

**The Government of  
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## **Educational Psychology, Educational Methodology, Educational Theory**

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## Self-esteem of Grade 9 Students in Aungmyaytharzan Township

Khaing Nyein Thant<sup>1</sup> & Ohnmar Tun<sup>2</sup>

### Abstract

The main aim of this study is to investigate self-esteem of Grade 9 students in Aungmyaytharzan Township. A total of Grade 9 students (Male-262, Female-318) from five selected Basic High Schools in Aungmyaytharzan Township were randomly selected in this study. Descriptive research design and survey method were used. Self-esteem Inventory (SEI) developed by Coopersmith (1987) was used to measure self-esteem. There are five subscales: General Self, Social Self (peer), Home Self (parents), Lie scale and School Self (Academic). In the present study, Lie Scale was excluded; only four subscales were used. In the (SEI) questionnaire, the total 24 items are five point likert type. Among 24 items, 12 items were negative statements and they are scored reversely. And demographic data of participants were also investigated. Descriptive statistics were firstly performed and it was found that self-esteem of Grade 9 students in Aungmyaytharzan Township was satisfactory. The result of *t* test indicated that there was no significant difference in self-esteem of students by gender. ANOVA result revealed that there was significant difference in self-esteem by schools and birth order.

**Keywords:** Self-esteem, General Self, Social Self, Home Self, School Self

### Introduction

As a child goes through adolescence he or she is subjected to many differential challenges stressors, and opportunities. As important factor in handling these challenges is high self-esteem (Strenke, 2010).

Coopersmith (1967) defined self-esteem as “positive and negative attitudes towards oneself. He considered self-esteem as an expression of approval or disapproval of oneself, and a measure of the extent to which one believes that he or she is talented, successful, and that his or her life has meaning and value.

Self-esteem is a major key to success in life. High level of self-esteem supplies individuals with the ability to accept happy moments, to

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cope effectively with challenges, to engage in close relationships and to improve their strengths.

Moreover, the role of self-esteem in psychological functioning has been studied for nearly a century (Greenier, Kernis & Waschull, 1995). It is a central construct in clinical, developmental, personality, and social psychology. High self-esteem is also considered to positively moderate the expression of dysfunctional schemata and depressive symptoms at the experience of negative life events (Stavropoulos et al, 2015). High self-esteem individuals also appear more effective in self-regulating goal-directed behavior (Di Paulala & Campell, 2002). According to Mackinnon (2015), the development of healthy self-esteem is extremely important for good personal and social adjustment.

Lower level of self-esteem has been linked to poor school performance and serious behavioral problems as suicidal tendencies, maladjustment and leads to psychological problems such as depression, social anxiety, loneliness, alienation, etc (Sharma & Agarwala, 2015). Furthermore, Donnellan, Trzesniewski, Robins, Moffitt, and Capi (2005) found a robust relation between low self-esteem and externalizing problems (aggression, antisocial behavior, and delinquency). Besides, low self-esteem has been linked to depression, aggression, fewer competencies to overcome difficulties and decreased level of well-being in adolescents (Stavropoulos et al, 2015). Weber (2001) hypothesized that college students who report emotional abuse are expected to have a lower self-esteem than those who do not report emotional abuse.

So, because of its robust implications, self-esteem appears to be a global construct that should be addressed in different communities. The present research will study this powerful construct, self-esteem among students, in Myanmar.

The adolescents with a high level of self-esteem have the following characteristics: they are capable of influencing positively the opinion and behavior of others; they tackle new situations positively and confidently; they have a high level of tolerance towards frustration; they accept early responsibilities, they assess correctly situations; they communicate positive feelings about themselves; they succeed in having a good self-control and the belief that the things they are undergoing are the result of their own behavior and actions (Lavoie, 2012).

Therefore, adolescence is the critical period for the development of self-esteem and low self-esteem may endanger adolescent's emotional regulation (Lin, Tang, Yen, Ko, Huang, Liu et al., 2008).

Unfortunately, the formation of self-esteem implies a long process. Its evolution in time involves downfall periods especially during transition periods from one stage to another, from one status to another, e.g., in adolescence (due to the psychosomatic changes), or grand age, as a consequence of the change in tasks and responsibilities (Orth et al, 2010). Self-esteem appears to decline during adolescence (Tsai, Ying & Lee, 2001).

That is why; raising self-esteem in adolescents became the most important tasks for parents and teachers (Afrooz, 1994). The present study chose the adolescent group, Grade 9 students in Aungmyaytharzan Township, as the major participants for studying self-esteem.

### **Purpose of the Study**

The purpose of the study was to investigate self-esteem of grade 9 students in Aungmyaytharzan Township.

### **Research Questions**

1. Is there any significant difference in self-esteem of grade 9 students in Aungmyaytharzan Township by gender?
2. Is there any significant difference in self-esteem of grade 9 students in Aungmyaytharzan Township by school?
3. Is there any significant difference in self-esteem of grade 9 students in Aungmyaytharzan Township by birth order?

### **Definition of Key Term**

**Self-esteem:** Self-esteem is an overall positive evaluation to the self (Rosenberg, 1965).

### **Review of Related Literature**

**Self-esteem Theory by Stanley Coopersmith (1967):** Coopersmith (1967) was concerned with the antecedents of self-esteem in children. Coopersmith defined self-esteem as follows: “The evaluation which the individual makes and customarily maintains with regard to himself. It expresses an attitude of approval or disapproval and indicates the extent to which the individual believes himself to be capable, significant, successful and worthy. In short, self-esteem is a personal judgment of worthiness that is expressed in the attitudes the individual holds towards himself”. Coopersmith’s definition of self-esteem looks too general rather than specific. As Cassidy (1991) points out, “it is difficult to imagine how one might arrive at a precise operational definition of self-esteem.”

One of the dimensions of self which form the basis of self-esteem is evaluation attitudes about the self. He refers to self-evaluation as “a judgmental process in which the individual examines his performance, capacities, and attributes according to his personal standards and values, and arrives at a decision of his own worthiness”. He separated the observation of self-esteem into two parts, subjective expression and behavioral expression (1959). Subjective expression includes the individual’s self-perception and self-description; behavioral expression is based on the individual’s prior positive and negative experiences which are also observed and reported by others. According to Coopersmith, description of a person’s self-esteem involves a composite index, reflecting both aspects of self-evaluative behavior (Coopersmith, 1959). Coopersmith (1967) identifies four variables which determine the individual’s self-esteem: successes, values, aspirations, and defenses.

Coopersmith (1967) said “the process of self-judgment derives from a subjective judgment of success, with that appraisal weighted according to the value placed upon different areas of capacity and performance, measured against a person’s personal goals and standards and filtered through his capacity to defend himself against presumed or actual occurrences of failure.

## **Method and Procedure**

A survey method was used in this study with quantitative perspective.

### **Participants**

A total of 580 Grade 9 students (male=262 and female=318) were selected from Aungmyaytharzan Township by simple random sampling technique.

### **Instrument**

Self-esteem Inventory (SEI) was used to measure self-esteem of Grade-9 students in Aungmyaytharzan Township. It was developed by Coopersmith (1987). There are five subscales: General Self-esteem, Social Self-esteem (Peer), Home Self-esteem (Parents), Lie Scale, and School Self-esteem (Academic). In the present study, Lie Scale was excluded; only four subscales were used: 12 items for General Self-esteem, 3 items for Home Self-esteem, and 3 items for Social self-esteem and 6 items for Academic Self-esteem. The total number of items used in this study was 24 items and all are five-point Likert type. Among 24 items, 12 items were negative statements and they are scored reversely.

After translating these items to Myanmar version, expert review was conducted for face and content validity by experts in the field of Educational Psychology from Sagaing University of Education (SUOE). The necessary changes were done according to their suggestions. Moreover, the inventory was designed to ask the participants' demographic factors in order to obtain specific information about the students concerning gender, schools and birth order. And then, pilot testing was conducted with 50 students of Grade 9 students in Aungmyaytharzan Township in order to determine the reliability of the instruments. The internal consistencies were 0.73 for SEI (Self-esteem Inventory).

### **Procedure**

First of all, literature review was studied. Then, research instruments were prepared and pilot study was conducted to validate instruments. Data collection was carried out after validating instruments. Moreover, the collected data was analyzed and interpreted. The necessary suggestions and recommendations of the study were discussed. And then, the research paper was written, edited and submitted.

## Findings

In this section, results of the present study were discussed in accordance with research questions.

In this section, to examine self-esteem of Grade 9 students in Aungmyaytharzan Township, descriptive statistics was used.

Table 1. Descriptive Statistics for Self-esteem of Grade 9 Students in Aungmyaytharzan Township

<b>Variable</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
Self-esteem	580	45	109	79.44	9.82

According to Table 1, mean score for self-esteem of Grade 9 students in Aungmyaytharzan Township was 79.44 while the highest possible score from SEI was 120. So, it can be concluded that self-esteem of Grade 9 students in Aungmyaytharzan Township was satisfactory.

To examine difference in Grade 9 students' self-esteem by gender, descriptive statistics was used.

Table 2. Descriptive Statistics for Self-esteem of Grade 9 Students by Gender

<b>Variables</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Mean Difference</b>
Self-esteem	Male	262	79.24	9.66	-0.36
	Female	318	79.60	9.97	

In Table 2, for self-esteem, it can be seen that the mean score of female students (79.60) was greater than that of the male students (79.24) in self-esteem with a mean difference (0.36).

Then, the independent sample *t* test was used to examine whether these mean differences in self-esteem by gender were significant or not.

Table 3. Results of Independent Sample *t* test for Grade 9 Students' Self-esteem by Gender

<b>Variables</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>p</i></b>	<b>Mean Difference</b>
Self-esteem	-.435	578	.664	-0.36

According to the result of *t* test, it was found no significant difference in self-esteem by gender.

To compare Grade 9 students' self-esteem by schools, descriptive statistics was firstly executed. The result was shown in Table 4.

Table 4. Descriptive Statistics for Grade 9 Students' Self-esteem by School

<b>Variable</b>	<b>Schools</b>	<b><i>N</i></b>	<b>Mean</b>	<b><i>SD</i></b>
Self-esteem	Schools 1	114	80.13	9.164
	Schools 2	116	76.54	8.480
	Schools 3	144	80.49	10.451
	Schools 4	121	79.89	9.882
	Schools 5	85	80.01	10.680

According to table 4, the school 2 (76.54) was the least in mean score for self-esteem among the schools. To examine whether these differences in mean scores were statistically significant or not, one-way analysis of variance (ANOVA) was conducted and significant difference in self-esteem by schools, ( $F = 3.261$ ,  $p=0.012$ ) was found at 0.05 significance level.

Then, to be more specific, Post-Hoc test was computed by Tukey (HSD) method and the students' self-esteem were interpreted by using the multiple comparison method (See Table 5).

Table 5. Result of Tukey (HSD) Multiple Comparison for Self-esteem by Schools

(I) School	(J) School	Mean Difference (I-J)	<i>p</i>
School 2	Schools 1	-3.588	0.043*
	Schools 3	-3.950	.011*
	Schools 4	-3.349	.064
	Schools 5	-3.469	.094

Note \* significance at 0.05 level

It can be seen from the above table (5) that students in school 2 were significantly lower in self-esteem than the students in school 1 and school 3 at the 0.05 level.

To compare the self-esteem with respect to birth order, descriptive statistics was also executed.

Table 6. Descriptive Statistics for Self-esteem by Birth Order

Variable	Birth Order	<i>N</i>	Mean	<i>SD</i>
Self-esteem	Only One Child	85	82.44	9.97
	Eldest	155	79.49	9.13
	Middle	143	78.18	10.04
	Youngest	197	79.01	9.82

According to table 6, mean score of the students who were middle in birth order (78.18) was the least for self-esteem among others. And then, one-way analysis of variance (ANOVA) was conducted and it was found that there was significant difference in self-esteem by birth order.

Then, to be more specific, Post-Hoc test was computed by Tukey (HSD) method and the students' self-esteem were interpreted by using the multiple comparison method.

Table 7. Result of Tukey (HSD) Multiple Comparisons for Self-esteem by Birth Order

Birth Order (I)	Birth Order (J)	Mean Difference (I-J)	<i>p</i>
Only One Child	Eldest	2.945	.115
	Middle	4.253	.008**
	Youngest	3.425	.035*

Note \*\* Significance at the 0.01 level

\* Significance at the 0.05 level

Table 7 indicated that students' self-esteem was different according to birth order. The students who were only one child have better self-esteem than those who were middle and youngest.

### Conclusion

In this section, summary of findings and discussion were stated via specific objectives.

**Levels of Self-esteem among Grade 9 Students in Aungmyaytharzan Township:** It was found that self-esteem of Grade 9 students in Aungmyaytharzan Township was in moderate level. To improve their self-esteem, students should-

- ❖ Proud of their schoolwork.
- ❖ Do the best work they can.
- ❖ Pretty sure of themselves.
- ❖ Make up their mind without too much trouble.
- ❖ Try to be pretty happy.
- ❖ Like to be with other people.

**Difference in Self-esteem by Gender:** The independent sample *t* test was used to analyze gender difference on self-esteem and the result revealed that there was no significant difference in self-esteem by gender.

In general, female tend to be lower in self-esteem than the males (Harter, 1990; Quatman & Watson, 2001). However, like the present finding, there were other studies which found no significant gender

difference in self-esteem (Tam, Lee, Har & Pook, 2011; Mandura & Murray, 2000).

There may be several possible reasons for the difference between the current study results and prior research. The main factor impacting the current results includes the use of Self-esteem Inventory (SEI) developed by Coopersmith (2011). SEI utilized the four constructs of General Self-esteem, Academic Self-esteem, Peer Self-esteem and Home (Parent) Self-esteem for measuring self-esteem of any individual. According to the nature of Coopersmith's inventory, although males may favor in general self-esteem than females, girls tend to be higher in academic and peer self-esteem than boys.

Moreover, gender differences in self-esteem are influenced by socialization experiences and environmental factors; such as working experiences, relationship with friends, education have influenced on self-esteem (Kendler, Gardner & Prescott, 1998). Nowadays, females in Myanmar context became improving in socialization experiences, are playing an important role in high ranking personnel and having similar attention compare with boys in families.

**Difference in Self-esteem by School:** In comparing self-esteem of students by school, students from school (1) and (3) were found to be significantly higher in self-esteem than the students from school (2).

According to Mathis (2016), small class size led to improvement in student's self-esteem. The class size in school 1 (about 35) and school 3 (about 40) has smaller than that of school 2 (about 70). As a school factor, present study assumed the class size in schools seems to impact students' self-esteem. Therefore, to adapt school differences in self-esteem, teachers should take care of class size in planning to improve their students' self-esteem.

**Difference in Self-esteem by Birth Order:** In comparing the self-esteem with respect to birth order, it was found students who were only one child have better self-esteem than those who were middle and youngest.

Dealing with birth order, Coopersmith (1967) revealed that first born and the child without sibling tends to have higher self-esteem than others. Similarly, Wilson (2002) also found that first born children often have greater self-esteem than later born and only child.

This is because, according to Birth Order Theory by Adler (1928), youngest child is often “babied” or “pampered” more than other siblings. Pampering can lead to dependence, and as well as irresponsibility when the youngest enter adulthood. Middle child may perceive the least amount of attention from family and is internally compelled to find peace within the family. Over pampering and neglecting seem to make lower self-esteem of youngest children and middle ones.

So, based on finding of the present study, some suggestions were discussed for parents.

- ❖ Parents should know pampering can inflict self-esteem of their children.
- ❖ Parents should empathize within the confusion their teens are facing and help them grow with messages of encouragement and love.

In summary, it is hoped the present study to support learning environment by providing the basic information that can contribute to develop intervention program for self-esteem.

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## **Family Structure, Family Process and Socioemotional Adjustment of Adolescents in Sagaing Township**

Saw Sandi Oo<sup>1</sup> & Thida Nyunt<sup>2</sup>

### **Abstract**

The primary purpose of this study was to examine whether family structure and family process affect on the socioemotional adjustment of adolescents. In this study, quantitative method and questionnaires survey research design was used. The participants of the study were 900 adolescent students of Grade 9 and Grade 10 from selected Basic Education High Schools in Sagaing Township during 2014-2015 academic years. Adolescents' family structure and family process were examined by using Adolescents' Family Structure and Family Process Questionnaire which was based on the Adolescents' Family Process (AFP) Measure of Alexander T. Vazsonyi, Jeffrey R. Hibbert, and J. Blake Snider (2003) and adolescents' socioemotional adjustment was measured by using Adolescents' Socioemotional Adjustment Questionnaires adopted from Weinberger Adjustment Inventory (2014) validated by Tania Romo Gonzalez. The analysis was conducted by using descriptive analysis, independent sample t-test, one-way ANOVA analysis and Pearson product moment correlation. There was a significant difference in socioemotional adjustment of adolescents by gender. The family process differed across family structure and the socioemotional adjustment of adolescents had significant difference based on family structure. Pearson product moment correlation revealed that the family process had positive correlation with the socioemotional adjustment.

**Keyword:** Family Structure, Family Process, Socioemotional Adjustment, Adolescents

### **Introduction**

Family, one of the fundamental social institutions, plays a major role in socializing children from birth through at least adolescence and has a significant influence on children's developmental outcomes. Family structure refers to the combination of relatives that comprises a family. There are many types of family structures such as intact or nuclear family, extended family, lone-parent or single-parent family, divorced or separated family and stepfamily.

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Next to family structure, another concept of family is family process. Family process means the psychological, physiological and spiritual functions and relationships within the family units. Family process indicators describe the interactions between members of a family, including their relationships, communication patterns, time spent together, and satisfaction with family life. The family process plays a key role in socializing and shaping children to enable them to adjust to the demands of their social environment (Pergamit, Huang & Lane, 2012 cited in Alice Yuen Loke & Yim-wah Mak, 2013).

Socioemotional adjustment refers to one's understanding of self and others, capacity to appreciate people and environment, social interaction, self-control and awareness of social rules and conventions (Kausar & Nadia, 2008).

### **Main Aim of the Study**

The main aim of this study is to examine whether family structures and family process affect on the socioemotional adjustment of adolescents or not.

### **Definitions of the Key Terms**

**Family structure** means the composition of a family on a biological basis with regard to numbers of parents in a household and their relationship to the child involved (Quarmby, 2011).

**Family process** represents the interactions between members of a family, including their relationships, communication patterns, time spent together, and satisfaction with family life (Annie.E.Casey foundation, 2012).

**Socioemotional adjustment** is defined as the one's understanding of self and others, capacity to appreciate people and environment, social interaction, self-control and awareness of social rules and conventions (Kausar, 2008).

**Adolescents** represent the Grade 9 and Grade 10 students of Basic Education High Schools in Sagaing Township.

## **Review of Related Literature**

Family structure refers to the combination of relatives that comprise a family. According to its composition, there are various types of family structure such as nuclear or intact family, extended family, lone-parent family, single-parent family, divorced family, separated family, stepfamily, childless family and grandparent family. The nuclear family is the traditional type of family structure. This family type consists of two parents and children. It is the most admired form among the various types of family structure. The extended family structure consists of two or more adults who are related, either by blood or marriage, living in the same home. The single parent family and lone parent family generally refer to a family with one parent raising one or more children on his or her own. Divorced family is a family which appears because of parental divorce and one whereby one custodial parent and children together in a household.

The family process plays a key role in socializing and shaping children to enable them to adjust to the demands of their social environment. Adolescent perceptions of what goes on in their family can make them vulnerable to behavior problems (Alice Yuen Loke & Yim-wah Mak, 2013). Annie. E. Casey foundation (2012) described the family process indicators as the interactions between members of a family, including their relationships, communication patterns, time spent together, and satisfaction with family life.

Rakhsana Kausar and Nadia Shafique (2008) defined socioemotional adjustment as the one's understanding of self and others, capacity to appraise people and environment, social interaction, self-control, and awareness of social rules or convention. The inability to control and adjust emotional outbursts and the excessive inhibition of emotions are associated with a variety of personal and interpersonal problems, psychological disorders, and states of health.

The family systems theory is a theory introduced by Dr. Murray Bowen that suggests that individuals cannot be understood in isolation from one another, but rather as a part of their family, as the family is an emotional unit. There are several evidences emphasizing attachment theory as a highly relevant and well-validated framework for explaining individual variation in adjustment across the lifespan (Al-Yagon, 2011).

## Methodology

### Population and Sample

The participants of the study were chosen from the adolescent students of Grade 9 and Grade 10 from Basic Education High Schools in Saging Township. The total numbers of the participants are 900 students, 390 students in Grade 9 (185 males and 205 females) and 510 students in Grade 10 (215 males and 295 females).

### Research Design and Method

This study was conducted by using Descriptive research design and Quantitative Survey method.

### Instrumentation

Family Structure and Process Questionnaires which was based on the Adolescents' Family Process (AFP) Measure was used. For examining adolescents' socioemotional adjustment, questionnaires from Weinberger Adjustment Inventory (2014) was used. Family Process Questionnaires consisted of 30 items consisting five dimensions; family life satisfaction, time spent together, communication patterns, parental conflict and parents-adolescent relationship. The Adolescents' Socioemotional Adjustment Questionnaires included 28 items for four dimensions ; self-control, experiences of distress, and defensiveness of distress and consideration of others. Both of the Questionnaires are five-point Likert scale type.

