function of males are better than females in some parts. Therefore, the male students were higher than females in estimating ability on a problem. This finding is in line with Gunawan et al. (2020a), that male students' thinking abilities is higher than female students. One study showed that female students were more influenced by the teachers they chose as their role models and showed high levels of intrinsic motivation (Christophersen et al., 2015).

Comparison of Student Teachers' Critical Thinking Skills by Education Degree Colleges

According to descriptive statistics, the mean scores and standard deviations of student teachers' critical thinking skills and its subscales for Education Degree Colleges were reported in Table 7. The results revealed that the mean scores of student teachers from EDC5 were higher in critical thinking skills than that of other EDCs. There was no significant difference of mean scores of student teachers in analyticity among EDCs. The mean scores of student teachers from EDC3, EDC4, EDC5, EDC6 and EDC7 were higher in curiosity than that of EDC1 and EDC2. The mean score of student teachers from EDC5 was higher in open-mindedness than that of other EDCs. The mean score of student teachers from EDC5 was higher in self-reliance than that of other EDCs. The mean scores of student teachers from EDC2, EDC3 and EDC4 were higher in search for truth than that of other EDCs. The mean score of student teachers from EDC5 was higher in systematicity than that of other EDCs.

ANOVA results indicated that there were significant differences of critical thinking skills, $F(6,664) = 2.623$, $p = 0.016$, open-mindedness, $F(6,664) = 3.418$, $p = 0.002$, self-reliance, $F(6,664) = 2.475$, $p = 0.022$, search for truth, $F(6,664) = 2.637$, $p = 0.016$ and systematicity, $F(6,664) = 2.691$, $p = 0.014$ by Education Degree Colleges (see Table 7).

Table 7 Means, Standard Deviations, and ANOVA Results of Student Teachers' Critical Thinking Skills by Education Degree Colleges

Subscales	EDC	N	M	SD	F	p
Analyticity	EDC1	99	21.05	1.72	0.705	0.646
	EDC2	100	21.34	2.26		
	EDC3	96	21.51	2.06		
	EDC4	100	21.64	2.33		
	EDC5	83	21.35	2.39		
	EDC6	92	21.50	2.29		
	EDC7	99	21.39	2.33		
Curiosity	EDC1	99	33.98	3.25	0.708	0.643
	EDC2	100	33.65	3.36		
	EDC3	96	34.25	3.15		
	EDC4	100	34.00	3.31		
	EDC5	83	34.54	3.35		
	EDC6	92	34.11	3.41		
	EDC7	99	34.33	3.30		

Subscales	EDC	N	M	SD	F	p
Open-mindedness	EDC1	99	17.66	3.01	3.418**	0.002
	EDC2	100	18.75	2.38		
	EDC3	96	18.46	2.75		
	EDC4	100	17.60	3.35		
	EDC5	83	19.12	3.03		
	EDC6	92	18.39	2.61		
	EDC7	99	18.28	2.88		
Self-reliance	EDC1	99	48.65	4.81	2.475*	0.022
	EDC2	100	50.28	4.28		
	EDC3	96	50.39	4.45		
	EDC4	100	50.44	4.40		
	EDC5	83	51.19	5.74		
	EDC6	92	50.60	4.27		
	EDC7	99	50.48	5.87		
Search for Truth	EDC1	99	31.72	3.01	2.637*	0.016
	EDC2	100	33.04	3.12		
	EDC3	96	33.22	2.83		
	EDC4	100	33.07	2.98		
	EDC5	83	32.92	3.26		
	EDC6	92	32.75	3.23		
	EDC7	99	32.94	3.09		
Systematicity	EDC1	99	20.26	1.88	2.691*	0.014
	EDC2	100	20.22	2.09		
	EDC3	96	20.29	2.28		
	EDC4	100	19.96	2.15		
	EDC5	83	21.02	2.16		
	EDC6	92	20.73	2.11		
	EDC7	99	20.69	2.40		
Critical Thinking Skills	EDC1	99	173.31	12.71	2.623*	0.016
	EDC2	100	177.28	11.16		
	EDC3	96	178.11	11.77		
	EDC4	100	176.71	12.08		
	EDC5	83	180.14	12.79		
	EDC6	92	178.08	12.48		
	EDC7	99	178.12	14.40		

Moreover the more detailed analyses, post-hoc test analysis method was conducted by Tukey HSD multiple comparison procedure for Education Degree Colleges (see Table 8).

Table 8 Results of Tukey HSD Multiple Comparisons of Student Teachers' Critical Thinking Skills by Education Degree Colleges

Subscales	(I) EDC	(J) EDC	Mean Difference(I-J)	<i>p</i>
Open-mindedness	EDC4	EDC5	-1.520**	0.007
	EDC5	EDC1	1.464*	0.012
Self - reliance	EDC1	EDC5	-2.546**	0.008
Search for Truth	EDC1	EDC2	-1.323*	0.040
		EDC3	-1.502*	0.012
		EDC4	-1.353*	0.032
Systematicity	EDC4	EDC5	-1.064*	0.016
Critical Thinking skills	EDC1	EDC5	-6.831**	0.005

Note. EDC 1 = Education Degree College 1, EDC 2 = Education Degree College 2, EDC 3 = Education Degree College 3, EDC 4 = Education Degree College 4, EDC 5 = Education Degree College 5

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

The results of Tukey HSD test indicated that the mean score of student teachers from EDC5 ($M = 180.14$) were significantly higher in critical thinking skills than that of student teachers from EDC1 ($M = 173.31$). Similarly, the mean score of student teachers from EDC5 ($M = 19.12$) were significantly higher in open-mindedness than that of student teachers from EDC4 ($M = 17.60$) and EDC1 ($M = 17.66$). The results also revealed that the mean score of student teachers from EDC5 ($M = 51.19$) were significantly higher in self-reliance than that of student teachers from EDC1 ($M = 48.65$).