## Data Analysis and Findings

Table 1. Classification of Adolescents' Family Structure

<b>Family Structure</b>	<b>Number</b>	<b>Percent</b>
Extended Family	419	46.6%
Nuclear Family	351	39%
Lone-parent Family	78	8.7%
Divorced Family	52	5.8%
Total	900	100%

According to Table 1, most adolescents in Sagaing Township live with extended and nuclear family structure and those who live with lone-parent family and divorced family are a little. In Myanmar's culture and tradition, most families are composed of many of others relatives.

Table 2. Descriptive Statistics for Family Process

<b>Scale</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
Family life satisfaction	23.78	3.341	9	30
Time spent together	21.01	3.598	10	30
Communication patterns	20.95	3.424	10	30
Parental conflict	22.77	3.614	9	30
Parent-adolescent relationships	20.39	3.397	8	30
Overall family process	108.90	12.227	68	143

According to Table 2, the adolescents' family process was high in Sagaing Township. Among the five variables of family process, parent-child relationship had got the least minimum score. This could be interpreted that when the children reached their adolescence, they want some degree of freedom to make own decision and so that they may have some conflict with their parents.

Table 3. Descriptive Analysis of Adolescents' Socioemotional Adjustment

<b>Scale</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
Self-control	25.05	4.003	11	35
Experience of Distress	22.53	3.682	10	35
Defensiveness of Distress	23.23	3.386	9	34
Consideration of Others	27.20	3.673	7	35
Socioemotional Adjustment Total	98.01	9.997	60	132

Table 3 revealed that the socioemotional adjustment of adolescents in Sagaing Township was high in nature. Moreover, the adolescents got high mean score in self-control and consideration of others dimensions than

the other two dimensions. So it could be interpreted that most adolescents were oriented and aware to the feelings of others and want to maintain their emotions in front of others.

Table 4. The Result of *t*-test for Gender Differences in Social Adjustment

<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>P</i></b>
Male	400	96.81	10.042	- 3.225***	898	.001
Female	500	98.96	9.867			

Note: \*\*\*. The mean difference is significant at the 0.001 level.

Based on the result of *t*-test, there was significant difference between male and female adolescents at 0.001 significant level. Therefore, it was found that female adolescents had higher socioemotional adjustment than male adolescents.

Table 5. ANOVA Result for Family Process of Adolescents According To Different Family Structure

<b>Family Process</b>	<b>Sum of Squares</b>	<b><i>df</i></b>	<b>Mean Square</b>	<b><i>F</i></b>	<b><i>p</i></b>
Between Groups	5709.999	3	1903.333	13.252***	.000
Within Groups	128684.183	896	143.621		
Total	134394.182	899			

Note; \*\*\*. Mean difference is significant at the 0.001 level.

Table 5 showed that there was significant difference of adolescents' family process according to the family structures in which they lived. To get more information about which family structure had better family process than others, post-hoc analysis was applied.

Table 6. Result of Tukey (HSD) Multiple Comparison for Adolescents' Family Process According To Different Family Structures

Category	(I)Family Structure	(J)Family Structure	Mean Differences(I-J)	<i>p</i>
Family Process	Extended Family	Nuclear Family	-.309	.984
		Lone-parent Family	2.765	.241
		Divorced Family	10.323 <sup>***</sup>	.000
	Nuclear Family	Extended Family	.309	.984
		Lone-parent Family	3.074	.171
		Divorced Family	10.632 <sup>***</sup>	.000
	Lone-parent Family	Extended Family	-2.765	.241
		Nuclear Family	-3.074	.171
		Divorced Family	7.558 <sup>**</sup>	.003
	Divorced Family	Extended Family	-10.323 <sup>***</sup>	.000
		Nuclear Family	-10.632 <sup>***</sup>	.000
		Lone-parent Family	-7.558 <sup>**</sup>	.003

Note. \*\*.The mean difference is significant at the 0.01 level.

Note. \*\*\*.The mean difference is significant at the 0.001 level.

According to Table 6, it was found that adolescents' who lived in divorced family had the lower in processing than the other three types of family structures. However, there was no significant difference among extended, nuclear, and lone-parent types of family structures in Sagaing Township.

Table 7. ANOVA Result for Adolescents' Socioemotional Adjustment According To Different Family Structures

Family Process	Sum of Squares	df	Mean Square	F	p
Between Groups	3014.233	3	1004.744	10.367***	.000
Within Groups	86834.712	896	96.914		
Total	89848.946	899			

Note; \*\*\*.Mean difference is significant at the 0.001 level.

Table 7 showed that there was significant difference in adolescents' socioemotional adjustment according to the family structures. To get more information, post-hoc analysis was applied.

Table 8. Result of Tukey (HSD) Multiple Comparison for Adolescents' Socioemotional Adjustment According To Family Structures

Category	(I)Family Structure	(J)Family Structure	Mean Differences(I-J)	p
Socio emotional Adjustment	Extended Family	Nuclear Family	-.114	.999
		Lone-parent Family	2.011	.348
		Divorced Family	7.575***	.000
	Nuclear Family	Extended Family	.114	.999
		Lone-parent Family	2.125	.311
		Divorced Family	7.689***	.000
	Lone-parent Family	Extended Family	-2.011	.348
		Nuclear Family	-2.125	.311
		Divorced Family	5.564**	.009
	(I)Family Structure	(J)Family Structure	Mean Differences(I-J)	p
	Divorced Family	Extended Family	-7.575***	.000
		Nuclear Family	-7.689***	.000
Lone-parent Family		-5.564**	.009	

Note. \*\* . The mean difference is significant at the 0.01 level.

\*\*\*. The mean difference is significant at the 0.001 level.

According to the result of Tukey (HSD) multiple comparison, socioemotional adjustment of adolescents' who lived in divorced family differed significantly from the extended family, nuclear family and lone-parent family. Therefore, like family process it could be interpreted that adolescents who lived in divorced family had the lower level of socioemotional adjustment than the other family structure.

Table 9. Relationship between Adolescent's Family Process and Socioemotional Adjustment

		<b>Socioemotional Adjustment</b>
Family Process	Pearson Correlation	.784***
	Sig.(2-tailed)	.000
	N	900

Note. \*\*\* .The mean difference is significant at the 0.001 level.

The result of the Table 9 showed that the adolescent's socioemotional adjustment was significantly correlated with family process ( $r=.784, p=0.000$ ). The correlation between socioemotional adjustment and family process was high positive relationship. Therefore, it could be interpreted that the better family process the adolescents experienced, the better socioemotional adjustment they had.

### **Conclusion and Suggestions**

The first social institution a child encounter is his family. So, the effect of family upon the child may be large to some extent. If a family has a favorable shadow upon a child, he will be grown up favorably. The value, customs and behaviour that a child experienced in his family is very important and influenced on his personality as well as his developmental outcomes. Moreover, the children could be experienced multiple living arrangement transitions from childhood to adolescence and these transitions can be detrimental to children's well-being. Especially, how the child attaches to his parents and family members and how they received familial interactions and functioning would be changeable according to the family structure in which he dwelled. As a consequence, the family process had a great impact upon the child psychological and socioemotional well-being.

In this study, the adolescents' family process was differed significantly across family structure and found that the adolescents in the divorced family are lower in family processing. This finding was consistent with the result of Christina D. Falci (1997). One aspects of family process, family life satisfaction of adolescents was significantly minimal in divorced family and this fact was similar to the finding of Mozghan Sepahmansour and Mohammadreza Bayat (2011).

Michal Al-Yagon and Mario Mikulincer (2004) suggested that gender of the adolescents did not affect socioemotional adjustment significantly. In this study, gender difference in socioemotional adjustment could be found and adolescent girls had better socioemotional adjustment than the adolescent boys. Besides, boys couldn't perform as well as girls in self-control and consideration of others components which are two aspects of socioemotional adjustment. This finding was in harmony with the suggestion of Rukhsansa Kausar and Nadia Shafique (2008) which explored that girls showed higher socioemotional control compared to boys.

In addition to family structure, family process also played an important factor in the socioemotional adjustment of adolescents. The socioemotional adjustment of adolescent was strongly related to the family process in which they attached. Qualified family process especially parent-adolescent relation and communication pattern could directly influence on the socioemotional adjustment of adolescents.

This research would be expected to contribute to the field of educational sociology and educational psychology and add some knowledge and implication for the parents and educators. And it would be also expected to have something valuable that can help and support the development of adolescents' social and emotional aspects which are very important in leading a purposeful and fulfilling life of adolescents.

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# **The Effect of Emotional Autonomy and Parent-Adolescent Communication on the Adjustment of Undergraduate Students in Sagaing District**

Thet Thet Mar<sup>1</sup> & Tint Swe<sup>2</sup>

## **Abstract**

Life is a constant changing process. People have conflict situations in life. Everyone should have an ability in adjusting process to get satisfactory conditions. Emotional autonomy and parent-adolescent communication is also important for adolescents' adjustment at college/university. So, this study is to examine the effect of emotional autonomy and parent-adolescent communication on the adjustment of undergraduate students in Sagaing District. Quantitative approach was used in this study. The participants were 585 university students (second year and final year). The questionnaires were used to collect data. According to descriptive statistics, students had enough emotional autonomy and satisfactory conditions in parent-adolescent communication and adjustment. The result of independent sample *t* test showed that there was significant difference in emotional autonomy, parent-adolescent communication and adjustment by gender. Moreover, the result of ANOVA showed that there was no significance difference in emotional autonomy by age. There was significant difference in parent-adolescent communication by university and no significant difference in parent-adolescent communication by age. There was significant difference in adjustment of students by university and age. The result of correlation analysis revealed that there was significant relationship among emotional autonomy, parent-adolescent communication and adjustment of students. The better the parent-adolescent communication and adjustment in university, the weaker the emotional autonomy. The result of multiple regression showed that emotional autonomy and parent-adolescent communication can predict 17% to the adjustment of students.

**Keywords:** emotional autonomy, adjustment, communication

## **Introduction**

### **Importance of the Study**

Adjustment is important for human beings and everyone has to adjust with everything in his or her environment. Especially adolescents who attend university or college meet various kinds of people and they

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adjust with different kinds of people. Only adjusting process will be fine, their daily lives will be convenient and they will learn throughout their lives successfully. Home, family and university or college plays a pivotal role in the adjustment of most adolescents. The process of adjustment starts right from the birth of the child and continues till his death. Each person constantly strives to meet his needs and reach his goals. At the same time he is under pressure of the environment to behave in certain ways. There are many factors affecting students' well-adjusted in college/university life; for example, stress, peer pressure, worry, conflict, parent-adolescent communication and emotional autonomy in adolescents.

Highly emotionally autonomous adolescents who also perceive their parents as being supportive are more likely to show positive patterns of adjustment and competence than those with higher levels of autonomy but low levels of connectedness to parents (Fuhrman & Holmbeck, 1995; Ingoglia, Lo Coco, Pace, Zappulla, Liga, & Inguglia, 2004; Lamborn & Steinberg, 1993). The reason why high scores of emotional autonomy as measured by the EAS are related with negative psychosocial outcomes, such as higher probability to be engaged in delinquent activities (Lamborn & Steinberg, 1993), and higher feelings of insecurity (Matos, Barbosa, Almedia, & Costa, 1999; as cited in Cricchio, M. G. L., Coco, A. L., Ingoglia, S., Liga, F., Maria, R. D., Inguglia, C. & Musso, P. 2016). To prevent serious delinquent activities, parents need to control and care about their adolescents.

Therefore, parental support is necessary for the development of emotional autonomy and positive patterns of adjustment. Only there is better communication between parent and adolescence, satisfactory conditions will appear in their environment. Lack of positive communication leaves adolescents in a difficult situation and unable to handle various adjustment problems they may encounter at home or outside (as cited in Bireda, A. D. 2013). Communication between children and their parents is a crucial factor to have a great effect on children's growth, development and socialization process, and to establish good attitudes and proper values.

So, parent-adolescent communication is necessary to study to know how deeply it is related to the emotional autonomy and adjustment of adolescents. And there were no studies conducted regarding parent-adolescent communication, emotional autonomy and adjustment of

undergraduate students. Thus, it was needed to study how these three variables relate each other. For these reasons, the effect of emotional autonomy and parent-adolescent communication on the adjustment of undergraduate students was investigated in this study.

**Purpose of the Study:** The main purpose of the study is to examine the effect of emotional autonomy and parent-adolescent communication on the adjustment of undergraduate students in Sagaing District.

### **Scope of the Study**

It was geographically limited to Sagaing District. A total of 585 undergraduate students (second year and final year students) were participated in this study.

### **Definition of Key Terms**

**Adjustment** means a state of harmonious relationship between a person and his environment. (Duncan, 1949)

**Emotional autonomy** is defined in terms of relationships with others and includes relinquishing dependencies and individuation from parents. (Steinberg and Silverberg, 1986)

**Communication** can be described as relatively concrete behaviours, which are open to observation and description. It focuses upon behaviours such as discussion, open expression of affection, nagging and readiness to listen (Barnes and Olson, 1985; Grotevant & Cooper, 1986).

## **Literature Review**

### **Multi-faceted Theory of Students Adjustment (Baker & Siryk, 1989)**

Baker and Siryk (1986) developed an instrument designed to assess students' adjustment to college, the Student Adaptation to College Questionnaire (SACQ). These authors recognized the multifaceted nature of college adjustment. In addition to overall experience, Baker and Siryk (1986) (as cited in Stoklosa, A. M. 2015) documented various aspects of adjustment, including academic adjustment, social adjustment, personal-emotional adjustment, and institutional adjustment. Each area of adjustment has been translated into a subscale within the SACQ. Among these four subscales, I will study only two subscales. The Academic Adjustment

subscale assesses students' success in coping with various academic demands of college, such as their academic performance, seeking academic support when needed, and their motivation and confidence to do well. The Social Adjustment subscale assesses students' demands with interpersonal-societal demands of college, such as developing satisfying relationships with others in college and involvement in social activities.

### **Emotional Autonomy (Steinberg & Silverberg, 1986)**

Steinberg and Silverberg (1986) identified four aspects of emotional autonomy. *De-idealization of parents* is gaining the understanding that parents are not all-knowing or all-powerful, as well as the ability to see both positive and negative characteristics in parents (Blos, 1979; Steinberg, 2005). This is typically the first sign of autonomy development in early adolescence (Steinberg & Silverberg, 1986). *Seeing parents as people* is a dimension of autonomy that develops later, possibly into emerging adulthood (Smollar & Youniss, 1985; Steinberg & Silverberg, 1986), requiring the greater social-cognitive functioning involved to understand not only that a parent isn't perfect, but also that a parent is an individual who may behave differently in different contexts. *Non-dependency on parents*, a third facet of autonomy, also increases throughout adolescence (Steinberg & Silverberg, 1996), reflecting the ability to depend on oneself rather than on parents. Finally, *individuation* is a central feature of autonomy. This sense of being an independent person (Blos, 1967) is gained by shedding childish dependencies on parents and accepting personal responsibility for one's actions (McElhaney et al., 2009). Individuation also increases with age (Steinberg & Silverberg, 1986).

### **System Theory**

Family systems theory is based on the notion that family members strive to maintain a sense of equilibrium in their relationships with each other.

Open communication consists of the free flowing exchange of factual and emotional information and positive relationship expressions within the family. Families that have open communications experience minimal or limited constraints. This type of communication is vital if the family system is to adapt to environmental and personal change (Barnes & Olson, 1982).

Problem communication is distinguished by the unhealthy restriction of information within the family caused by the distortion and denial of individual expression (Barnes & Olson, 1982; Rosenblatt, 1994). Family members exhibit problem communication when they are unable or unwilling to express thoughts and feelings. Their communication is constrained.

### Methodology

Table 1. Sample of the Study

No.	Universities	Second Year		Final Year		Total
		Males	Females	Males	Females	
1	University 1	48	53	52	49	202
2	University 2	46	50	52	53	201
3	University 3	41	50	46	45	182
Total		135	153	150	147	585

### Research Method

Quantitative research design and descriptive survey method were used.

### Instrumentation

To get the necessary information, three instruments were used in this study. They are Emotional Autonomy Scale (EAS; Steinberg & Silverberg, 1986), Parent-Adolescent Communication Scale (Barnes & Olson, 1982) and Student Adaptation to College Questionnaire (SACQ; Baker & Siryk, 1984). The EAS scale included 20 items with four subscales. Parent-Adolescent Communication Scale consisted of 20 items with two subscales. The SACQ included 42 items with two subscales. All items in three questionnaires were Likert Type and each followed by four responses: strongly agree, agree, strongly disagree and disagree.

### Data Analysis and Findings

Table 2. Descriptive Statistics for Emotional Autonomy

Dimensions	N	Minimum	Maximum	Mean %	S.D
De-idealization	585	25	95	57.62	11.317
Seeing parent as people	585	33	96	62.70	9.604
Non-dependency	585	25	94	55.89	10.807
Individuation	585	40	100	71.51	10.003
Emotional Autonomy	585	28	70	49.82	4.975

According to Table 2, students in Sagaing District were satisfactory in emotional autonomy because the mean percentage value of students' emotional autonomy was between 44.85 and 54.79.

Table 3. Emotional Autonomy of University Students by Gender

Variable	Gender	Mean%	<i>t</i>	<i>df</i>	<i>p</i>
Emotional Autonomy	Male	51.11	.061***	583	.000
	Female	48.59			

Note; \*\*\*. The mean difference is significant at the 0.001 level.

The result of Table 3 revealed that, the mean percentage value of male students was higher than that of female students. It was interpreted that males had higher emotional autonomy than females.

There was no significant difference in emotional autonomy by age.

Table 4. Descriptive Statistics for Parent-Adolescent Communication

Dimensions	N	Minimum	Maximum	Mean%	S.D
Open Communication	585	42	100	73.51	10.114
Problem Communication	585	32	89	59.69	10.144
Parent-Adolescent Communication	585	32	72	54.94	6.780

Table 4 showed that the mean percentage value of university students in open communication dimension was higher than that of students in problem communication dimension. Thus, it could be said that parent-adolescent communication of university students in Sagaing District was satisfactory.

Table 5. Parent-Adolescent Communication by Gender

Variable	Gender	Mean%	<i>T</i>	<i>df</i>	<i>p</i>
Parent-Adolescent Communication	Male	53.72	-4.321***	583	.000
	Female	56.10			

Note; \*. The mean difference is significant at the 0.001 level.

The result of *t* test revealed the mean percentage value of female students was higher than that of male students. It meant that females communicated more with their parents than males. Females more disclosed with their parents than males.

Table 6. ANOVA Result for Parent-Adolescent Communication by University

Variable	University	Sum of Squares	<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Parent-Adolescent Communication	Between Groups	305.944	2	152.972		
	Within Groups	26540.962	582	45.603	3.354*	.036
	Total	26846.906	584			

Note; \*.The mean difference is significant at the 0.05 level.

Table 7. Tukey Result for Parent-Adolescent Communication by University

Variable	University (I)	University (J)	Mean Difference (I-J)	<i>p</i>
Parent-Adolescent Communication	University 1	University 2	-1.711*	.030
		University 3	-1.148	.220

Note; \*.The mean difference is significant at the 0.05 level.

According to the result, students from university (2) had more parent-adolescent communication than students from university (1).

There was no significant difference in parent-adolescent communication of university students by age.

Table 8. Descriptive Statistics for Adjustment by Dimensions

Dimensions	N	Minimum	Maximum	Mean%	S.D
Social Adjustment	585	46	98	73.63	6.907
Academic Adjustment	585	31	92	67.50	7.265
Adjustment	585	82	163	123.70	10.876

Table 8 showed that the mean percentage value of students' adjustment was between 112.83 and 134.57. Therefore, it was concluded that the overall adjustment of students were satisfactory.

Table 9. Adjustment of University Students by Gender

Variable	Gender	Mean%	<i>t</i>	<i>df</i>	<i>p</i>
Adjustment	Male	122.17	-3.350***	583	.001
	Female	125.16			

Note; \*. The mean difference is significant at the 0.001 level.

There was significant difference between males and females in adjustment. It meant that females were better adjusted than males. This finding was consistent with previous finding of Roy, Ekka. (2010).

Table 10. ANOVA Result for Adjustment by University

Variable	University	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Adjustment	Between Groups	2630.453	2	1315.227	11.519***	.000
	Within Groups	66451.386	582	114.178		
	Total	69081.839	584			

Note; \*\*\*.The mean difference is significant at the 0.001 level.

Table 11. Tukey Result for Adjustment by University

Variable	University (I)	University (J)	Mean Difference (I-J)	<i>p</i>
Adjustment	University (1)	University (2)	-4.268***	.000
		University (3)	-4.647***	.000

Note; \*\*\*.The mean difference is significant at the 0.001 level.

The result revealed that students from university (2) and (3) were significantly better in overall adjustment than those from university (1).

Table 12. ANOVA Result for Dimension of Adjustment by Age

Dimension	Age	Sum of Squares	df	Mean Square	<i>F</i>	<i>p</i>
Academic Adjustment	Between Groups	333.604	2	166.802	3.184*	.042
	Within Groups	30486.924	582	52.383		
	Total	30820.528	584			

Note; \*.The mean difference is significant at the 0.05 level.

Table 13. Tukey Result for Academic Adjustment by Age

Variable	Age (I)	Age (J)	Mean Difference (I-J)	<i>p</i>
Academic Adjustment	Under 20	Between 20 and 22	1.478*	.046
		Over 23	1.741	.399

Note; \*. The mean difference is significant at the 0.05 level.

According to Table 13, students of age under 20 were better in academic adjustment than those from age between 20 and 22. This result was agreed with the finding of Aderi, Jdaitawi & Ishak (2013).

Table 14. Relationship among Emotional Autonomy, Parent-Adolescent Communication and Adjustment of University Students

Variables	PA	AD
EA	-.546**	-.259**
PA	1	.397**

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

EA = Emotional Autonomy

PA = Parent-Adolescent Communication

AD = Adjustment

Table 14 showed that emotional autonomy of students was negatively correlated with parent-adolescent communication ( $r = -.546$ ,  $p < .001$ ) and adjustment ( $r = -.259$ ,  $p < .001$ ). It can be said that high emotional autonomy without parental support can cause delinquent activities and does not facilitate parent-adolescent communication and adjustment of students. In other words, the better the parent-adolescent communication and adjustment in university, the weaker the emotional autonomy. Parent-adolescent communication was positively correlated with university students' adjustment ( $r = .397$ ,  $p < .001$ ). It can be said that students who have positive parent-adolescent communication can adjust well in their university.

Table 15. Results of Multiple Regressions on Emotional Autonomy, Parent-Adolescent Communication and Adjustment of Students

Model	Variables	B	Beta	t	p	R	R <sup>2</sup>	Adjusted R <sup>2</sup>	F
1	(Constant) AD	100.680		12.691	.000	.422	.178	.170	20.889
	De	-.580	-.121**	-2.697	.007	<b>R<sup>2</sup> = 17%</b> <b>AD=100.680-</b> <b>.580De+.612Op+.366Pro</b>			
	Op	.612	.296***	6.401	.000				
	Pro	.366	.096*	2.146	.032				

According to the result, emotional autonomy and parent-adolescent communication was a significant predictor of adjustment,  $F(6,578) = 20.889$ ,  $R^2 = .178$  and  $p < .001$ . Review of the beta weights specified that only three variables significantly contributed to the model. This model accounted for 17% (adjusted  $R^2$ ) of the variance in adjustment of students. The equation for this model was as follows:

$$AD = 100.680 - .580De + .612Op + .366Pro$$

AD = Adjustment, De = De-idealization

Op = Open Communication, Pro = Problem Communication

Note; Figure for this model was not described.

### Conclusion

In this study, males had higher emotional autonomy than females. The emotional autonomy of university students was no significant difference according to their age and university. Females communicated more with their parents than males. There was significant difference in parent-adolescent communication by university. Parent-Adolescent communication did not change according to their age. Females were better adjusted than males. There was significant difference among universities in adjustment of students. There was significant difference in academic adjustment by age. Emotional autonomy of students was negatively correlated with parent-adolescent communication and adjustment. Parent-Adolescent communication was positively correlated with adjustment. Emotional autonomy and parent-adolescent communication can predict 17% to the adjustment of students.

### **Suggestions**

Results indicated that emotional autonomy was negatively correlated with adjustment of students and parent-adolescent communication was positively correlated with adjustment of students. According to Lamborn and Steinberg, adolescents high in emotional autonomy but low in parental support had more problematic adjustment. Parents play a vital role in adolescents' development. Parents encourage them to redefine their roles and seek an equalitarian parent-adolescent relationship. The growing sense of autonomy and independence promotes adolescents to exercise more control over their thoughts, emotions and activities and to be more critical of their parents' values and beliefs. Developing and using emotional autonomy is good for students but used in negative way lead to maladjusted person. So, parent should support adolescents in an effective way to develop emotional autonomy. It is hoped that the current study will serve a useful source for emotional autonomy, parent-adolescent communication and adjustment with the aim of impressing cognitive maturity adolescents and developing identity.

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# **A Study on the Effect of Parenting Styles on Learning Autonomy of Grade 10 Students in Banmaw Township**

May Nandar Hlaing<sup>1</sup> & Thida Nyunt<sup>2</sup>

## **Abstract**

The main purpose of this study was to investigate the effect of parenting styles on learning autonomy of Grade 10 students in Banmaw Township. A total of 600 (male=288, female=312) Grade 10 students were randomly selected in this study to assess their parents' parenting styles and their learning autonomy. To find out students' perceptions of parents' parenting styles and their learning autonomy, Parenting Styles Questionnaire (PSQ) developed by Robinson, Mandelco, Olsen, and Hart (1995) and Learning Autonomy Questionnaire (LAQ) developed by Zhang and Li (2004) were used. Descriptive statistics, cross-tabulation analyses, Independent samples *t* test, ANOVA, exploratory analyses were used for data analysis. Descriptive analyses for PSQ showed that most of the parents practised authoritative parenting. The result of cross-tabulation analyses also confirmed that father's education can dominate their parenting styles but mother's are not. Then, independent sample *t* test pointed out that there was significant difference in gender for learning autonomy of Grade 10 students. Moreover, in line with ANOVA result, a significant mean difference in learning autonomy of Grade 10 students was found according to their school locations. In addition, exploratory analyses indicated that authoritative parents can foster their children's learning autonomy. In this study, all kind of parenting styles and learning autonomy were significantly correlated with one another.

**Keywords:** Parenting Styles, Learning Autonomy

## **Introduction**

From the Educational Sociology point of view, the individual must also constantly learn to fit into a new society that is itself constantly changing in some manner. What the child learns from the beginning of his life to his adulthood are initially from his parents and family. Therefore, the family is the first society and model for child's life.

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Students' academic interest, success or failure is not influenced by only individual intelligence or abilities (Goodenow, 1993), but also by their capacity to control (autonomy) and contextual factors. Learning is most optimal when the learner is intrinsically motivated to engage and assimilate the information. Therefore, parenting styles and learning autonomy is essential factor to overcome the difficulties and failures of adolescents who are the leaders of colorful future.

### **Purpose of the Study**

The major purpose is to investigate the effect of parenting styles on their children' learning autonomy of Grade-10 students in Banmaw Township.

### **Definitions of Key Terms**

**Parenting style:** Parenting style is the way parents interact and deal with their children in everyday life events or is also defined standards and demands set by parents for their children and the responses to and communication with their children (Pong, Hao and Gardner, 2005).

**Learning Autonomy:** Learning autonomy is the learner's willingness and capable of taking charge of his own learning. The learner should be capable of determining the objectives; defining the contents and the progressions; selecting methods and techniques to be used; monitoring the procedure of acquisition; evaluating what has been acquired (Henri Holec, 1981).

### **Review of Related Literature**

According to Steinberg et al. (1992), the way a child is generally treated in their home (or in the parenting style of a child's parents) can affect the child's engagement in school. Parents affect a child's cognitive and social competence and, academic achievement, through their behaviors involved in parenting. Therefore, parenting styles is one of the fundamental important for child's developing.

Parenting styles are collections of parental attitudes, practices, and non-verbal expressions that characterize the nature of parent-child relationships. According to Baumrind, all parenting styles can be classified as containing some degree of two factors: parental control-degree of control over child's behavior, punitive or verbal discipline, and demands; and parental warmth – affection, degree of emotional support and responsiveness.

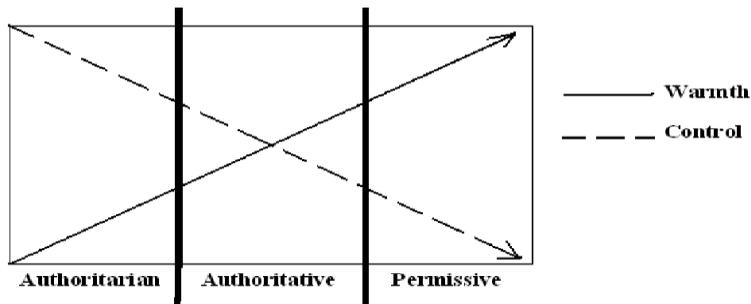


Figure 1. Baumrind's Model of Parenting Prototypes

The authoritarian and permissive parenting styles are considered to be the two poles of a continuum, whereas the authoritative style lies somewhere in the middle. Baumrind's parenting styles have been found to predict child well-being in terms of social competence, academic performance, psychosocial development, and problem behavior. In general, children do better in life if they come from a home in which there is positive (authoritative) parenting. They have good self-esteem and self-confidence, and have lower levels of anxiety and depression. They function better socially, academically. They tend to become respectful and responsible adults. Children from authoritarian homes have both low self-esteem and self-confidence, high levels of anxiety and depression, and tend to have problems interacting with others. Their academic achievement is usually average and they have some behavior problems. They also have persistent problems with authority. Children from permissive homes have high self-esteem and self-confidence, and reduced levels of anxiety and depression, but they tend to do badly at school, show a lot of behavior problems, and lack respect and responsibility.

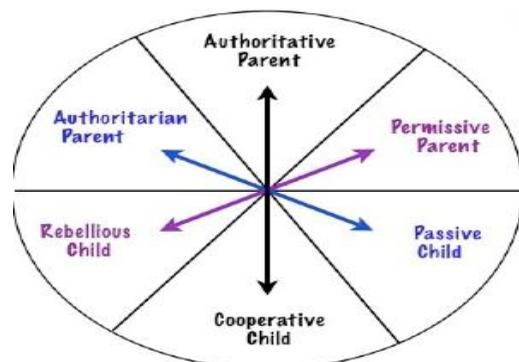


Figure 2. Baumrind's Parenting Styles to child's outcome

During adolescence autonomy development typically accelerates because of rapid physical and cognitive changes, expanding social relationships, and additional rights and responsibilities. Little (1991) defined autonomy as a capacity – for detachment, critical reflection, decision-making, and independent action. This capacity depends on two main components – ability and willingness.

**Multiple dimensions:** Steinberg (1990; Sessa & Steinberg, 1991; Steinberg & Silverberg, 1986) has described three dimensions of autonomy: behavioral, cognitive, and emotional. Behavioral autonomy has been defined as active, independent functioning including self-governance, self-regulation of behavior, and acting on personal decisions (Feldman & Quatman, 1988; Feldman & Rosenthal, 1991; Sessa & Steinberg, 1991). Cognitive autonomy most often has been defined as a sense of self-reliance, a belief that one has control over his or her own life, and subjective feelings of being able to make decisions without excessive social validation (Sessa & Steinberg, 1991). The third dimension, emotional autonomy, has been defined as a sense of individuation from parents and relinquishing dependence on them.

Baltes and Silverberg (1994) proposed that healthy autonomy might encompass psychosocial functioning in many domains, including competence in academic, work, and social domains; emotion regulation and impulse control; leadership; and positive self-esteem and identity.

### **Method and Procedure**

A survey method was used in this study with quantitative perspective.

#### **Participants**

A total of 600 (male=288, female=312) Grade 10 students with an age range of 14+ were randomly selected from Banmaw Township.

#### **Instruments**

Students' report of Parenting Styles Questionnaire (PSQ) consisted of 33 items relevant to Grade 10 with 3 dimensions: authoritative, authoritarian, and permissive. And, Learning Autonomy Questionnaire (LAQ) was also a 35 items - five points Likert Scale instrument. After piloting, the 35 items questionnaire was reduced to 30 items questionnaire as a reliable tool for the present study.

## Procedure

After conducting the pilot testing, the Grade 10 students from Banmaw Township were distributed and collected the questionnaires.

## Results and Findings

Apart from the three main patterns (authoritative, authoritarian and permissive), there were parents who preferred the multi-styles among Baumrind's parenting typology. Descriptive analysis was conducted to reveal each of parenting styles practised by parents.

Table 1. Number and Percent for Parenting Styles Practised by Parents

Type of parenting styles	Frequency	Percent (%)
Authoritative	351	58.5
Authoritarian	124	20.7
Permissive	24	4.0
Authoritative & Authoritarian	57	9.5
Authoritative & Permissive	7	1.2
Authoritative, Authoritarian & Permissive	37	6.1
Total	600	100.0

According to the above table, the results showed that the maximum number of parents who preferred authoritative style was 351 (58.5%) and the second maximum number of parents who preferred authoritarian was 124 (20.7%). Very few number of parents 24 (4%) preferred permissive styles. Thus, the most commonly used parenting style upon Grade 10 students of parents in Banmaw Township was Authoritative parenting. However, a considerable number of parents were practiced multi-styles among the Baumrind's three parenting styles. Accordingly, some parents preferred; authoritative & authoritarian (57, 9.5%), authoritative & permissive (7, 1.2%) and authoritative, authoritarian & permissive (37, 6.1%). To analyze whether father's education can dominate their parenting styles, cross-tabulation analyses was conducted.

Table 2. Frequency and Percentages of Parenting Styles with Respect to Fathers' Education Level

Parenting Styles	Father's Educational Level					
	illiterate	Primary	Middle	High	Graduate	Post-graduate
Authoritative	0 0.0%	14 19.7%	73 38.8%	215 75.7%	46 93.9%	3 100.0%
Authoritarian	3 60.0%	39 54.9%	60 31.9%	21 7.4%	1 2.0%	0 0.0%
Permissive	1 20.0%	4 5.6%	13 6.9%	6 2.1%	0 0.0%	0 0.0%
Authoritative & Authoritarian	0 0.0%	3 4.2%	24 12.8%	30 10.6%	0 0.0%	0 0.0%
Authoritative & Permissive	0 0.0%	0 0.0%	2 1.1%	5 1.8%	0 0.0%	0 0.0%
Authoritative, Authoritarian & Permissive	1 20.0%	11 15.5%	16 8.5%	7 2.5%	2 4.1%	0 0.0%

The results of Table 2 stated that the number of parents whose education level is illiterate preferred authoritarian were three (60.0%) where as one (20%) preferred permissive. Among the primary school graduate parents, majority of parents preferred authoritarian (39, 54.9%), some of them preferred authoritative (14, 19.7%), and permissive (4, 5.6%).

Among the parents who completed middle school level education, most parents preferred authoritative (73, 38.8%), following with authoritarian (60, 31.9%), and permissive (13, 6.9%). Most of the high school level graduated parents preferred authoritative (215, 75.7%), and some preferred authoritarian (21, 7.4%), and permissive (6, 2.1%).

Among the graduate level parents, most parents (46 in number, 93.9%) preferred authoritative, and one (2.0%) preferred authoritarian. Among the parents of post-graduate level, all of the parents (3, 100%) preferred authoritative. Some parents prefer multi-styles. This result revealed that the parents who have gained the higher level of education

preferred authoritative parenting to practice or bring up their children. To analyze whether mother's education can dominate their parenting styles, cross-tabulation analyses was conducted.

Table 3. Frequency and Percentages of Parenting Styles with Respect to Mothers' Education Level

Parenting Styles	Mother's Educational Level					
	illiterate	Primary	Middle	High	Graduate	Post-graduate
Authoritative	4 57.1%	102 54.0%	139 57.0%	70 60.3%	34 81.0%	2 100%
Authoritarian	2 28.6%	44 23.3%	53 21.7%	20 17.2%	5 11.9%	0 0.0%
Permissive	0 0.0%	5 2.6%	11 4.5%	7 6.0%	1 2.4%	0 0.0%
Authoritative & Authoritarian	0 0.0%	20 10.6%	26 10.7%	10 8.6%	1 2.4%	0 0.0%
Authoritative & Permissive	0 0.0%	3 1.6%	3 1.2%	1 0.9%	0 0.0%	0 0.0%
Authoritative, Authoritarian & Permissive	1 14.3%	15 7.9%	12 4.9%	8 6.9%	1 2.4%	0 0.0%

According to table 3, the percentages of most mothers who had different education levels used authoritative parenting styles. Therefore, all of parents who have different education levels practice authoritative parenting. These results revealed that the association between mothers' education level and their parenting style was found weak.

To explore the students' learning autonomy is good or not, descriptive analysis was conducted.

Table 4. Descriptive Analysis for Learning Autonomy of Grade 10 Students

<b>Variables</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
Learning autonomy	600	111.19	9.239	63	138

This result revealed that students' learning autonomy was high enough to manage for their learning.

Table 5. The Result of Independence Sample *t*-test for Gender Differences in Students' Learning Autonomy

<b>Variable</b>	<b>Gender</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>P</i></b>
Learning Autonomy	Male	288	109.88	9.464	-3.351***	598	.001
	Female	312	112.40	8.872			

Note: \*\*\* mean difference is significant at the 0.001 level.

According to the above table, there was significant difference in learning autonomy by gender. The effect size ( $d=.3$ ) was small to median or typical according to Cohen (1988). And then, the students were grouped according to their location: urban, suburban and rural. Descriptive analysis was computed.

Table 6. Comparison of Student's Learning Autonomy by Locations

<b>Location</b>	<b>Groups</b>	<b>Frequency</b>	<b>Mean</b>	<b>SD</b>
Urban	High	31	111.70	8.879
	Moderate	154		
	Low	26		
Suburban	High	34	112.12	9.644
	Moderate	142		
	Low	28		
Rural	High	26	109.53	9.005
	Moderate	121		

Location	Groups	Frequency	Mean	SD
	Low	38		
Total		600	111.19	9.239

To make sure these differences, one-way analysis of variance (ANOVA) was conducted and the result revealed that there was significant difference in students' learning autonomy by their location ( $F(2,597) = 4.383$ ) at 0.05 levels.

Table 7. Result of Tukey HSD Multiple Comparison for Students' Learning Autonomy by School Locations

(I)Location	(J)Location	Mean Difference (I – J)	P
Urban	Rural	2.174*	.050
Suburban	Rural	2.590*	.016
Rural	Urban	-2.174*	.050
	Suburban	-2.590*	.016

Note: \* The mean difference is significant at the 0.05 level.

According to the Table, the result revealed that the students from urban were different with students from rural area in their learning autonomy ( $p=.05$ ,  $d=.24$ ). It was also apparent that students from suburban were significantly different in learning outcomes with students from rural ( $p<.05$ ,  $d=.3$ ). However, learning autonomy of students from urban was not different those of students from suburban area.

Table 8. Descriptive Statistics of Learning Autonomy by Parenting Styles

Parenting Styles	N	Minimum	Maximum	Mean	SD
Authoritative	351	63	135	112.31	9.170
Authoritarian	124	87	138	109.09	8.807
Permissive	24	90	122	108.42	8.851
Authoritative & Authoritarian	57	81	134	112.65	9.001

Parenting Styles	N	Minimum	Maximum	Mean	SD
Authoritative & permissive	7	89	119	108.14	10.792
Authoritative, Authoritarian & permissive	37	88	128	107.81	9.635

In Table 8, the mean scores of learning autonomy of the students from authoritative parents, and multi parenting of authoritative and authoritarian parents’ were higher than that of other types of parenting were. Thus, it can also be said these two parenting were highly related to students’ learning autonomy.

In Figure 3, Os refers to outlier and \*s refers to asterisks. The number next to the ‘O’ indicated which participants these scores belong to. As indicated by the Os and \*s at the bottom of the whiskers, the boxplots for each parenting style showed there were outliers (i.e., there were students who got less than expected scores). The “O” at the top of the whisker also indicated which participants belong to extreme scores. Moreover, the median line in the boxes were not in the middle of the boxes and the whiskers were not approximately the same length except authoritative, and multi parenting of authoritative and authoritarian. Thus, learning autonomy for other parenting styles were quite skewed and not normal.

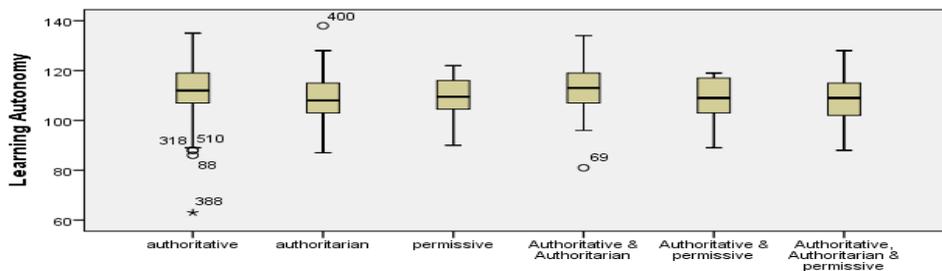


Figure 3. Boxplots for Learning Autonomy on Parenting Styles

## Conclusion

The finding of the study indicated that students perceived most common practiced parenting style is authoritative parenting style. Therefore, it can be said that students in Banmaw Township have appropriate independence, confidence and well-adjusted to face the real world. And it can also be interpreted that parents who have high education level preferred authoritative. And, if the higher education level the father has, the more they tend to practice authoritative parenting style. But, no significant differences were found among mother's education level on parenting styles.

The research finding for learning autonomy of the gender comparison revealed that females have high learning autonomy than males at 0.001 level. Also, ANOVA results showed that students' learning autonomy differed significantly with their location (urban, suburban and rural) ( $F(2,597) = 4.383, p < .05$ ). By using Tukey (HSD) test, a significant mean difference on learning autonomy was found between urban and rural, and suburban and rural. It can be interpreted that student's autonomy in learning can alter according to the environment where they are brought up. In this study, authoritative and multi-styles of authoritative and authoritarian are the most highly linked to students' learning autonomy and it can be foster children to possess all-round development.