The results also revealed that the mean score of student teachers from EDC2 ($M = 33.04$), EDC3 ($M = 33.22$), and EDC4 ($M = 33.07$) were significantly higher in self-reliance than that of student teachers from EDC1 ($M = 31.72$). The results also revealed that the mean score of student teachers from EDC5 ($M = 21.02$) were significantly higher in systematicity than that of student teachers from EDC4 ($M = 19.96$) (see Table 8).

Critical thinking skills could be improved by learning and developing with time and effort. To improve critical thinking skills, it depends on learning environment that create by teacher educators. Lujan and Dicarlo (2006) stated that teacher need to focus on active learning, more specifically, on inquiry models as solutions to solve the low level of critical thinking skills. Llewellyn (2013) has also recommended for implement inquiry learning in order that students get involved in the exploration process actively by using skills of logical and critical thinking. There are some other researches that proved that inquiry learning improves the scores of critical thinking skills (Azizmalayer, 2012; Mahanal, 2012; Kazempour, 2013).

Relationship of Reflective Journal Writing and Critical Thinking Skills of Student Teachers

To explore the relationship between reflective journal writing and critical thinking skills of student teachers, Pearson product-moment correlation was calculated. It was found that reflective journal writing of student teachers were significantly related to a wide range of critical

thinking skills of student teachers. The correlation between reflective journal writing and critical thinking skills of student teachers was shown in table 9.

Table 9 Correlation Between Reflective Journal Writing and Critical Thinking Skills of Student Teachers

Subscales	CTS	RP	F	H	G	E	RJW
Critical Thinking Skills(CTS)	1	.230 [*]	.322 ^{**}	.242 ^{**}	.296 ^{**}	.306 ^{**}	.455 ^{**}
Reflective Practice (RP)		1	.163 ^{**}	.124 ^{**}	.255 ^{**}	.204 ^{**}	.549 ^{**}
Feeling (F)			1	.270 ^{**}	.197 ^{**}	.271 ^{**}	.681 ^{**}
Honesty (H)				1	.157 ^{**}	.137 ^{**}	.575 ^{**}
Grading (G)					1	.383 ^{**}	.570 ^{**}
Embellishment (E)						1	.653 ^{**}
Reflective Journal Writing (RJW)							1

^{**} $p < .01$.

As expected, reflective journal writing and its subscales were positively correlated with critical thinking skills ($r = .455$).

Discussion and Recommendations

The process of teaching and learning is more advanced for developing and processing education including teacher training program. In Myanmar, Ministry of Education is implementing to be innovation and using modern teaching methodologies. Reflective journal writing is effective for doing self-assessment and also helps to improve critical thinking skill and self-directed learning for all learners.

The use of reflective learning journals is purported to enhance the development of the professional self in practice (Boud, 2001; Wong, Kember, Chung, & Yan, 1995). This survey examines their own attitudes and needs in daily programs. This finding is consistent with the literature, in that reflective journal writing allows for the exploration of attitudes such as self-doubt and fear of exposure (Kerka, 2002).

Reflective journal writing may also enhance growth and accountability as a professional and facilitate the formation of a base of knowledge needed to become a well-rounded practitioner (Banker, 2004; Hiemstra, 2001). This outcome of reflective journal writing is moderately acknowledged for student teachers yet. But there is a recognition that the professional is a cognitive and effective process.

In this context, to ensure the development of critical thinking skills during formal education, it is generally recommended that different perceptions are considered and used during classes, and that these skills are practiced actively by employing suitable techniques (Bulut, Ertem and Sevil, 2009). In his study, Tok (2008) describes that reflective thinking activities are effective for improving student performance and attitudes towards the class, and that teachers should be trained on the implementation of such activities in classroom environments by

receiving both pre-service and in-service trainings. Therefore, identification and developing of the critical and reflective thinking skills of student teachers is very crucial during their education.

Conclusion

This study also showed high levels of professionalism among student teachers. They were also found to have great respect for the teaching profession throughout the work of reflective journal writing. However, this improvement in professionalism was not statistically significant. Reflective journal writing is believed to contribute to success in higher education by providing insight into academic difficulties, changes in performance, and increased student responsibility for learning (Patterson, 1995). The result on the perception of the student teachers were consistent with the previous research, Student teachers perceived positive learning outcomes of reflective journal writing in learning courses, a finding that is consistent with a recent qualitative study in web-based courses conducted by Ruland and Ahern (2007). Student teachers motivate to engage in reflection and thinking critically by understanding of the purposes and benefits of reflective journal writing.

To sum up, reflective journal writing and critical thinking skills are important variables to educational profession and it is hoped that the contribution of this research can provide the successful profession for student teachers and development of education system for educational personnel. An also the results of this study reveal favorable perceptions of graduate students and faculty regarding the outcomes of reflective journal writing in teacher education. Plans for future investigations include examination of the psychometric characteristics of the instrument for the learning outcomes of professional development, personal growth, empowerment, and facilitation of the learning process. Reflective journal writing can strengthen student teachers growth and facilitate faculty.

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