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## **An Investigation into the Academic and Emotional Functioning of Grade 9 Students in Katha Township**

Swe Thu Mon<sup>1</sup> & Aye Aye San<sup>2</sup>

### **Abstract**

The main aim of the study was to investigate academic and emotional functioning of Grade 9 Students in Katha Township. This study was conducted from the point of motivation in academic setting. So, student's academic functioning was comprised students' motivation to learn (competence beliefs and values) and achievement. Emotional functioning was examined by frequent feeling feelings of depressive symptom and anger. Academic achievements were obtained by three monthly test scores. This study was based on expectancy-value theory. Descriptive research design and survey method were used in this study. Data were randomly collected from 531 Grade 9 students from two high schools and one middle school. The result of descriptive analysis were absolutely satisfactory. The result of t test showed there were gender differences in academic and emotional functioning and school perception. ANOVA results for the three selected schools revealed that middle school students excelled in academic and emotional functioning than the students from another two high schools students. Accordingly, the results of correlation analysis showed that students' academic and emotional functioning showed large affect size upon academic achievement,  $r=.53$  at  $p<0.001$ . The predictive measure of simple regression pointed out that 28% of variance in achievement was explained by academic and emotional functioning. Therefore, it can be clearly seen the importance of academic and emotional functioning for doing research.

**Keywords:** Academic functioning, Emotional functioning

### **Introduction**

Students' motivation to learn not only predicts their actual effort, learning, and achievement in school, it also represents one important intrapsychic process that links academic functioning with emotional functioning. Two specific motivational processes, adolescents' beliefs about their competence as a learner and their valuing of school, are important to emotional functioning. For instance, studies on the self indicate that children's confidence in their academic abilities can promote feelings of

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general self-worth (cited in Roeser, Eccles , and Sameroff ,1998). Hence, self-efficacy in school is associated with academic and emotional functioning.

Dryfoos (1994) estimated that, by age 15, approximately one child in four engages in a high risk lifestyle characterized by poor school motivation and academic failure, truancy, drug use, depressed mood, and engagement in other risky behaviors (cited in Roeser et al., 1999). Brackney and Karabenick (1995) also found psychological distress adversely impacted student's academic self-efficacy beliefs and ability to effectively regulate a study environment. It was these factors that mediated the negative impact of students' distress on their actual achievement (cited in Roeser, Eccles, and Sameroff ,1998).

### **Main objective of the Study**

The main aim of the study is to investigate the academic and emotional functioning of Grade-9 students.

### **Scope and Procedure**

Questionnaire that assessed Academic and Emotional Functioning of Grade-9 students were used. Descriptive research design and survey method will be used for this study. Data were collected during regularly scheduled class time from Grade-9 students from two high schools and one middle school. Three monthly test scores were used by finding average as the empirical measure of academic achievement. For analyzing the obtained data, SPSS 16.0 will be used. Finally, interpretation findings and conclusion will be done.

### **Definitions of the Key Terms**

**Academic functioning** aims students' motivation to learn and achievement. Academic functioning or school functioning was assessed by measures of student's academic motivation and academic performance.

**Emotional functioning** is defined by the frequency of symptoms of distress which students experienced.

### **Review of Related Literature**

Studies on the relationship between students' emotional distress and achievement behavior, researchers found that students with frequent feelings of internalized distress (e.g., sadness, anxiety, depression) show diminished academic functioning and those with externalized distress (e.g., anger, frustration, and fear) exhibit school difficulties including learning delays and poor achievement (seen in Roeser, Eccles, & Stroble, 1998). Moreover, Asarnow, Jaycox, Duan, LaBorde (2005) found out that adolescents with depression are at increased risk for impairment in school and educational attainment. Ryan and Patrick (2001) confirmed that students' perceptions of teacher support and the teacher as promoting interaction and mutual respect are related to positive changes in the student's academic motivation and engagement (cited in Roeser, Eccles, and Sameroff, 1998).

Heckhausen (1980) stated that anticipatory hope and pride relating to success and failure were deemed key determinants of achievement motivation and task behavior by tradition theories of achievement motivation, along with anticipatory fear and shame (cited in R. Pekrun et al, 2002).

Expectancy-value theory postulates the amount of effort invested is a product of the expectation of success and the value of the reward. Students' belief that school is interesting, important, and instrumental for attaining future goals is indicative of a strong connection between their personal identities and the socially sanctioned pathways to future opportunity in the United States. Such an integration can provide students with a sense of hope, purpose, and direction that manifests itself in positive behavioral choices, a sense of well-being, and a positive outlook on the future (Eccles, 1983; Erikson, 1968; Finn, 1989).

## Methodology

The following table showed the detail list of participants from each selected schools.

Table 1. Participants of the Study

<b>Gender</b>	<b>B.E.H.S-1</b>	<b>B.E.H.S-2</b>	<b>B.E.M.S-2</b>	<b>Total</b>
Male	152	46	42	240
Female	180	52	59	291
Total	332	98	101	531

## Method and Design

Descriptive survey method and quantitative approach was used for analyzing the data.

## Instrumentation

Self-report questionnaire for academic and emotional functioning was developed for this study. Academic functioning was assessed by measures of student's academic motivation and academic performance. For assessing emotional functioning, 9 items were used. Items were drawn from the symptoms Checklist 90-Revised (SCL-90-R; Derogatis, Rickels, & Rock, 1976) and Kovac's (1992) Children's Depression inventory (CDI). Among them, 4 items were negatively asked.

The instruments were validated through a panel of 5 experts, two from (S.U.O.E) and three from (Y.U.O.E), and a pilot study. The reliability coefficient of the questionnaire was 0.93.

The questionnaire contained 50 items. All these items used 3- point Likert scales. The scoring type in positive items is 1 (disagree) to 3 (agreed), and vice versa, in reverse questions 1 (agree) to 3 (disagree).

## Data collection

Firstly, the researcher took the permission of Headmasters from respective schools. Students were instructed to answer by their own feeling and to feel freely on the paper. The researcher confirmed about the answers of the students to be remained confidential.

## Data Analysis and Findings

Analyzing the data was carried out by using statistical software package SPSS 16.0. The researcher conducted the descriptive statistic, independent sample t test, one way ANOVA and simple regression in finding the statistical results. Findings were presented as follow.

Table 2. Descriptive Statistics for Students' Academic and Emotional Functioning

Variable	N	Minimum	Maximum	Mean	SD
Academic Functioning	531	26	51	45.12	3.871
Emotional Functioning	531	14	27	21.13	2.306

According to the results, it was found that the students had high academic and emotional functioning to get positive conditions in academic pursuit because the possible mean scores were greater than the middle scores.

Table 3. Descriptive Statistics Showing Students' Academic Achievement

Variable	N	Minimum	Maximum	Mean	SD
Achievement	531	240	571	373.04	87.960

The mean score pointed out the good condition of students' academic achievement.

Table 4. Results of *t* Test for Students' Academic and Emotional Functioning

Variables	Gender	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Academic Functioning	male	44.80	4.062	-1.759	529	.079
	female	45.39	3.692			
Emotional Functioning	male	21.02	2.190	-1.011	529	.313
	female	21.22	2.398			

<b>Variables</b>	<b>Gender</b>	<b>Mean</b>	<b>SD</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>p</i></b>
SP Total	male	56.74	5.115	-2.476	529	.014
	female	57.87	5.340			
Total	male	122.45	8.777	-2.512	529	.012
	female	124.41	9.075			
Achievement	male	366.12	82.011	-1.648	529	.100
	female	378.75	92.330			

Note: SP Total= Total of School Perception (support of competence, support of autonomy, quality of relationships with teachers)

The comparison of gender difference in academic functioning, emotional functioning and achievement had no statistical difference. In students' school perception, females were significantly different from males ( $t = -1.011$ ,  $p < 0.05$ ). The result showed that female students had good perception than males. Accordingly, the total score of academic and emotional functioning showed significant gender difference for  $p < 0.05$  and the  $t$  value was  $-2.512$ . The result revealed that female students were more in a good condition than males in academic and emotional functioning. Cohen (1988) said that the obtained value (0.22) is in the range of smaller than typical.

Table 5. Results of ANOVA for Comparison of Three Selected Schools

<b>AE Functioning</b>	<b>Mean Square</b>	<b><i>F</i></b>	<b><i>p</i></b>
Between Groups	1798.30	24.219	.000
Within Groups	74.250		

Note: AE Functioning= Academic and Emotional Functioning

There can be seen statistically difference in academic and emotional functioning among the three groups ( $F=24.219$ ,  $p < 0.001$ ).

Detail information were presented by conducting Post-Hoc test which was established by Tukey HSD method.

Table 6. Result of Tukey HSD for Students' Academic and Emotional Functioning

Categories	I school	J school	Mean Difference (I-J)	<i>p</i>
Academic and Emotional Functioning	hta-1	hta-2	1.91	.132
		la-2	-5.936*	.000
	hta-2	hta-1	-1.910	.132
		la-2	-7.846*	.000
	la-2	hta-1	5.936*	.000
		hta-2	7.846*	.000
Academic Achievement	hta-1	hta-2	58.662*	.000
		la-2	-55.696*	.000
	hta-2	hta-1	-58.662*	.000
		la-2	-114.358*	.000
	la-2	hta-1	55.696*	.000
		hta-2	114.358*	.000

Note: hta-1=BEHS(1), hta-2=BEHS(2), la-2= BEMS(2)

Post-Hoc Tukey HSD test indicated that there are significant difference in academic and emotional functioning of students in three schools ( $F(2, 528)=24.219$ ,  $p=.132$  and  $p<0.001$ ). There are significant differences of academic achievement in three schools ( $F(2,528)=49778$ ,  $p<0.001$ ). In academic and emotional functioning, the result was indicated that BEHS(1) was significantly different from BEMS(2) ( $p<0.001$ ,  $d=0.05$ ) and not much difference from BEHS(2) ( $p=.132$ ,  $d=0.02$ ). Also, BEHS(2) was significantly different from BEMS(2) ( $p<0.001$ ,  $d=0.1$ ). Among them BEMS(2) was positively excel than others.

In academic achievement, these were significant differences in all the mean differences. It can be summarized that middle school (la-2) was excel among other schools.

Table 7. Correlation of Academic Functioning and Achievement

<b>Variable</b>	<b>Achievement</b>	<b>Academic functioning</b>
Achievement	1	.52**
Academic Functioning	.52**	1

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

By the results of Table 8, there was statistically significant relationship between academic functioning and achievement. The correlation coefficient  $r$  is .52 statistically significant at the 0.01 level with 531 participants ( $r(1,531)=.52, P<0.01$ ). This can be assumed that students who had positive academic functioning tended to be high in their academic achievement. The strength of the relationship  $r=.52$  was considered larger than typical according to Cohen's (1988) guideline.

To investigate if there was any effect upon academic achievement by emotional functioning, Pearson Product-Moment Correlation was applied to explain.

Table 8. Correlation Between The Effect of Emotional Functioning upon Academic Achievement

<b>Variables</b>	<b>Emotional Functioning</b>	<b>Academic Achievement</b>
Emotional Functioning	-	.43**
Academic Achievement	.43**	-

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

The correlation can be seen statistically correlated  $r(1,521)=.43$  at the significant level of  $p<0.001$ . The effect size measure was indicating median to large according to Cohen" (1988) guideline. The result indicated that students' positive emotional functioning was tended to be getting high academic achievement.

Table 9. Reciprocal Relation of Academic Functioning and Emotional Functioning

<b>Variables</b>	<b>Academic Functioning</b>	<b>Emotional Functioning</b>
Academic Functioning	-	.32**
Emotional Functioning	.32**	-

\*\* Correlation is Significant at 0.01 level.

Table 10 showed the result was statistically significant between the two variables ( $r(1,531)=.32$ ,  $p<0.001$ ). According to Cohen (1988), the effect size is considered median or typical. This can be concluded that positive academic functioning is positively correlated with positive emotional functioning, and vice versa.

Table 10. Correlations between Academic Achievement and School Perception

<b>Variables</b>	<b>Achievement</b>	<b>Competence</b>	<b>Autonomy</b>	<b>Relationships</b>
Achievement	-	.29**	.18**	.231**
Competence	.29**	-	.102*	.15**
Autonomy	.18**	.102*	-	.11*
Relationships	.23**	.15**	.11*	-

\*\* Correlation is Significant at 0.01 level.

\* Correlation is Significant at 0.05 level.

Table 11 showed that all variables were significantly correlated at  $p=0.01$  and  $0.05$  significant level, respectively. All effect sizes were ranging from small to median. By summarizing all results, the assumption can be as that positive school perception was positively correlated with high achievement.

Table 11. Correlation between Academic and Emotional Functioning and Academic Achievement

<b>Variables</b>	<b>AE Functioning</b>	<b>Achievement</b>
AE Functioning	-	.53**
Achievement	.53**	-

\*\* Correlation is Significant at 0.01 level.

The result of Table 12 was clearly significant between the two variables ( $r(1,531)=.53, p<0.001$ ). The result also showed large effect size of  $r=.53$ . The result was suggested as positive academic and emotional functioning was positively correlated with high achievement.

Moreover, to predict the impact of academic and emotional functioning upon academic achievement, simple regression was conducted because correlation did not indicate prediction of one variable from another.

Table 12. Results of Simple Regression for the Impact of Academic and Emotional Functioning on Academic Achievement

	<b>R</b>	<b>R square</b>	<b>Adjusted R Squared</b>	<b>F</b>	<b>p</b>	<b>B</b>	<b>Beta</b>
AE Functioning Achievement	.533	.284	.282	209.474	.000	- 270.9 5.213	.533

Note: AE Functioning= Academic and Emotional Functioning

Table 13 pointed out that the results were statistically significant ( $F(1,531)=209.474, p < 0.001$ ). The result showed that students' academic and emotional functioning was a predictor of their academic achievement. The identified equation for this relation was academic achievement = - 270.900+ 5.213\* (academic and emotional functioning).

The adjusted R Square value (.282) indicated that 28% of variance in achievement was explained by academic and emotional functioning. The bivariate regression  $R = .533$  indicated that this was a large effect according to Cohen (1988).

## Conclusion and Recommendation

Adolescence is a time when relationships with non-parental adults can take on increased meaning because adolescents are looking for guidance and support from adults outside of the home. Consequently, positive relationships with teachers can enhance adolescents' motivation, achievement, and feelings of well-being. Also, well prepared course and class period can promote students' feeling of interesting doing the class work rather than doing for the purpose of just finishing the middle school or getting into high school. Thus, school must pay attention to students' overall academic and emotional functioning.

According to the findings of this study, the impact of academic and emotional functioning on academic achievement can be seen clearly. And, the reciprocal relationship between academic functioning and emotional functioning can be seen. Next, the gender differences of both the two functioning and school perception were presented for teacher to be recognized. This study highlights the importance of academic and emotional functioning of students for educators to conduct. They could provide additional direction for prevention and intervention efforts aimed at improving early adolescent adjustment.

Recommendations for future study were also presented for researchers to be recognized. They were as follow;

- In this study, the participants were only Grade 9 students. So, other grades were still left for doing research, it needed to explore in future study.
- One subject alone (e.g., Mathematics) can conduct rather than all subjects.
- As academic and other functioning (e.g., social) still left to carry out, the future research should investigate other functioning.
- This study did not incorporate a longitudinal design. So, over time functioning of students should be explored in primary school level as well as middle school level and high school level.
- This study was conducted only by paper and pencil type, other types of qualitative research design should be conducted for getting more precise and reliable results.(e.g., interview procedure, observation, case study, etc)

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# **The Aspects of Aggression on Grade 9 Students on Waingmaw Township**

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## **Abstract**

The main aim of this study was to study the aspects of aggression on Grade 9 students in Waingmaw Township by gender, age and school. A survey study was conducted in 2014-2015 academic year to explore the students' aggression. Five hundred Grade 9 students participated in this study (216 males, 284 females). The participants were collected from three Basic Education Middle Schools and three Basic Education High Schools (Branch). The inventory that was modified form of Aspects of Aggression Rating Scale designed by Mabitla (2006) was utilized in this study. The three factors were Family related aspect, Peer and School related aspect, and Self related aspect. The inventory consisted of 50 items and each had five-point Likert Scales. According to the result of *t* test, there were significantly different by gender in family and, peer and school related aspects. But in self-related aspects, there was no significant difference. ANOVA result for aspects of aggression by selected schools showed that there were significant differences among the schools. According to the ANOVA result by different age groups, there were no significant differences. Then, Pearson Correlation was used to study the interrelationship among the aspects of aggression. There were significant correlation among all aspects of Aggression. By this result, it was assumed that the adolescent students had peer pressure, so they accepted the ideas of their friends, they could not control their emotions and their aggression may be caused by peer and school related aspect rather than family related aspect. Based on the result of the study, all the teachers can understand these aspects of students' aggression and apply them effectively to upgrade students' self-concept and this result will contribute to the subject area of Educational Psychology.

## **Introduction**

### **Importance of the Study**

The aim of 'Education' is to develop a person in such aspects as physical, mental, emotional and social. To be all round developed person, all children should be guided effectively by adults. The guidance system for

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children includes the child, the child's parents, the child's teacher and the physical environment of the classroom. Nowadays, there had various aggressive manners in most children from school. Some educators in the school also continually complain of individual learner's misbehavior and subsequent poor academic performance.

Aggression is any behavior that results in injury to another person or an animal or in damage to or destruction of property (Parke & Slaby, 1983, cited in Marion, 1986). Children are not aggressive when they are born, and not all children become aggressive as they get older. The most complete explanation of how children become aggressive seems to be a "system" because it acknowledges a child's embeddedness in a variety of social system family, peer group, and community (Parke & Slaby, 1983, cited in Marion, 1986).

The researcher constantly grapples with cases of learners' acute aggressive behavior. The prevalence of the problem forces some educators to forfeit their break time dealing with problems of fights, use of obscene language, writing of provocative graffiti and vandalism to property. The purpose of this research is to investigate the possible causes and the manifestations of aggression in Grade 9 students for above mentioned facts because it needs to know how the children form the aggressive behaviors by studying the possible aspects of aggression.

### **Purposes of the Study**

The main aim of this study was to study the aspects and manifestation of aggression on Grade 9 students in Wine Maw Township. There are the following specific objectives.

1. To study the differences in aspects of aggression between male and female;
2. To compare the aspects of aggression for Grade 9 students in the sampled learner population by age;
3. To investigate the aspects of aggression for Grade 9 students in the sampled learner population by selected schools from Wine Maw Township;
4. To find out the correlation between all aspects of aggression for Grade 9 students.

### Definition of the Key Terms

**Aggression** : The definition of the Dictionary of Counseling (1993, cited in Mabitla, 1986) defines ‘aggression’ as ‘a general term for the attitude and behavior that is energy directed towards in hostility, threat or violence’.

**Misbehavior** : Morally bad or wrong behavior, Improper or unlawful conduct. For example, threaten to do injury to another person or animal. (Mabitla, 2006)

**Aggressive behavior** : Aggressive behavior is a behavior that it is behaving in an angry threatening way, as if you want to fight or attack someone. (Mabitla, 2006)

**Deviant** : A person who deviates significantly from what is considered appropriate or typical for a social group is called deviant. (Mabitla, 2006)

**Delinquent** : A person who behaves in a way that is illegal or that society does not approve is called delinquent. (Mabitla, 2006)

**Public nuisance** : A person who does things that annoy a lot of people. (Mabitla, 2006)

### Review of Related Literature

#### Aspects of Aggression among Adolescents

##### Family Related Aspects

Families play a critical role in the acquisition, maintenance and modification of children’s aggression (Parke & Slaby, 1983, cited in Marion, 1986). Some children lives in violent families, and it is here that children take lessons in how to hunt other people and animals. Violent families become violent because members of the system develop aggressive patterns of interacting with one another. Adults in many aggressive family systems are insensitive and no supportive and are poor managers of their children’s environment.

### **Peer and School Related Aspects**

Aggression has rooted in a child's family, but it is also learned, maintained, and modified in a child's peer group. Peer influence each other aggression in several ways. They model aggression, teach other children how to avoid being victims, reinforce aggression, set norm regarding aggression and serve as disinhibiting agents (Parke & Slaby, 1983, cited in Marion, 1986). Studied found that domestic violence affects the children emotionally, socially, physically and behaviorally (Szyndrowski, 2005, cited in Mabitla, 2006).

### **Self-Related Aspects**

Psychologists often refer to that "I" as the self. Psychological science has largely neglected the role of self-control in studying aggression. When people imagine an extremely aggressive person, they often think of someone who is cold-blooded, plans the details of an aggressive act far in advance and never lets an emotion sway a decision to behave aggressively. Yet, as the quote from Jeffrey Dahmer illustrates, even the aggressive behavior of serial killers can arise from impulsive aggressive urges (Mabitla, 2006). Poor self-control over aggressive urges is a widespread problem.

## **Methodology**

### **Population and sample**

The whole population of this study was all the Grade 9 students from Waingmaw Township. By using simple random sampling techniques, participants were selected from three Basic Education High Schools and three Basic Education Middle Schools. The schools selected for this study are located in Waingmaw Township, Kachin State. The participants investigated in this study were 500 students including 216 male students and 284 female students.

### **Research design and methods**

In this study, quantitative survey method and descriptive research design were used.

### **Instrumentation**

The aspects of aggression inventory which were modified from Makwetle Aubrey Mabitla questionnaire were conducted. In order to validate the instrument, content validity is examined by the review and judgement of three experts in this area. For Aggression Inventory in pilot study, a 56- item instrument (Aspects of Aggression Inventory) was administered 100 Grade 9 students from Basic Education High School Tada U Township in order to measure their aggression. The reliability for the instrument was measured by using Cronbach's alpha and its reliability coefficient was 0.87 after removing 6 items that did not adequately measure aspects towards aggression. This demonstrated that the aspects of aggression inventory used in this study were a highly reliable instrument.

Finally, the questionnaire for this study comprised 50 items. Each positive statement in the aggression inventory was examined by a five point Likert-type scale (Strongly Disagree=1, Disagree=2, Undecided=3, Agree=4, Strongly Agree=5). Negative Statements were scored reversely. This inventory was divided into three dimensions such as (1) Family, (2) Peer, School and (3) Self. The participants' demographic information.

### **Data Collection**

For collecting accurate data for this study, the researcher requested permission from the Head of the Department of Educational Psychology. Second permission to collect the data was acceded from the respective Principles of High Schools and Middle Schools in Waingmaw Township. With the permission of the respective Principles, the data were collected with Grade 9 students from selected Basic Education High Schools (Branch) and Middle Schools in Waingmaw Township. The students were asked to complete all items and were assured the results were completely confidential. In order to implement this study, the data were collected in third week of November, 2014. The data collected from the participants were analyzed by using the Statistical Package for Social Science (SPSS) program.

### **Data Analysis and Findings**

As shown in Table 1, according to the mean percentage result, the students' aggression was the highest in Self aspect and the lowest in Family

aspect. It was found that students' aggressive behaviors were caused by self-related aspects. Moreover, peer and school related aspect were considered as an essential factor that caused the students' aggression, but parental control decreased in students' aggression.

Table 1. Descriptive Statistics for the Aspects of Aggression

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Mean %</b>	<b>SD</b>
Family related aspect	500	10	43	22.72	52.84%	3.933
Peer and School related aspect	500	27	99	63.42	64.06%	10.688
Self-related aspect	500	26	81	52.69	65.05%	8.922

Table 2. Comparison of Means, Standard Deviations and the Results of *t* test on Dimensions for Aspects of Aggression by Gender

<b>No</b>	<b>Dimensions</b>	<b>Male</b>		<b>Female</b>		<i>t</i>	<i>df</i>	<i>p</i>
		<b>Mean</b>	<b>SD</b>	<b>Mean</b>	<b>SD</b>			
1	Family	22.21	4.028	23.09	3.824	-2.492*	498	.013
2	Peer and School	65.11	10.739	62.14	10.489	3.108**	498	.002
3	Self	52.55	9.609	52.79	8.382	-.298	498	.766

Note; \* Mean difference is significant at the 0.05 level.

\*\* Mean difference is significant at the 0.01 level.

The result of *t* test from Table 3 showed that there were significant differences between gender in Family and, Peer and School dimension. The female students were significantly different in Family dimension than male students at 0.05 level. But the male students were significantly different in Peer and School dimension than female students at 0.01 level. In Self dimension, there was no significant difference. So, the result revealed that male students expressed more aggressive aspects by peer and school pressure than female students.

Table 3. Descriptive Statistic for Aspects of Aggression in terms of selected Schools

	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
School 1	176	85	195	132.43	17.072
School 2	49	100	200	145.10	19.593
School 3	58	110	170	144.02	13.194
School 4	88	69	187	140.07	19.332
School 5	61	108	188	147.39	17.512
School 6	68	96	194	137.76	17.766
Total	500	69	200	138.91	18.283

As mentioned in Table 4, the mean score of Aggression from School 5 was the highest and the mean score of Aggression from School 1 was the least among others schools.

Table 4. ANOVA Results for Aspects of Aggression in Selected Schools

	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>p</b>
Between Groups	15392.724	5	3078.545	10.044***	.000
Within Groups	151414.578	494	306.507		
Total	166807.302	499			

Note; \*\*\*Mean difference is significant at the 0.001 level.

Table 5. ANOVA Results for Different Aspects of Aggression in Selected Schools

		<b>Sum of square</b>	<b>df</b>	<b>Mean square</b>	<b>F</b>	<b>p</b>
Family	Between group	614.977	5	122.955	8.552***	.000
	Within group	7104.695	494	14.382		
	Total	7719.672	499			

		<b>Sum of square</b>	<b>df</b>	<b>Mean square</b>	<b>F</b>	<b>p</b>
Peer and School	Between group		5	710.227	6.563***	.000
	Within group		494	108.211		
	Total		499			
Self	Between group		5	721.836	9.874***	.000
	Within group		494	73.102		
	Total		499			

Note;\*\*\* Mean difference is significant at 0.001 level.

Post Hoc Test was further conducted by Tukey method to find which particular school had greatest difference in different dimensions (See in Table 6). To investigate the aspects of aggression among age groups, firstly, the participants were grouped into five groups according to their age years, 13, 14, 15, 16 and 17 groups. According to the results of Table 7, the mean score of age group of 17 was the highest mean score and it had 140.20. The minimum mean score (136.18) was obtained by the age group of 16.

Table 6. Mean and Standard Deviation of Aspects of Aggression by Age Groups

	<b>Age Groups</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>
Aspects of Aggression	13	122	137.30	18.611
	14	217	139.77	17.796
	15	103	139.78	16.762
	16	38	136.18	22.159
	17	20	140.20	21.515

Then, one way analysis of variance was executed to find out the different aspects aggression different between age groups.

Table 7. Result of ANOVA for Aspects of Aggression by Age Group

		<b>Sum of squares</b>	<b>df</b>	<b>Mean squares</b>	<b>F</b>	<b>p</b>
Aspects of Aggression	Between group	873.15	4	218.304	.651	.626
	Within group	165934.087	495	335.220		
	Total	166807.302	499			

The result from the ANOVA showed that there were no significant for aspects of aggression among different age groups. (See in Table 7).

Table 8. Correlation between Each Aspects of Aggression

<b>Variable</b>	<b>Family Related Aspect</b>	<b>Peer, School Related Aspect</b>	<b>Self-Related Aspect</b>
Family Related Aspect	1	.164*** .000 500	.216*** .000 500
Peer, School Related Aspect	.164*** .000 500	1	.470*** .000 500
Self-Related Aspect	.216*** .000 500	.470*** .000 500	1

Note: \*\*\* Correlation is significant at 0.001 level.

According to Table 8, there were significant relationships among the different dimensions of aspects of aggression at 0.001 level. Particularly, there was significant correlation between peer and school related aspect, and self-related aspect ( $r=.470$ ,  $p<.001$ ). According to the result, it was assumed that the adolescent students had peer pressure, so they accepted the ideas of their friends. And then, they could not control their emotions. Thus,

their aggression may be caused by peer and school related aspect rather than family related aspect.

### **Conclusion and Suggestion**

The main purpose of this study was to study the aspects and manifestation of aggression on Grade 9 students in Waingmaw Township. Based on the results of data analysis, there were significant relationship among all aspects of aggression. From the results, there is a need to recognize the prevalence of aggression in school. Modern students resort to physical aggression to resolve conflicts. This is a typical of children who are exposed to aggressive media, an aggressive environment and most of all, a violent family setup. Children who are the victims of aggression at home by their next-of-kin, would adopt aggressive measures to resolve conflicts.

Adults concerning the children should know the some following facts. Neglect of children at home and at school makes them vulnerable to aggression as there is no prompt intervention to correct their behavior. So, no one could argue the fact that the whole world is in need of guidance. Therefore, parents and teachers are more alive to the need for adequate guidance of their children not to aggressive behavior.

According to the above reasons, the following suggestions and recommendations were made for controlling aggression in young children and reducing the students' aspects of aggression.

- Parents, teachers and adults should give children a chance to practice controlling anger.
- Parents, teachers and adults should use positive discipline.
- Parents, teachers and adults should let children to increase empathy.
- Parents, teachers and adults should reinforce cooperative behavior and cooperative verbal responses.
- Parents, teachers and adults should teach children to be able to face difficult situations in non-aggressive way.
- Parents, teachers and adults should work with a child's family, school, peer group and community systems.

The final benefit of this particular study would be a better understanding of the resources for the students' aspects of aggression. We, all of the teachers, should know this aspects thoroughly and apply it effectively for students not to aggressive and to become all round developed students.

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# Achievement Goal Orientation and Learning Strategies of Pre-service Teachers from Selected Education Colleges in Upper Myanmar

Thae Su Htwe<sup>1</sup> & Thida Nyunt<sup>2</sup>

## Abstract

Goal orientation was a disposition toward developing or demonstrating ability in achievement learning. The main purpose of this study is to investigate pre-service teachers' achievement goal orientation and used of learning strategies. This study was carried out in 2015-2016 academic year from Mandalay, Sagaing, Taunggyi, Meikhtila and Pakokku Education Colleges in Upper Myanmar. As research instruments; achievement goal questionnaires (18 items) and motivated strategies for learning questionnaires (50 items) was developed. And, data analyses, descriptive statistics, independent sample *t*-test, one way ANOVA, correlation technique and regression analysis were used in this study. Totally, 708 pre-service teachers participated in this study, including 314 males and 394 females. The results of this study showed the differences in achievement goal orientation and used learning strategies by grade. Furthermore, it was also showed that significant differences were not found in achievement goal orientation and used of learning strategies by gender. Moreover, there was no significant difference in achievement goal orientation by education colleges but significant differences in used of learning strategies. The results also showed that there was a significant and positive relationship between achievement goal orientation and used of learning strategies ( $r=.585$ ,  $p<.01$ ). The result revealed that the achievement goal orientation has a mediation effect learning strategies. This study gives educators to know information of pre-service teachers' initial expectations regarding their success in college and how they relate to their used of learning strategies.

**Keyword:** Achievement Goal, Goal Orientation, Learning Strategies

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## **Introduction**

Achievement motivation has been defined as the extent to which individuals differ in their needs to strive to attain rewards, such as physical satisfaction, praise from others and feelings of personal mastery (McClelland, 1985, cited in Awan, Noureen, and Naz, 2011). Achievement goals have become an important motivational construct in organizational research providing an explanation for the approaches, responses, and reasons that individuals use to engage in achievement activities (Ames, 1992, cited in Coutinho, 2007).

Learning strategies interact with personal characteristics of students. There is no ideal strategy which generates success in all learning situations. Students should be trained to develop an understanding and skills for using appropriate strategies that satisfy their needs (Weinstein, 1987, cited in Simsek, & Balaban, 2010).

Learning strategies can be divided into two broad domains: cognitive strategies and metacognitive strategies. Cognitive strategies, basically consisting of rehearsal, elaboration and organization, help students encode new information as well as organize and retrieve it. On the other hand, metacognitive strategies, basically consisting of planning, monitoring, and regulating, help one control and execute their learning processes (Gall et al., 1990; Pintrich, 1988, cited in Yildirim, & Somuncuoglu, 1998).

## **Aim of the Study**

The main aim of this study is to explore pre-service teachers' achievement goal orientation and used of learning strategies in education colleges. The specific objectives of this study are:

- To compare achievement goal orientation of pre-service teachers by gender, grade and education colleges.
- To find out the difference in used of learning strategies of pre-service teachers by gender, grade and education colleges.
- To measure the relationship between achievement goal orientation and used of learning strategies of pre-service teachers.
- To investigate the prediction of achievement goal orientation on used of learning strategies of pre-service teachers.

## Scope of the Study

This study focused to investigate the achievement goal orientation and used of learning strategies of pre-service teachers from selected education colleges in upper Myanmar. Participants of this study were selected pre-service teachers from Mandalay, Sagaing, Taunggyi, Meikhtila and Pakokku Education Colleges in Upper Myanmar. Both first year pre-service teachers and second year pre-service teachers were selected in this study.

## Definition of Key Terms

**Achievement goal orientation** is defined as a future-focused cognitive representation that guides behavior to a competence-related end state that the individual committed to either approach or avoid (Harackiewicz, 2002).

**Learning strategy** is defined as an individual's approach to a task; it includes how a person thinks and acts when planning, executing, and evaluation performance on a task and its outcomes (Schumaker and Deshler, 2006).

## Review of Related Literature

Achievement goals typically refer to cognitive representations of the different purposes students may adopt for their learning in achievement situations. These purposes would guide and direct students' cognition and behaviour as they engage in academic tasks. Students can and do hold multiple, hierarchically arranged, social and academic goals in academic achievement settings, including mastery goals, performance approach goals, and performance avoidance goals.

In the mid to late 1990s, Elliot and colleagues produced empirical work testing the tri-chotomous achievement goal framework. In this framework, three types of achievement goals are posited: mastery goals that focus on the development of competence, performance-approach goals that focus on having favorable judgments of competence and performance-avoidance goals that focus on avoiding unfavorable judgments of competence.

Three independent achievement goals are delineated:

- a mastery goal focused on the development of self-referenced competence and task mastery
- a performance-approach goal focused on the attainment of favorable judgments of normative competence
- a performance-avoidance goal focused on avoiding unfavorable judgments of normative competence (Elliot & Church 1997; Elliot & Harackiewicz, 1996, cited in Alkharusi, 2010).

The word strategy originally from the ancient Greek *strategia* indicates generalship or the art of war. The basic characteristics of strategy imply planning, competition, conscious manipulation, and movement toward a goal. Gradually, the concept of strategy has become influential in education (Oxford, 1990). As a result, a lot of definitions of learning strategies from different aspects have appeared.

In attempting to integrate the multitude of definitions available at the time, Pintrich, 2000 described self-regulated learning as: “an active, constructive process whereby learners set goals for their learning and then attempt to monitor, regulate, and control their cognition, motivation and behaviour, guided and constrained by their goals and the contextual features in the environment”. Commonly, most of the definitions and classifications is the division of learning strategies into two broad domains: cognitive strategies and metacognitive strategies. Cognitive strategies, basically consisting of rehearsal, elaboration, and organization, help students encode new information as well as organize and retrieve it. On the other hand, metacognitive strategies, basically consisting of planning, monitoring, and regulating, help one control and execute their learning processes (Yildirim, & Somuncuoglu, 1998).

## **Methodology**

### **Population and Sample**

By using simple random sampling technique, participants were selected from education colleges in upper Myanmar. A total of five education colleges were selected; Mandalay, Sagaing, Taunggyi, Meiktila and Pakokku Education Colleges. A total of 708 pre-service teachers

participated in this study. The number of first year pre-service teachers was 358 and that of second year pre-service teachers was 350.

### **Research Design and Method**

Quantitative research design and descriptive survey method were used in this study.

### **Instrumentation**

The Elliot and Church's (1999) Achievement Goal Questionnaire was used as the measure of goal orientation. The questionnaire consisted of 18 items with 3 scales; mastery, performance-approach and performance-avoidance. There are six items for each subscale. Motivated Strategies for Learning Questionnaire (MSLQ) constructed by Pintrich et al., (1991) was used. It contained 50 items with nine subscales (Rehearsal, Elaboration, Organization, Critical Thinking, Metacognitive Self-regulation, Time/Study/Environmental Management, Effort Regulation, Peer Learning and Help Seeking). Elliot and Church's (1999) achievement goal questionnaire 4-point Likert scale of 1(strongly disagree) to 4(strongly agree).

### **Data Collection**

After the permission of the headmasters, the necessary data were collected by the participation of pre-service teachers from selected education colleges. Independent sample *t* test analysis was used to determine whether there was significant difference between achievement goal orientation and used of learning strategies of pre-service teachers according to gender and grade. And, One-Way Analysis of Variance (ANOVA) was used to determine whether there was significant difference between achievement goal orientation and used of learning strategies according to the education colleges. Next, the relationship between achievement goal and used of learning strategies was analyzed by means of correlation analysis. Finally, regression analysis was conducted to examine the predictor effects of use of learning strategies.

### Data Analysis and Findings

Table 1. Results of Independent Sample *t* test of Achievement Goal Orientation (A.G.O) by Gender

Gender	Number	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
Male	315	57.03	6.14	706	.85	.09
Female	393	56.94	6.13			

According to Table 1, there was no significant difference between male and female. It meant that both male and female pre-service teachers are equally oriented to be mastered in their learning. Similarly, Steinmary and Spinath (2008) also reported that there was no sex difference in performance-approach goals.

Table 2. Results of Independent Sample *t* test of A.G.O by Grade

Grade	Number	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
First year	358	58.21	5.96	5.527***	706	.000
Second year	350	55.71	6.06			

Note; \*\*\*Mean difference is significant at the 0.001 level.

According to the result of Table 2, there was significant difference in achievement goal orientation by grade. To be specific, achievement goal orientation of first year pre-service teachers was higher than that of second year pre-service teachers. But, Lai, et al., 2006 showed that there was no difference between senior and junior secondary school students in their achievement goal orientation.

Table 3. Mean and Standard Deviation of A.G.O by Education Colleges

Achievement Goal Orientation	Number	Mean	SD
EC-1	136	56.89	6.01
EC-2	145	56.23	6.29
EC-3	132	57.14	5.71
EC-4	149	57.99	6.71
EC-5	146	56.62	5.76

Among the selected education colleges, pre-service teachers of EC-3 and EC-4 had the highest mean score 57.14 and 57.99 in their achievement goal orientation. To make the confirmation of the significant differences in pre-service teachers' achievement goal orientation by education colleges, One Way Analysis of Variance (ANOVA) was worked out.

Table 4. ANOVA Results of A.G.O by Education Colleges

<b>Achievement Goal Orientation</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean of Square</b>	<b>F</b>	<b>p</b>
Between Groups	255.179	4	63.795	1.704	.147
Within Groups	26311.412	703	37.427		
Total	26566.592	707			

As above mentioned, ANOVA results in Table 4, it was found that there were no significant differences in achievement goal orientation among education colleges ( $p > .05$ ). It was revealed that all the participants did not differ in their goals oriented for learning although they had been attending different places. It means that students' achievement goal orientation is only his/her internal desire and may not affected by external location.

Table 5. Results of Independent Sample *t* test of Learning Strategies (L.S) by Gender

<b>Gender</b>	<b>Number</b>	<b>Mean</b>	<b>SD</b>	<b>t</b>	<b>df</b>	<b>p</b>
Male	315	150.52	14.71	1.67	706	.096
Female	393	148.66	14.86			

The results showed that there was no significant difference between male and female. It may be because both male and female pre-service teachers did not differ in their goal orientation so, their used of learning strategies would not differ in academic setting. Although the present study had no gender difference in use of learning strategies, Bembenutty (2007) investigated gender differences in academic achievement and learners' use of self-regulation of learning and suggested that males had lower rehearsal scores than females.

Table 6. Results of Independent Sample *t* test of L.S by Grade

Grade	Number	Mean	SD	<i>t</i>	<i>df</i>	<i>p</i>
First year	358	153.25	14.90	7.07***	706	.000
Second year	350	145.64	13.71			

Note; \*\*\*Mean difference is significant at the 0.001 level.

According to the result of Table 6, there was significant difference in used of learning strategies by. To be specific, first year pre-service teachers were higher in used of learning strategies than second year pre-service teachers. It may be because first year pre-service teachers were actively learning as they are fresher and the beginner of transition from Basic Education to Higher Education.

Table 7. Mean and Standard Deviation of L.S by Education Colleges

Learning Strategies	Number	Mean	SD
EC-1	136	149.79	13.84
EC-2	145	151.54	14.91
EC-3	132	146.15	14.02
EC-4	149	152.65	16.29
EC-5	146	146.97	13.81

Of the selected education colleges, pre-service teachers of EC-2 and EC-4 had the highest mean score 151.54 and 152.65 respectively in use of learning strategies. Besides, One Way Analysis of Variance (ANOVA) was worked out so that it would observe clearly whether there were statistically differences in use of learning strategies according to education colleges.

Table 8. ANOVA Results of L.S by Education Colleges

Achievement Goal Orientation	Sum of Squares	<i>df</i>	Mean of Square	<i>F</i>	<i>p</i>
Between Groups	4505.36	4	1126.34	5.258***	.000
Within Groups	150591.57	703	214.21		
Total	155096.931	707			

Note; \*\*\*Mean difference is significant at the 0.001 level.

According to ANOVA results in Table 8, a significant difference in use of learning strategies among Education Colleges was found ( $F=5.258$ ,  $p=.000$ ) at .001 level. Thus, to find out the specific differences in use of learning strategies of pre-service teachers among colleges, Post Hoc Test (Tukey HSD) was conducted.

Table 9. Tukey HSD Results of L.S by Education Colleges

Variable	Education Colleges (I)	Education Colleges (J)	Mean Difference (I-J)	<i>p</i>
Learning Strategies	EC-2	EC-1	1.75	.854
		EC-3	5.39*	.019
		EC-4	-1.11	.966
		EC-5	4.57	.061
	EC-3	EC-1	-3.64	.251
		EC-2	-5.39*	.019
		EC-4	-6.5*	.002
		EC-5	-.82	.990
	EC-4	EC-1	2.864	.466
		EC-2	1.113	.966
		EC-3	6.499*	.002
		EC-5	5.678*	.008

Note; \*Mean difference is significant at .05 level (2-tailed).

It can be easily seen the results in Table 9 that pre-service teachers from EC-4 were higher in use of learning strategies than pre-service teachers from EC-3 ( $p<.05$ ) and EC-5 ( $p<.05$ ). Moreover, use of learning strategies of pre-service teachers from EC-2 was higher than that of pre-service teachers from EC-3 ( $p<.05$ ). Conversely, learning strategies of pre-service teachers in EC-2 were significantly different from that of pre-service teachers in EC-3 and EC-4 was significantly different from that of EC-3 and EC-5 ( $p<.05$ ). According to the results, pre-service teachers in EC-4 were the highest in use of learning strategies.

Table 10. Relationship between A.G.O and L.S

	<b>Achievement Goal Orientation</b>	<b>Learning Strategies</b>
Achievement Goal Orientation	-	.585**
Learning Strategies	.585**	-

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

According to Table 10, the results showed that the achievement goal orientation was positively significantly correlated with use of learning strategies ( $r=.59$ ,  $p < 0.01$ ). The strength of correlation was moderate. Inconsistently with the present study, Li Cao revealed in his study that there was no relationship between goal orientation and study strategies.

Table 11. Linear Regression Analysis Summary for A.G.O and L.S

<b>Variable</b>	<b>B</b>	<b><math>\beta</math></b>	<b><math>t</math></b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R<sup>2</sup></b>	<b>F</b>
L. S	68.94	.585	16.314	.585	.342	.341	367.52***
A. G. O	1.41	.585	19.17***				

Note; \*Mean difference is significant at .001 level (2-tailed).

The results of linear regression analysis pointed out that achievement goal orientation factors made a significant predictive contribution to pre-service teachers' use of learning strategies,  $F=367.52$ ,  $p < .001$  and was able to account for 34% (adjusted R<sup>2</sup>) of the variance in learning strategies. So, it can be interpreted that pre-service teachers who have oriented high achievement goal use more learning strategies. Then, the model can be defined as in the following equation:

$$\mathbf{LS = 68.94 + 1.141AGO}$$

Note: LS= Learning Strategies

AGO= Achievement Goal Orientation

## **Conclusion and Suggestions**

Since, both male and female pre-service teachers may assume that teacher education is the foundation of their occupation, achievement goal orientation of pre-service teachers was not different by gender and also their used of learning strategies would not differ in academic setting. First year pre-service teachers are fresher and active in college student life in order to prepare their future career. Also, they had just finished Matriculation Examination, they may use various ways as much as possible in their learning than second year pre-service teachers.

As all education colleges instruct the same curriculum for all pre-service teachers, they were equally oriented to achieve in their learning. Although education colleges instruct the same curriculum, their various instructional methods may diverse. So, pre-service teachers' used of learning strategies may be different among education colleges.

This study indicates that achievement goal orientation should be considered effectible variable on used of learning strategies of pre-service teachers in education colleges. Studying the relationship between goal orientations and used of learning strategies is important from several perspectives.

Based on the findings of the present study, some limitations are found. A follow up program to observe classroom structure, teaching practices and learning atmosphere of these schools have not conducted. Pre-service teachers' used of learning strategies was not observed in practically. Next, teachers' suggestions for the improvement of achievement goal orientation and used of learning strategies could not be collected.

Future researches need to examine the achievement goal orientation and learning strategies not only in Sagaing University of Education and Yangon University of Education but also Sagaing University for the Development of National Races of the Union.

To sum up, this study gives educators to design proactive interventions to support pre-service teachers in their transition from high school to college and help them attain their achievement goal. The results of this study can support the teacher education program and contribute teaching-learning process of pre-service teachers.

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## **A Study on Reasoning and Problem Solving Skills of Grade 10 Students in Mogok Township**

Hay Man Oo<sup>1</sup> & Ohnmar Tin<sup>2</sup>

### **Abstract**

The aim of the study is to explore the relationship between reasoning skill and problem solving skill of adolescents among Grade 10 students. This research was carried out in 2015-2016 academic year in various types of schools in Mogok Township in Mandalay Region. Quantitative research design was used in this study. Totally 872 students in Grade 10 participated in this study, including 390 males and 482 females. A questionnaire was used to collect demographic information of the participants. The research instrument used in this study was adopted from Jittachuan's reasoning skill test (1992) including 32 items with 6 categories; namely, (1) analogy, (2) classification, (3) inference, (4) series, (5) logical diagram and (6) analytical reasoning. The instrument for problem solving skill was adopted from Min Basadur's Simplex problem-solving model (1998) consisting of 15 items. There was significant difference in both reasoning skill and problem solving skill according to students' age and subject combination. Correlation matrix showed that the coefficient for reasoning skill and problem solving skill was ( $r=.232$ ,  $p<.001$ ). Students' reasoning skill should be developed with training and practicing so that they might get greater success in their problem solving skill.

**Keywords:** Reasoning Skill, Problem Solving Skill

### **Introduction**

All over the world, education is highly acclaimed as the most essential prerequisite in developing every sector in various fields of human, especially adolescents, the leaders of future. Their school period is the most sensitive period of their lives, hence, it is important to identify and improve their reasoning skill and problem solving skill which is one of the most essential key factors in learning environments that affect and shape through their long lives in accordance with the rapidly changing age. In the 21<sup>st</sup> century, students are required to master thinking skills in order to deal with many situations that arise in the environment which later would translate into the workplace.

A problem is a situation that confronts a person, that requires resolution, and for which the path to the solution is not immediately known (Krulik &

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Posamentier, 1998). A student must think and find the relations between the subjects and methods to solve a problem. Problem refers to a situation which is different from routine exercises and the drilling questions whose solution procedure is known commonly. Krulik and Rudnick (1993) believe that people who can solve problems easily usually use reasoning skills and intend to do their job very well. Moreover, they are excited to solve problems too.

Overall, the factors which influence human skill are a huge number. To focus and narrow the research, this research will examine some necessary skills for the new admission system especially reasoning skills and problem solving skill between different schools.

### **Main Aim of the Study**

The main aim of this study is to explore the correlation between reasoning skill and problem solving skill of Grade 10 students.

### **Definitions of the Key Terms**

**Reasoning skill** is combining past experiences in order to solve a problem which cannot be solved by mere reproduction of earlier solutions (Munn, 1967).

**Problem solving skill** is a process of overcoming difficulties that appear to interfere with the attainment of a goal. It is a procedure of making adjustment in spite of interferences (Skinner, 1968).

### **Review of Related Literature**

Reasoning refers to the process of drawing conclusions or inferences from information. Reasoning always requires going beyond the information that is given (Bruner, 1957). In logic, an inference is called deductive if the truth of the initial information (or premises) guarantees the truth of the conclusion. The inference is called inductive if the truth of the premises makes the conclusion probable but not certain.

Distinctions between deductive and inductive reasoning can be important in understanding logic; but in practice, these distinctions may exist more in the mind of the researcher developing a task than in the performance of examinees on that task. Many researchers have found that performance on deductive and inductive tests is strongly related (Wilhelm, 2005) (cited in David F. Lohman and Joni M. Kakin, 2009).

Kamaruddin and Hazni (2010) recommended that the problem solving skill is very important especially for students. Students can improve their learning skill if the teachers teach them with implementation of problem solving. Newell, Simon and Shaw (1958) introduced a new theory of problem solving, based on concepts of information processing and computer programming. The nature of human problem solving methods has been studied by psychologists over the past hundred years. There are several methods of studying problem solving, including; introspection, behaviorism, simulation and computer modeling, and experiment.

## **Methodology**

### **Population and Sample**

In this study, a total of 239 high school branch students and 633 high school students participated. Thus the total sample for the study constituted 872 students of Grade 10 including 390 male students and 482 female students.

### **Research Design and Method**

In this study, descriptive research design and quantitative survey method were used.

### **Instrumentation**

The research instrument used in this study was adopted from Jittachaun's reasoning skill test (1992) including 32 items with 6 categories; namely, (1) analogy, (2) classification, (3) inference, (4) series, (5) logical diagram and (6) analytical reasoning. The instrument for problem solving skill was adopted from Min Basadur's Simplex problem-solving model (1998) consisting of 15 items.

## **Data Analysis and Findings**

### **Comparison for Reasoning Skill by Age**

The differences in reasoning skill by age were shown in Table 1.

Table 1. Mean and Standard Deviation of Reasoning Skill by Age

<b>Variable</b>	<b>Age</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>Minimum</b>	<b>Maximum</b>
Reasoning Skill	14	513	22.32	4.074	9	32
	15	273	20.75	4.904	6	30
	16	86	18.97	4.854	9	29
	Total	872	21.50	4.558	6	32

In accordance with Table 1, 14 years old students had the highest mean score and the least standard deviation in reasoning skill. So, it can be concluded that 14 years old students are better in reasoning skill than that of 15 years and 16 years old students.

Besides, One Way analysis of Variance (ANOVA) was worked out so that it would observe clearly the significant differences in reasoning skill.

Table 2. ANOVA Result of Reasoning Skill by Age

Variable	Sum of Squares		df	Mean Square	F	P
Reasoning Skill	Between Group	1050.317	2	525.159	26.776***	.000
	Within Group	17043.664	869	19.613		
	Total	18093.982	871			

Note \*\*\* The mean difference is significant at the 0.001 level.

As above mentioned ANOVA result Table 2, the obtained value  $F(2,869) = 26.776$ ,  $p < .001$  for reasoning skill was significantly difference. Thus, there were significant differences for reasoning skill of Grade 10 students according to age at .001 level.

Also, the Post Hoc Test was calculated in terms of Games-Howell method in order to observe more detailed information about the significance by age.

Table 3. Result of Post Hoc Test for Students' Reasoning Skill by Age

Variable	Student Age (I)	Student Age (J)	Mean Difference (I-J)	p
Reasoning Skill	14	15	1.570***	.000
		16	3.353***	.000
	15	14	-1.570***	.000
		16	1.782**	.010
	16	14	-3.353***	.000
		15	-1.782**	.010

Note \*\*\*The mean difference is significant at the 0.001 level.

\*\*The mean difference is significant at the 0.05 level

It can be easily seen from the result in Table 3 that reasoning skill of the age of 14 years old students was significantly difference from that of students with the age of 15 years and 16 years old students ( $p < .001$ ). Then reasoning skill with the age of 15 years old students was significantly different from that of students with the age of 16 years old students ( $p < .05$ ). It can be assumed that the younger students are more likely to solve the problems step by step. Although the theory explained that in reasoning skill, the more the people older, the more the consideration better but when the older people approach the problems, they had been learned many contexts and thus they also thought many subject matters to solve the problems. As they have learned many contexts, they do not apply their thinking skill as much as the 14 years old students apply.

### Comparison for Reasoning Skill by Subject Combination

The differences in reasoning skill by subject combination were shown in Table 4.

Table 4. Mean and Standard Deviation of Reasoning Skill by Subject Combination

Variable	Subject Combination	<i>N</i>	Mean	<i>SD</i>
Reasoning Skill	Art subject combination	346	20.16	4.925
	Science subject combination	525	22.37	4.076

In accordance with Table 4, the mean score of reasoning skill were slightly different by subject combination. The mean score of Science subject combination students were 2.21 more than that of Art subject combination students.

To be exact statistically, the independent sample *t* test was used to explore whether these differences were significant or not.

Table 5. Result of Independent Sample *t* test for Reasoning Skill by Subject Combination

Variable	<i>T</i>	<i>df</i>	<i>p</i>	<i>MD</i>
Reasoning Skill	-7.205***	869	.000	-2.211

Note \*\*\* The mean difference is significant at the 0.001 level.

The result for the independent sample  $t$  test in Table 5 showed that there was significant difference in reasoning skill by subject combination ( $t=-7.205$  and  $p<.001$ ). Thus, it was significantly difference at .001 level.

### Comparison for the Subscales of Reasoning Skill by Subject Combination

The differences in the subscales of reasoning skill by subject combination were shown in Table 6.

Table 6. Mean and Standard Deviation of the Subscales of Reasoning Skill by Subject Combination

Variable	Subject Combination	<i>N</i>	Mean	<i>SD</i>
Analogy	Art subject combination	346	71.60	27.274
	Science subject combination	525	79.00	21.912
Classification	Art subject combination	346	68.35	28.154
	Science subject combination	525	73.24	22.815
Inference	Art subject combination	346	55.78	20.201
	Science subject combination	525	60.40	18.652
Series	Art subject combination	346	67.35	25.694
	Science subject combination	525	78.38	21.105
Logical	Art subject combination	346	50.35	23.453
	Science subject combination	525	56.99	22.600
Analytical	Art subject combination	346	72.25	24.665
	Science subject combination	525	78.38	22.578
Reasoning Skill Total	Art subject combination	346	20.16	4.925
	Science subject combination	525	22.37	4.076

According to Table 6, it was found that science subject combination students had the highest mean score and the least standard deviation. It can be interpreted that science subject combination students were better in the subscales of reasoning skill than that of art subject combination students.

To be exact statistically, the independent sample  $t$  test was used to explore whether these differences were significant or not.

Table 7. Result of Independent Sample *t* test for Subscales of Reasoning Skill by Subject Combination

<b>Variable</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>p</i></b>	<b><i>MD</i></b>
Analogy	-4.417***	869	.000	-7.396
Classification	-2.814**	869	.005	-4.885
Inference	-3.404***	869	.001	-4.621
Series	-6.913***	869	.000	-11.027
Logical	-4.150***	869	.000	-6.644
Analytical	-3.708***	869	.000	-6.127
Total	-7.205***	869	.000	-2.211

Note \*\*\* The mean difference is significant at the 0.001 level.

\*\* The mean difference is significant at the 0.01 level.

The result for the independent sample *t* test in Table 7 showed that there was significant difference in analogy, series, logical and analytical reasoning by subject combination ( $p < .001$ ). Again, there was significant difference in classification and inference ( $p < .01$ ) at .01 level. According to the results, it can be interpreted that science subject combination students were significantly better in the subscales of reasoning skill than that of art subject combination students. It can be assumed that science subjects have the nature of carefully investigated and logically considered. So, it seemed that science subject combination students are better in reasoning skill than art subject combination students because science students performed scientific experimentations practically and carefully and they also conduct environmental study in order to study what happens and to gain new knowledge. In contrast with the findings of previous research study conducted by JEOTEE, KUNCHON (2012), the reasoning scores between computer students and psychological students did not show statistically significant difference.

### Comparison for Problem Solving Skill by Age

The differences in problem solving skill by age were shown in Table 8.

Table 8. Mean and Standard Deviation of Problem Solving Skill by Age

Variable	Age	<i>N</i>	Mean	<i>SD</i>	Minimum	Maximum
Problem Solving Skill	14	513	54.03	8.088	24	75
	15	273	52.75	8.405	15	71
	16	86	52.92	8.477	28	72
	Total	872	53.52	8.240	15	75

In accordance with Table 8, 14 years old students had the highest mean score and the least standard deviation in problem solving skill. It can be assumed that the 14 years old students were better in problem solving skill than that of 15 years and 16 years old students.

Besides, One Way analysis of Variance (ANOVA) was worked out so that it would observe clearly the significant differences in problem solving skill.

Table 9. Result of ANOVA for Problem Solving Skill by Age

Variable	Sum of Squares		<i>df</i>	Mean Square	<i>F</i>	<i>p</i>
Problem Solving Skill	Between Group	325.098	2	162.549	2.402	.091
	Within Group	58812.488	869	67.678		
	Total	59137.586	871			

As above mentioned ANOVA results Table 9, the obtained value  $F(2,869) = 2.402$ ,  $p = .091$  for problem solving skill was not significantly different. Thus, there were not significant differences for problem solving skill of Grade 10 students according to age.

### Comparison for Problem Solving Skill by Subject Combination

Table 10. Mean and Standard Deviation of Problem Solving Skill by Subject Combination

Variable	Subject Combination	<i>N</i>	Mean	<i>SD</i>
Problem Solving Skill	Art subject combination	346	52.81	8.263
	Science subject combination	525	54.00	8.204

In accordance with Table 10, the mean score of problem solving skill were slightly difference by subject combination. The mean score of science subject combination students were 1.19 more than that of art subject combination students. It can be concluded that science subject combination students were better in problem solving skill than that of art subject combination students.

To be exact statistically, the independent sample *t* test was used to explore whether these differences were significant or not.

Table 11. Result of Independent Sample *t* test for Problem Solving Skill by Subject Combination

Variable	<i>t</i>	<i>df</i>	<i>p</i>	<i>MD</i>
Problem Solving Skill	-2.099*	869	.036	-1.196

Note \* The mean difference is significant at the 0.05 level.

The result for the independent sample *t* test in Table 11 showed that there was significant difference in problem solving skill by Subject Combination ( $t=-2.099$  and  $p< .05$ ). Thus, it was significantly different at .05 level. It can be obviously seen that the science subject combination students were significantly better in problem solving skill than that of art subject combination students. It can be assumed that science subject combination students studied the contexts which assist their problem solving skill. The principles and rules studied in the science subject are considered logically. They conduct combination and formula derivation that enhance their problem solving skill. But art subject combination students performed thinking formally. Due to these reasons, science subject

combination students are better in problem solving skill than art subject combination students.

### Correlation between Reasoning and Problem Solving Skills

Table 12. Correlation between Reasoning Skill and Problem Solving Skill

Variables	Correlation	Reasoning Skill Total	Problem Solving Total
Reasoning Skill Total	Pearson Correlation Sig. (2-tailed) <i>N</i>	-  872	.232*** .000 872
Problem Solving Total	Pearson Correlation Sig. (2-tailed) <i>N</i>	.232*** .000 872	-  872

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

According to Table 12, there was a correlation in reasoning skill and problem solving skill ( $r=.232$ ,  $p<.001$ ). Thus, there was a statistically correlation in reasoning skill and problem solving skill. So, it can be concluded that problem solving skill was very low positively correlated with reasoning skill.

### Conclusion and Suggestions

The purpose of the present study was to investigate Reasoning Skill and Problem Solving Skill of students. This research was conducted by drawing the sample of students in Grade 10 classes from various types of schools in Mogok Township during Academic Year 2015-2016. Reasoning Skill Test (RST) including 32 items was adapted and applied on 872 students and the results were analyzed with the use of Statistical Package for Social Science (SPSS). The second questionnaire called Problem Solving Skill (PSSQ) was used with items of 15 which were answered as a Liker 5-point scale.

Then, descriptive, difference inferential and associational analyses were used to examine the hypotheses of the study. Therefore, the

relationship between reasoning skill and problem solving skill would be studied by means of the differences among demographic characteristics.

In order to improve reasoning skill of students, teachers may be suggested for the following facts.

- (1) Practice with matching
- (2) Practice visual memory
- (3) Cultivate attention to detail
- (4) Do puzzles
- (5) Teach left and right
- (6) Stimulate logical thinking skills
- (7) Ask open-ended questions

Here is a model that most students can easily memorize and put into action and which has direct applications to many areas of the curriculum as well as everyday life:

- (1) Understand the problem
- (2) Describe any barriers
- (3) Identify various solutions

Thus, the results of this study will help students, teachers and the administrative leaders in this research area, then the ones in other areas under the various education departments, including both private and state, in the development of students' reasoning and problem solving skills to fulfill their true potentials along the right pathway in accordance with the currently changing education age in Myanmar.

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## **The Effects of Discussion Method on Grade-Ten Physics Achievement of Students**

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### **Abstract**

The main purpose of this study is to investigate the effects of discussion method on Grade-Ten students' achievement in physics. Discussion method is a natural way of engaging students' active participation, improving students' thinking, and helping students' learning important communication skills and thinking processes. A quantitative research method was used to compare the physics achievement between experimental group and control group. The design adopted in this study was one of the true experimental designs, the posttest only control group design. Two sample schools in Yangon Divisions were selected by simple random sampling method. The sample size for this study was (120) students from No. (4), Basic Education High School, Sanchaung, and Basic Education High School (Branch), West Phaunggyi. In this study, the lesson plans were based on Arends' five steps of developing discussion method in the classroom. Learning materials were selected from Grade (10) physics textbook. Independent samples *t*-test was used to test whether there was a significant difference between the two groups. Findings showed that the students who are taught by discussion method performed significantly better than those who are not. Research findings proved that discussion method has positively contributed to the improvement of physics teaching at high school level and could encourage the improvement of students' higher order thinking ability.

**Keywords:** discussion method, physics, achievement, effects

### **Introduction**

Education is a developmental process which takes place in an individual as a result of his exposure and interaction with people and other stimuli in his environment (Vessel, 1965). To educate a person is to stimulate the instinct of the individual and to create some changes in the raw materials. Transforming 21<sup>st</sup> century education is about making sure that all learners to prepare to thrive and succeed in a competitive world. Twenty-first century life and work environments require far more than

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thinking skills and content knowledge. To face the challenges of 21st century education, students should be coping with 21st century competencies such as cognitive competencies, interpersonal competencies and intrapersonal competencies. Discussion is a strategy designed to stimulate thinking, challenge attitude and beliefs, and develop interpersonal skills (Oser, 1986, cited in Eggen & Kauchak, 1999). These thinking and interpersonal skills include: learning to listen to others, developing tolerance for dissenting views, learning democratic processes and critically examining one's understanding, attitude, and values as well as those of others.

In modern society there has been an exploration of knowledge. Knowledge grows far faster in the field of science than in other fields. Thus, if the teachers would not follow the pace of this knowledge exploration, they would lag behind in all areas, as science is the back bone of progress of these days. It is a process of thinking, a means of acquiring knowledge and means of understanding the nature world. Science learning must be an interactive process in which students become engaged with scientific phenomena and debate with both peers and instructors in order to develop a full understanding of underlying concepts. Physics, like other science, is rooted in observations and experiments. The study of physics not only improves the academic knowledge of the students but also develops an intellectual honesty in the students. The ultimate aim of physics teaching and learning is to understand its scientific processes and application in everyday activities. Students will learn effectively in physics if the teacher gives them maximum chance for social interaction. From a constructivist perspective, learning is viewed not as students passively receiving information from the teacher but rather as students actively engaging in relevant experiences and having opportunities for interaction. Discussion method is the method of teaching where the central and essential characteristic is interaction. It represents a type of team work, based on the principle that the knowledge, ideas, and feelings of several members have great merits than those of a single individual. The experiences a student gains through discussion are valuable at many levels. Discussion method helps students become independent thinkers and consequently, good citizens in democratic society, where freedom of thought and expression are highly regarded and cherished. According to above reasons, it is imperative to study the effects of discussion method on Grade-Ten physics achievement of students.

### **Purposes of the Study**

Main purpose of this study is to study the effects of discussion method on Grade-Ten physics achievement of students. The specific purposes are as follows.

1. To compare the physics achievement between the students who are taught by discussion method and those who are not.
2. To give suggestions for improving teaching physics according to the results of the study.

### **Hypotheses of the Study**

The hypotheses of this study are as follows.

1. There is a significant difference in the achievement of learning physics between students who are taught by discussion method and those who are not.
2. There is a significant difference in performing knowledge level, comprehension level, and application level questions between students who are taught by discussion method and those who are not.

### **Scope of the Study**

This study is geographically restricted to Yangon Region and is limited to the content area of Chapter (8) Wave Concept and Sound Wave, and Chapter (9) Reflection of Light from Grade Ten Physics Textbook prescribed by the Basic Education Curriculum, Syllabus and Textbook Committee. The subjects in this study are Grade Ten students from the selected schools during the period within the academic year 2018-2019.

### **Definition of Key Terms**

**Effect:** Effect means having power to produce, or producing a desired result (Cruickshank & Bainer, 1990).

**Discussion Method :** Discussion is an orderly process of group interaction in which students are exchanging ideas, listening to a variety of points of view, expressing and exploring their own views, applying their knowledge and reflecting on their attitudes and values (Killen, 2016)

**Physics:** Physics is the branch of science that describes matter, energy, space, and time at the most fundamental level (Giambattista, Richardson & Richardson, 2010).

**Achievement:** Achievement is the result of what an individual has learned from some educational experiences ( Travers, 1970).

## **Review of Related Literature**

### **Constructivism in Education**

Constructivism can be defined as an approach to learning in which learners are provided the opportunity to construct their own sense of what is being learned by building internal connections or relationships among the ideas and facts being taught (Borich & Tombari, 1997, cited in Killen, 2016). Constructivism is particularly applicable to the teaching and learning of science. Constructivist theory suggests that students construct their own understanding and knowledge of the world by experiencing things and reflecting on those experiences. The purpose of learning is for students to construct their own meaning, not just to memorize the right answers.

A basic assumption of constructivism is that people are active learners and must construct knowledge for themselves (Geary, 1995, cited in Schunk, 2004). Typical goal for constructivist classrooms are to help children become inquisitive, inventive and reflective, and to encourage them to take the initiative, think, reason and be confident to explore and exchange ideas with others.

### **Discussion Method**

All good teaching is characterized by proper teaching method. Teaching methods are a crucial issue in any education system. Student-centered approaches to learning are now being officially encouraged. Among student-centered approaches, discussion improves the students' thinking and reasoning skills beyond the retention of classroom lessons. Effective teachers promote learning through discussion. Discussion method is a teaching method that involves a conversation between teacher and pupils in a class or among pupils in small group. Group members have reciprocal influence over each other and exchange idea or opinions through discussion under the guidance of the teacher. When participating in discussion, students are active in their learning, and they are able to relate the topics being learned with experiences they have had in their lives

already. Through the discussion, the student will come to understand the issue with increased depth and comprehension (Collette & Chiappetta, 1989). The success of the discussion method depends on the flexibility of the teacher, students, physical arrangements, and scheduling. A disruption of any of these may diminish the effectiveness of a discussion.

## **Research Method**

Quantitative research method was used in this study.

### **Research Design**

The design adopted for the quantitative study was one of the true experimental designs, viz., posttest only control group design.

### **Population and Sample**

This study was geographically restricted to Yangon Region. The required schools were selected by using simple random sampling method. The sample schools were No. (4) Basic Education High School, Sanchaung from West District and Basic Education High School (Branch) West Phaunggyi from North District. Among them, (30) students for the experimental group and (30) students for the control group from each school were selected by using the simple random sampling method.

### **Instrumentation**

In this study, a posttest was used to measure the physics achievement of the students. The test items were based on Chapter (8) Wave Concept and Sound Wave and Chapter (9) Reflection of light from the Grade-Ten Physics Textbook. In the posttest, the test items were constructed based on the first three levels of Bloom's Cognitive Domain; knowledge, comprehension, and application.

### **Procedure**

Participants included in this study were selected by random assignment. Mid-Term marks are used to get the initial equivalency. After that, the experimental group was provided the treatment through discussion method while control group was provided through formal method. The treatment period lasted from 12th November to 7th December, 2018. The total experiment time was lasted for four weeks. Instructional time was 45 minutes per day. At the end of the treatment period, all selected students had to sit for posttest.

### Findings

The Mid-Term scores as initial level of both groups in selected schools were compared by using independent samples *t*-test to get initial equivalency before the treatment was given. The results of *t*-test, the mean scores, standard deviations, and mean differences of both groups for Mid-Term scores are presented as follows.

Table 1. *t* Values for Mid-Term Physics Achievement Scores

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig.(2-tailed)
S1	Experimental	30	39.80	6.55	0.13	0.79	58	0.937(ns)
	Control	30	39.67	6.46				
S2	Experimental	30	38.60	5.65	0.63	0.45	58	0.656(ns)
	Control	30	37.97	5.31				

Note: ns = not significant

S1 = No. (4) Basic Education High School, Sanchaung, S2 = Basic

### Education High School (Branch), West Phaunggyi

The result showed that there was no significance difference on the scores of Mid-Term physics achievement between the experimental group and control group in each school.

### Findings of Two selected Schools on Posttest

Table 2. *t* Values for Posttest Physics Achievement Scores

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig.(2-tailed)
S1	Experimental	30	42.80	5.68	8.83	5.98	58	0.000***
	Control	30	33.97	5.76				
S2	Experimental	30	41.43	4.07	11.13	8.47	58	0.000***
	Control	30	30.30	5.94				

Note: \*\*\**p* < .001

The mean scores of the experimental group were significantly higher than that of the control group in each school. It showed that there was a significant difference on the overall physics achievement between the experimental group and control group in each school.

Table 3. *t* Values for Scores on Knowledge Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2 tailed)
S1	Experimental	30	11.37	1.16	1.27	2.90	58	0.006**
	Control	30	10.10	2.09				
S2	Experimental	30	8.93	1.36	0.63	1.52	58	0.133(ns)
	Control	30	8.30	1.82				

Note: \*\* $p < .01$

The mean score of the experimental group was significantly higher than that of the control group in No.(4), Basic Education High School, Sanchaung. The mean score of the experimental group and control group was nearly the same in BEHS (Branch) West Phaunggyi (see Table 3). It showed that there was a significant difference on the score of the knowledge level questions between the experimental and control groups in No. (4) BEHS, Sanchaung, but there was no significant difference on the score of the knowledge level questions between the experimental and control groups in BEHS (Branch), West Phaunggyi.

Table 4. *t* Values for Scores on Comprehension Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2 tailed)
S1	Experimental	30	15.20	1.45	2.93	5.40	58	0.000***
	Control	30	12.27	2.60				
S2	Experimental	30	12.87	1.99	4.17	4.71	58	0.000***
	Control	30	8.70	4.41				

Note: \*\*\* $p < .001$

According to the scores on the comprehension level questions, the mean scores of the experimental groups were significantly higher than that of the control groups in each school. It showed that there were significant differences on the score of the comprehension level questions between the experimental group and control group in both selected schools.

Table 5. *t* Values for Scores on Application Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2 tailed)
S1	Experimental	30	16.23	4.42	4.63	3.86	58	0.000***
	Control	30	11.60	4.87				
S2	Experimental	30	19.67	3.26	6.80	6.88	58	0.000***
	Control	30	12.87	4.32				

Note: \*\*\* $p < .001$

In terms of the scores on the application level questions, the mean scores of the experimental groups were significantly higher than those of the control groups in both selected schools. It showed that there were significant differences on the scores of the application level questions between the two groups for the selected schools.

## Discussion, Suggestions and Conclusion

### Discussion

Discussion method is a successful mean for the quality of interaction between children and teachers. It differs from lecture in two ways: (a) the students can be more active, (b) there can be more personal contact. Discussion method is effective in developing students' thinking skills and higher-level learning such as application, analysis and evaluation and also creativity (Anderson, et al., 2001, cited in Cashin, 1986). So, to become effective teaching-learning process, discussion method plays an important role in education.

The main purpose of this study is to study the effects of discussion method on Grade Ten physics achievement of students. To fulfill this purpose, learning materials and the lesson plan were developed. In the

session of using discussion method, students were encouraged to find out learning problems by discussing within the group with the use of extended materials under the guidance of the teacher. The teacher served as a facilitator or guide in learning process. In formal instruction, the teacher taught physics concepts by presenting facts and information, imparting knowledge and emphasizing main point with a little students' involvement in teaching learning situation. At the end of the treatment period, posttest was conducted in both selected schools.

After analyzing the data obtained, the results showed that the students in the experimental group could perform better in answering knowledge level, comprehension level, and application level items than those of the control group. Statistical results verified that discussion method was superior in improving students' physics achievement. Therefore, it can be interpreted that the students in the experimental group improve memorization, critical thinking skills, and logical understanding about physical concepts. Moreover, they can transfer what they have learned at school to real life situations. This finding is consistent with the research of Sultana Kaseem Al- Faleh (1992) and with the research of Rahman, Kalil, Ajmal, Malik and Sharif (2011). Their research revealed that there was a significant difference between students who are taught by discussion method and those who are taught by lecture method. Therefore, it can be interpreted that the use of discussion method has significant effect on the overall physics achievement of the students in performing knowledge, comprehension, and application level question.

### **Suggestions**

The emergence of a highly competitive economy, rapid scientific and technological innovations and a growing knowledge base will continue to have a profound impact on all of lives. In order to meet the challenges posed by these changes, Physics, like other science subjects, will provide a platform for developing scientific literacy and for building up essential scientific knowledge and skills for life-long learning in science and technology.

With respect to the research findings, the following suggestions should be considered in depth in order to use the discussion method in class.

- Before conducting discussion method both the teachers and students should make careful planning.
- The extended materials should be used to provide the opportunity to increase students' discussion and understanding in the teaching-learning process.
- Teachers should encourage the students that they are responsible for their study and all the learning process is taking place in the students' mind.
- Teachers should act as facilitators who stimulate students' thinking and enhance their understanding of the related concepts.
- Teachers should establish rules of behavior for students during discussion and should remind students not to get off from the discussion topic.
- Teachers should give the contexts for learning that are relevant to daily life, so that students will experience physics as interesting and important to them.

This study indicates that discussion method had positive effects in learning physics. By using discussion method in the classroom, students may be well prepared to meet the challenges of their future in a rapidly changing world. However, the results of this study do not represent to other levels of basic education. Hence, further research is necessary. Therefore, discussion method should be applied for various school levels. Since the size of the sample is small, this result may not be generalized to a larger population. Thus, carrying out a larger research with a wide content area of Grade Ten and Grade Eleven Physics textbooks in a longer duration is highly recommended to validate the results of present research.

## **Conclusion**

Education today is changing from one of factual based to one of inquiry based. Traditional educational practices will no longer provide learners with the necessary skills. Students learn best when they are engaged in the learning process, discover for themselves, and discuss in group to understand the meaning of knowledge. In modern society, there has been an exploration of knowledge. In order to follow the pace of this knowledge exploration, teachers need to change their teaching and learning approaches from old to new that are in line with the current education

system. The teaching procedures should be flexible and the methods employed should flow easily from one to the other. To fulfill these requirements, this research was carried out to study whether discussion method is effective or not for Grade Ten physics teaching.

There is no special method in teaching. However, discussion method can be assumed as an effective method for improving learning physics for students. Discussing in the physics classroom is the opportunity for learners to cooperate, negotiate, communicate, express ideas in a variety of contents and consider other points of view. Therefore, it can be concluded by saying that physics teaching through discussion method positively contributed to the improvement of students' achievement at the high school level.

### Acknowledgements

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## The Effectiveness of Interactive Teaching Methods in Teaching Myanmar at the Middle School Level

Khin Thant Zin<sup>1</sup> & Ei Myat Myat Nyein<sup>2</sup>

### Abstract

The main purpose this study is to investigate the effectiveness of interactive teaching methods in teaching Myanmar at the middle school level. It was an experimental study in which students who were treated with interactive teaching methods were compared with those who did not in improving the achievement of Myanmar. Interactive teaching methods used in this study are brainstorming, discussion and storytelling. The method applied in this study was quasi-experimental research, non-equivalent control group design. The instruments used in this study were pretest and posttest. This study included (167) Grade Eight students from two schools in Wuntho Township. The sample schools were selected by random sampling method. The two intact groups in each school were assigned into experimental and control groups. Before the treatment, a pretest was administered to know whether the initial level of the students were the same or not at the beginning of the study. The experimental group was taught by using interactive teaching methods while the control group was taught by using conventional methods of teaching. After the treatment period, a posttest was administered to both groups whether there were significant differences between the two groups in regarding their achievement. Independent samples *t* test was used to analyze the data obtained from the test as the initial levels of the students were the same. It was found that the students who were taught by interactive teaching methods achieved significant higher scores in answering cognitive and affective level questions. Considering the significant effects of using interactive teaching methods, it is suggested that Myanmar teachers should use interactive teaching methods to enhance the Myanmar achievement of students. It was concluded that the use of interactive teaching methods is effective in teaching Myanmar at the middle school level.

**Keyword:** A teaching method, Interactive teaching, Interactive teaching method

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## **Introduction**

### **Significance of the Study**

Education enables an individual to make his life better both as an individual and as a member of his society. It emphasizes total development of an individual such as intellectual, social, moral, aesthetic, cultural, and physical development. The future of a nation depends on the hands of educated individuals. Education is closely related to the development of the nation. It is the main role in nation-building and progress. So, the standard of education should be modernized.

In the 21st century, Gass (2003, as cited in Fahim, 2013) asserts that education should have the following features:

- Education in schools should focus on critical thinking, creative thinking, active in-group learning, and teacher-learner interaction.
- Education in schools should not be learner-centered, knowledge-centered, or society-centered. Rather, it must include all these factors and should look at the issue from a holistic point of view.

Nowadays, Myanmar language teachers teach using lecture method and so students are not interested to learn Myanmar. As a result, students are weak in basic skills of the mother tongue and then they have no wish to study Myanmar language thoroughly and widely. Traditional methodologies of 'talk and chalk' which are teacher-centered are not adequate in shaping modern education. Teaching methods are the most important techniques employed by teachers to realize the objectives of a lesson.

In order to teach Myanmar students for developing Myanmar language skills, interactive teaching methods are appropriate. Interactive teaching methods are crucial in the development of language skills in learners. These methods provide opportunities for language use, accuracy, proficiency and immediate feedback (Jessica, Gladys & Nelly, 2015). They are aimed at the interaction between not only students and the teachers but also with each other. Interactive teaching methods are known to keep children motivated and aroused, aid cognition and enhance retention. In interactive teaching methods, learners are involved in retrieval of information, understanding it by integrating it with existing knowledge they are able to produce a new or a desired learning task.

Through interactive teaching methods, students will be more interested in teaching Myanmar when they can interact with one another and participate actively. They can learn from peers and teachers to develop social skills and abilities, to organize their thoughts and to develop rational arguments. There are many types of interactive teaching methods such as jigsaw, problem-based learning, case study, guided discovery, discussion, storytelling, concept mapping brainstorming, etc. So, the researcher wanted to study the effectiveness of interactive teaching methods in teaching Myanmar at the middle school level.

### **Purpose**

The purpose of the study is to study the effectiveness of interactive teaching methods in teaching Myanmar at the middle school level.

### **Objectives**

The objectives of this study are as follows:

1. To compare the achievement of students who are taught by interactive teaching methods with those who are not.
2. To investigate the effectiveness of interactive teaching methods in teaching Myanmar.
3. To provide suggestions for the application of interactive teaching methods in teaching Myanmar at the middle school level.

### **Research Hypotheses**

1. There is a difference in the achievement of Myanmar between the students who receive interactive teaching methods and those who do not.
2. There is a difference in the achievement of Myanmar between the students who receive interactive teaching methods and those who do not in answering cognitive and affective level questions.

## Scope

The following points indicate the scope of the study.

1. The study is geographically restricted to Wuntho Township, Sagaing Region.
2. Participants in this study are all Grade Eight Students from the selected schools during the 2018-2019 Academic Year.

## Research Method

### Population and Sample Size

This study was geographically restricted to Wuntho Township, Sagaing Region. The required sample schools were selected by using a simple random sampling method. The sample schools were Basic Education High School, Wuntho and Basic Education Middle School (Branch), Myo Thit. A sample of 101 students was selected from Basic Education High School, Wuntho and a sample of 66 students from Basic Education Middle School (branch), MyoThit.

### Instruments

The pretest and posttest were used as instruments for this study. The pretest was conducted to measure the previous knowledge of subjects. The posttest was conducted to measure the achievement of students.

#### (a) The Pretest

The pretest was constructed according to the advice and guidance of the supervisor. In order to get validation, the copy of the pretest was delivered to three experienced teachers. After validation, the pretest was modified according to the suggestions of those experienced teachers. The pretest is presented in Appendix A. A pilot test was administered with (40) Grade-Seven students from Basic Education High School, Nan Khan. The allocated times was (45) minutes. According to the pilot test, the responses to questioned showed reliability as indicated by Cronbach's Alpha coefficient with 0.749. The pretest was used to see whether the initial level of the students were the same or not at the beginning of the study (Gay & Airasian, 2003). Marking scheme for pretest was also presented in Appendix B.

### **(b) The Posttest**

The posttest was constructed with the advice and guidance of the supervisor. In order to get validation, the copy of the posttest was distributed to three experienced teachers. After that, the posttest was modified again according to their suggestion. The posttest is presented in Appendix C. The allocated time for the test is (1:30) hours and the given marks are 50. Marking scheme for the posttest is also presented in Appendix D. Then, the posttest was administered at the selected high schools on December 7, 2018.

### **Procedure**

For theoretical framework, relevant data were explored and collected through educational journals, books, theses, dissertations and Internet. Then literature review was made based on the obtained data. And a pilot test was administered with 40 students from Basic Education High School, Nan Khan. According to Gay and Airasian (2003), the quasi-experimental research allows researchers to make cause-effect statements about their research studies. The quasi-experimental researcher often has to agree to keep existing classrooms intact when it is just not possible to assign individual participants to group randomly. In other words, entire classrooms, not individual students, were assigned as experimental and control groups to receive the treatments.

In each school, the control group was provided treatment by using the method which is currently used in schools and the experimental group was provided treatment through the interactive teaching methods. The treatment period was lasted from 1st November, 2018 to 7th December, 2018. The researcher taught both groups: the experimental and the control groups. The content area were “နွားညီနောင်၊ ပိုးစုန်းကြူး၊ ကေဒါရကျေးမင်း၊ မိတ်ဆွေသုံးဦးနှင့် ဝန်လှိုင့်ကံ” from Grade Eight Myanmar Textbooks.

In the experimental group, the students were taught through a variety of interactive teaching methods such as brainstorming, storytelling and discussion. The researcher told the students the introduction of the task, problem and question. The students were divided into small groups. They have to take their own roles actively and cooperatively. They had to work together, discuss together and assess with each other. The researcher had to

monitor and assess teams and their work. On the other hand, the researcher taught the control group with conventional method.

At the end of the treatment period, all selected students had to sit for posttest. The posttest was administered on 7th December, 2018 in both schools. The data were analyzed by Independent Samples *t* test. The suggestions and conclusion were made according to finding.

### Data Analysis

In the analysis of the data, the computer program: Statistical Package for Social Science (SPSS) 23 was applied in this study. In order to find out the research questions, the posttest scores of both groups were compared by using the independent samples *t* test.

### Findings

The main purpose of this study is to investigate the effectiveness of interactive teaching methods in teaching Myanmar at the middle school level. A quantitative research method is used to compare the achievement of students who are taught by interactive teaching methods with those who are not. To analyze the data obtained from the main study, the independent samples *t*-test is used. This chapter deals with the findings of quantitative research study, analysis and interpretations of the data.

### Analysis on Pretest Scores

The Results of t-test for Independent Samples on Pretest

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2tailed)
S1	Experimental	49	17.24	3.153	2.830	0.440	99	.661 (ns)
	Control	52	16.69	3.325				
S2	Experimental	35	16.29	3.561	-0.972	-1.204	64	.238 (ns)
	Control	31	17.26	3.000				
	Control	83	17.07	3.192				

Note. ns = not significant

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

The above table shows that the means of the experimental and control groups are nearly the same in each school.

### Analysis on Overall Posttest Achievement Scores

At the end of the treatment period, a posttest is administered to measure the achievement of students in teaching Myanmar. The answer papers are marked and the data obtained from the posttest are recorded systematically. The independent samples *t*-test is used to examine the differences between the two groups in each selected school.

#### Analysis on Overall Posttest Achievement Scores

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
S1	Experimental	49	31.18	8.705	5.953	3.395	99	.001**
	Control	52	25.23	8.902				
S2	Experimental	35	28.89	6.919	6.015	3.239	64	.002**
	Control	31	22.87	8.164				
Total	Experimental	84	30.23	8.046	5.877	4.544	165	.000***
	Control	83	24.35	8.695				

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

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

The results indicate that the means of the experimental groups in both schools are higher than those of the control groups. Therefore, there is a difference in the achievement of Myanmar between the two groups on the posttest.

### Comparison of Achievement Scores by Levels of Cognitive Domain

#### Analysis on Remembering Component

School	Group	N	M	SD	MD	t	df	Sig. (2tailed)
S1	Experimental	49	4.55	0.937	0.666	2.762	99	.007**
	Control	52	3.88	1.423				
S2	Experimental	35	4.37	1.060	0.791	2.088	46	.042*
	Control	31	3.58	1.858				

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

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

According to the above table, the means of the experimental groups in both schools are higher than those of the control groups. The results are significantly different between the two groups in both selected schools.

#### Analysis on Understanding Component

School	Group	N	M	SD	MD	t	df	Sig. (2-tailed)
S1	Experimental	49	5.90	1.358	0.763	2.480	99	.015*
	Control	52	5.13	1.704				
S2	Experimental	35	5.63	.877	0.564	2.251	64	.028*
	Control	31	5.06	1.153				

Note. \*p<.05

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

As shown in above table, the means of the experimental groups in both schools are higher than those of the control groups. The results are also significantly different between the experimental and control groups in both selected schools.

## Analysis on Applying Component

School	Group	N	M	SD	MD	t	df	Sig. (2-tailed)
S1	Experimental	49	9.02	2.222	0.963	2.069	99	.041*
	Control	52	8.06	2.453				
S2	Experimental	35	9.17	1.485	1.107	2.215	64	.030*
	Control	31	8.06	2.502				

Note. \* $p < .05$

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

According to above table, the means of the experimental groups in both schools are higher than those of the control groups. Hence, experimental group's scores are significantly different than that of control group in each selected school.

## Analysis on Analyzing Component

School	Group	N	M	SD	MD	t	df	Sig. (2-tailed)
S1	Experimental	49	2.41	1.606	0.658	2.354	87	.021*
	Control	52	1.75	1.153				
S2	Experimental	35	2.43	1.243	0.687	2.012	64	.048*
	Control	31	1.74	1.527				

Note. \* $p < .05$

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

In above table, the experimental groups' means are higher than those of the control groups. Thus, the result shows significant differences between the two groups in both schools.

## Analysis on Evaluating Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
S1	Experimental	49	1.37	0.859	0.521	3.025	99	.003**
	Control	52	0.85	0.872				
S2	Experimental	35	1.20	0.868	0.458	2.643	56	.011*
	Control	31	0.74	0.514				

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

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

In above table, it can be seen that the means of the experimental groups are higher than the control groups. There are significant differences between the means of the achievement of the two groups.

**Comparison of Achievement Scores by Levels of Affective Domain**

## Analysis on Receiving Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>
S1	Experimental	49	1.22	0.743	.301	2.084	99	.040*
	Control	52	0.92	0.710				
S2	Experimental	35	1.17	0.664	.397	2.264	64	.027*
	Control	31	0.77	0.762				

Note. \* $p < .05$

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

In above table, the means of the experimental groups are higher than that of control groups. Hence, there is a significance difference in the achievement of students between the two groups.

## Analysis on Responding Component

<b>School</b>	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>MD</b>	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>
S1	Experimental	49	4.61	2.737	1.401	2.758	99	.007**
	Control	52	3.21	2.363				
S2	Experimental	35	3.37	2.647	1.210	2.181	61	.033*
	Control	31	2.16	1.828				

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

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

The means of the experimental groups are higher than those of the control groups. The results are also significantly different between the two groups in each selected schools.

## Analysis on Valuing Component

<b>School</b>	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>MD</b>	<b>t</b>	<b>df</b>	<b>Sig. (2-tailed)</b>
S1	Experimental	49	2.10	1.503	.698	2.603	91	.011*
	Control	52	1.40	1.159				
S2	Experimental	35	1.51	1.378	.894	3.143	59	.003**
	Control	31	0.68	0.909				

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

S1 = Basic Education High School, Wuntho

S2 = Basic Education Middle School (Branch), MyoThit

In above table, the means of the experimental groups in both schools are higher than those of the control groups. So, there are significant differences between the experimental and control groups of the two schools.

### **Summary of Findings**

The results of research findings were as follows.

1. There is a difference in the achievement of Myanmar between the students who receive interactive teaching methods and those who do not.
2. There is a difference in the achievement of Myanmar between the students who receive interactive teaching methods and those who do not in answering cognitive level questions (remembering, understanding, applying, analyzing, evaluating).
3. There is a difference in the achievement of Myanmar between the students who receive interactive teaching methods and those who do not in answering affective level questions (receiving, responding, valuing).

### **Discussion**

All interactive strategies require a positive and stimulate environment where the student can reveal his thoughts and express his ideas (Petrova, 2005). Interactive instructional classroom is a place where the teacher can move around all groups to assess the progress during instruction while traditional instructional classroom is a place where the teacher stands up in front of the class to inform (Hall, n.d., as cited in McNeil & Wiles, 1990). It is also a flexible space while traditional instructional classroom is a usual place.

According to findings, interactive teaching methods are more effective in teaching Myanmar than conventional method of teaching. But there were some variables that could not control in the experimental classroom. It was found that some students are shy to discuss their ideas and opinions, and some are worried about the mistakes they make while discussing and brainstorming. But students would like to have opportunities to share their own experiences with their friends as well through storytelling. It can be concluded that students from the experimental group improve not only academic performance but also the social and communication skills. Therefore, this study will be beneficial to some extent in the teaching learning process of Myanmar language.

## **Suggestions**

According to the research findings, it was found out that interactive teaching methods have many benefits for our education. Therefore, teachers at all levels should teach using interactive teaching methods to promote their pupils' academic performance, to learn from peers and teachers for developing social skills and abilities, organizing their thoughts and developing rational arguments.

## **Conclusion**

The main purpose of this study was to study the effectiveness of interactive teaching methods in teaching Myanmar at the middle school level. Quantitative research method was used to compare the achievement of Myanmar between the Grade Eight students from two selected schools. The design used in this study was one of the Quasi-experimental designs, namely, the non-equivalent control group design. It was conducted in Wuntho Township in Sagaing Region. The participants in this study were 167 Grade Eight Students from Basic Education High School, Wuntho and Basic Education Middle School (Branch), MyoThit in 2018-2019 Academic Year. The instruments for this study were pretest and posttest. The sets of pretest and posttest questions were distributed to the three educators from Sagaing University of Education in order to get validation.

Before the treatment, pretest was used to check the equivalence of the two groups. These two intact groups were assigned as experimental and control group. In each school, the control group was taught by conventional methods. The experimental group was taught by the interactive teaching methods such as brainstorming, storytelling and discussion.

And after the treatment, a posttest was used to measure the achievement of students. To calculate and analyze the results of students' performance from both schools, the independent samples *t*-test was used. On the overall Myanmar achievement scores, there were significant differences between control groups and experimental groups in two selected schools in answering cognitive and affective level questions.

Based on the findings of the research, the achievement of the Grade Eight students taught by interactive teaching methods was better than that of students who were not taught by interactive teaching methods. So,

interactive teaching methods are able to arouse the students' interest and encourage the active participation of everyone in the educational process. They also appeal to the feelings of students, contribute to the efficient absorption of the material being studied, have a multifaceted impact on them and allow giving feedback. It is obvious that interactive teaching forms life skills and promotes the behavior change.

Therefore, it can be concluded that using interactive teaching methods in teaching Myanmar increases the achievement of the students, encourages students' performance in answering cognitive and affective level questions and helps them improve the social and communication skills.

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# **A Study of the Effectiveness of Teaching Structures through Games**

Khine Nyein Aye<sup>1</sup> & Khin Than Myint<sup>2</sup>

## **Abstract**

The purpose of this study is to investigate the effectiveness of teaching structures through games at the middle school level. In this study, the experimental method was used to investigate the effectiveness of games in learning grammar. The design adopted in this study was one of the true experimental designs, viz. the posttest-only control group design. Three schools, viz. BEHS Pale, BEHS Panywa and BEHS Lattaunggyi in Pale Township, Sagaing Region were selected by simple random sampling method. It was conducted with the help of 60 Grade Five students from each school by using systematic sampling method. They were randomly assigned into two groups: control group and experimental group. The instruments used in this study were a placement test and a posttest. Independent samples *t*-test was used to explore whether there were significant differences between the two groups. The results of the study showed that the achievements of the experimental groups were significantly better than those of the control groups. According to the findings, it is recommended that games should be used in teaching structures to have better outcomes in students' achievement. It is also suggested that further researches should be conducted to investigate the effects of games on different areas of English, and other subjects as well.

**Keywords:** effectiveness, structures, games

## **Introduction**

Today, the development of civilization and education depends upon the growth and use of language that is a unique tool granted to human beings for communication. English plays an important role in the lives of people in every nation because it has a role as a language of science and technology and art. Almost all the great works of master minds are translated into English. In other words, human knowledge can be learnt through English. People who are proficient in English have easier access to information and knowledge.

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In our country, English is prescribed starting from Grade One to equip students with the proficiency of communicating in English. Students need to have a good foundation in grammar in order to communicate effectively in English. It is undeniable that grammar plays an important role in learning English. Having a good command of a language means not only to have communicative competence but also to achieve linguistic competence.

Structure is an important element in language. It is an essential means of conducting communication. It is useless studying a language without learning its structure. The language will be acceptable if the structure is correct. In addition, by definition grammar is a description of the structure of a language and the way in which linguistic units such as words and phrases are combined to produce sentences in the language. Traditionally, many teachers approach grammar teaching very seriously, making the lesson dull and uninteresting. Grammar seems to be something which is hovering like a threatening cloud below the classroom ceiling. If the teacher accidentally let slip out that today's lesson will consist of grammar instructions, amurmur would be heard in the classroom which would be likely to express boredom or lack of interest. That is one reason why applied linguists and teachers alike are trying to find ways and means in which grammar could be taught both effectively and interestingly.

One way to reinforce the grammar structures of students is through the use of games. Teachers should know that explanations and examples can be enlivened by varieties of language games. Language games deliver and stimulate an added dimension to language learning (Woodward, 1997, cited in Hamzah & Dourado, 2009). Therefore, this paper is an attempt to investigate the effectiveness of teaching structures through games.

### **Purposes of the Study**

- To explore the effectiveness of using games in teaching structures,
- To provide constructive suggestions on the findings, and
- To contribute some insights into improving the process of teaching English in general and teaching grammar in particular to sixth graders.

## **Research Hypotheses**

1. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Posttest Scores'.
2. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Adjective Degrees of Comparison'.
3. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Negative Pattern'.
4. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Tag Questions'.

## **Review of Related Literature**

### **Importance of Grammar in Language Learning**

Language is a system of arbitrary vocal symbols, which permit all people in a given culture, or other people who have learned the system of that culture to communicate or to interact (Finocchiaro, 1964, cited in Lightbown & Spada, 1993).

Grammar is an important element in teaching English. According to Lock (2002), grammar is a set of rules that specify the grammatical structures of the language. In the teaching of grammar, learners are taught rules of language commonly known as sentence patterns. According to Ur (1999), grammatical rules enable the learners to know and apply how such sentence patterns should be put together. The teaching of grammar should also ultimately center attention on the way grammatical items or sentence patterns are correctly used. In other words, teaching grammar should encompass language structure or sentence patterns, meaning and use.

### **Using Games in Teaching Grammar**

Using games in teaching grammar is better than any other methods because it enables teachers to teach grammar by absorption and repetition which is the way people learn their native language. Vernon (2008) mentioned four reasons to teach grammar with games. First, by using games in teaching grammar, students not only gain knowledge but also can apply

and use what they learn. So, games are regarded as communicative activities. Second, it is obvious that fun learning games usually contain repetition, which makes the language easier and understandable by students. Third, using games motivate students and increase the cooperation and competition in the classroom and this creates positive atmosphere. Fourth, learning a new language requires a great of tiring effort. Games facilitate the matter because they are amusing and challenging and they allow meaningful use of the language in context.

According to Sánchez, Morfin and Campos (2007), the steps in which a game is developed in a class are as follows.

- The teacher should give the instructions and example of the game.
- Then, students play the game. They should never be interrupted to give feedback because it may reduce their motivation and they might lose their confidence in the language.
- The teacher should be present so as to be assist students if they ask for help while the game is played.
- Afterwards, the winner is decided according to the rules of the game.
- At the end, there is feedback. It is a teacher's decision if it is given individually or in general to the class.

## **Materials and Methods**

A quantitative research method is used in order to compare students' achievement between two groups: control group and experimental group. The design used in this study was one of the true experimental designs, viz. the posttest only control group design. The instruments used in this study were a placement test of students' basic grammar knowledge to divide them into two equal qualified groups and a posttest to see students' achievement in teaching three structures. The posttest items were based on three structures: adjective degrees of comparison, negative and tag questions from Grade Five English Textbook. The placement test and posttest questions were prepared under the guidance of some experts from Department of Methodology, Sagaing University of Education. After getting validation from experts, suitable refinement was made. In order to evaluate the feasibility of the instruments for full-scale study, pilot experiment was conducted at BEHS (Branch) Kyeningyi in Pale Township.

The main study was conducted in BEHS Pale, BEHS Panywa and BEHS LattaungGyi, in Pale Township, Sagaing Region. These three schools were selected by simple random sampling method. Sample size was 180 Grade Five students of selected schools and each group consisted of 30 students. The placement test was administered to all participants before treatment. According to their results, the students were divided into two groups by random assignment of members of matched pairs. In each school, the control group was taught by conventional method and the experimental group had to learn grammar structures through using games. The treatment period was two weeks. At the end of treatment period, both groups from each school had to sit for posttest.

### Findings

Table 1. *t*-values for Overall Posttest Scores

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>P</i>
<b>BEHS1</b>	Experimental	30	36.03	6.08	5.16	2.83	58	0.006**
	Control	30	30.87	7.93				
<b>BEHS2</b>	Experimental	30	35.53	10.29	7.10	2.65	58	0.010*
	Control	30	28.43	10.45				
<b>BEHS3</b>	Experimental	30	36.83	7.07	6.96	3.57	58	0.001**
	Control	30	29.87	8.03				
<b>Total</b>	Experimental	90	36.13	7.95	6.41	5.12	178	0.000***
	Control	90	29.72	8.84				

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

**BEHS1**=BEHS Pale, **BEHS2**= BEHS Panywa, **BEHS3**=BEHS Lattaunggyi

According to the results, the mean scores of the experimental groups were significantly higher than that of the control groups on the posttest. Thus, it showed that teaching structures through games had significant effects on achievement scores of the students.

Table 2. *t*-values for Posttest Scores on Adjective Degrees of Comparison

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
<b>BEHS1</b>	Experimental	30	15.27	3.248	2.00	2.24	58	0.029*
	Control	30	13.27	3.657				
<b>BEHS2</b>	Experimental	30	15.80	4.350	2.53	2.07	58	0.043*
	Control	30	13.27	5.085				
<b>BEHS3</b>	Experimental	30	16.57	3.848	3.14	2.72	58	0.009**
	Control	30	13.43	5.001				
<b>Total</b>	Experimental	90	15.88	3.836	2.56	4.06	178	0.000***
	Control	90	13.32	4.576				

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

Results showed that the total mean score of the experimental groups was higher than that of the control groups. It showed that there was a significant difference between these groups on scores of Adjective Degrees of Comparison.

Table 3. *t*-values for Posttest Scores on Negative Patterns

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	<i>p</i>
<b>BEHS1</b>	Experimental	30	8.57	2.59	1.64	2.54	58	0.014*
	Control	30	6.93	2.39				
<b>BEHS2</b>	Experimental	30	9.43	3.35	2.70	3.14	58	0.003**
	Control	30	6.73	3.31				
<b>BEHS3</b>	Experimental	30	8.53	3.29	1.83	2.37	58	0.021*
	Control	30	6.70	2.67				
<b>Total</b>	Experimental	90	8.84	7.95	2.05	4.69	178	0.000***
	Control	90	6.79	8.84				

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

The mean scores of the experimental groups were significantly higher than that of the control groups. It showed that there were significant differences between the two groups for scores on Negative Patterns.

Table 4. *t*-values for Posttest Scores on Tag Questions

<b>School</b>	<b>Group</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>MD</b>	<b><i>t</i></b>	<b><i>df</i></b>	<b><i>p</i></b>
<b>BEHS1</b>	Experimental	30	12.20	3.49	1.53	2.20	58	0.040*
	Control	30	10.67	1.97				
<b>BEHS2</b>	Experimental	30	11.20	3.67	2.77	2.99	58	0.004**
	Control	30	8.43	3.48				
<b>BEHS3</b>	Experimental	30	11.73	2.80	2.00	2.60	58	0.012*
	Control	30	9.73	3.13				
<b>Total</b>	Experimental	90	11.71	2.90	2.10	4.42	178	0.000***
	Control	90	9.61	3.46				

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

The mean scores of the experimental groups were significantly higher than that of the control groups. It showed that there was a significant difference between the scores of experimental groups and control groups in answering apply level questions.

Therefore, there were significant differences between experimental groups and control groups in three schools in teaching structures through games at the middle schools. It can be interpreted that using games has positively contributed to teaching grammar structures: Adjective Degrees of Comparison, Negative Patterns and Tag Questions.

### Discussion and Suggestions

The purpose of this study is to find out the effectiveness of teaching structures through games at the middle school level. The followings will be discussed according to the findings of the experiment.

Firstly, relating to the overall posttest, the study's results showed that there were significant differences between the performance of the two

groups at .001 level,  $p < .001$ . Thus, it showed that teaching structures through games had significant effects on achievement scores of the students. Hence, games can contribute to the improvement of students' achievement in teaching grammar structures. This result is consistent with the finding of Yu (2005) who investigated the use of games as a teaching strategy for raising the grammatical accuracy level of secondary students of German as a second language. This study revealed the result that the use of game in practicing grammatical features may improve the students' rate of accuracy, as well as create a more positive learning experience overall.

From the results of the posttest scores on Adjective Degree of Comparison, there were significant differences between the performance of the two groups at .001 level,  $p < .001$ . It pointed out that the use of games in teaching structures had significant effects on students' achievement scores. Besides, the comparison of mean scores on Negative Patterns and Tag Questions indicated that there were significant differences between the means of the two groups in each school at 0.001 level,  $p < .001$ . Thus, their findings showed that the use of games in teaching structures had great potential for improving students' achievement generally. These results are consistent with Hamzah and Dourado (2009) who examined the effects of using games in teaching grammar, particularly in the use of the present simple tense and past simple tense in Malaysia. Their result indicated that grammar games had a positive effect in learning the present and the past simple tenses.

According to the research findings, the following facts were needed to consider for suggestions. While using games in teaching structures, the teachers should prepare the materials for games and manage to engage all the students in the games. The teachers who use structures through games should have a firm knowledge base about the purposes and procedures of games.

However, this study is not perfect in an effort, because there were some limitations in this study such as content area and time duration. In this study, the results were not representative for the whole content area of Grade Five English Textbook because only three grammar structures were studied. The participants were not able to get enough practice in the class especially the interpersonal and small group skills because time duration for two weeks was too be shortened. Therefore, further studies should be

extended with a large number of contents and enough time duration in order to obtain reliable and generalizable results.

This study was specially contributed to teaching grammar at the middle school level. Although this research was concerned with teaching structures, it can be applied into other language contexts, other subjects and the various school levels including primary school and high school levels. In this study, only three sample schools were randomly selected from Pale Township, Sagaing Region. To be more reliable, the similar research should be conducted on other States and Regions.

Finally, it is suggested that the teachers and students' attitudes towards the use of games in teaching structures or other language areas or other subjects at different school levels should be explored because teachers and students' attitudes are important to improve their teaching learning abilities.

### **Conclusion**

Games can be applied in classes to improve learners' language acquisition and to facilitate students' learning. The results of this study are expected to be beneficial for English teaching. In addition, the results of this study are also expected to be the guidance for language teachers in constructing and using games in teaching grammar. Besides, it is expected that this paper would provide teachers with some insights into making their lessons effective by arousing students' interest in learning structures.

According to the results of the study, the conclusions were as follows.

1. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Posttest Scores'.
2. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Adjective Degrees of Comparison'.
3. There are significant differences between the performance of the control group and that of the experimental one in relation to the 'Negative Pattern'.

4. There are significant differences between the performance of the control group and that of the experimental one in relation to the ‘Tag Questions’.

To sum up, the results of students’ performance with games did better than those with conventional method. Therefore, games should be used in teaching structures in order to facilitate teaching English as a foreign language in our country.

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## The Effects of Problem Solving Method in Teaching Geometry at the Middle School Level

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### Abstract

The main purpose of this study is to investigate the effects of using problem solving method on students' achievement in teaching Geometry at the middle school level. In today Mathematics classroom, some students are difficult to solve the geometrical problems and thus lack of interest in mathematics. Teachers should find out the suitable approaches for improving teaching learning process. Problem solving method is one of the effective techniques in different stages of teaching geometry. To explore the effects of this method, a sample of (122) Grade Six students from two Basic Education High Schools in Sagaing Township were used. The design applied in this study was one of the quasi-experimental designs, nonequivalent control group design. The sample schools were selected by using simple random sampling method and two classes from each school were also randomly selected as intact groups. These groups were assigned to experimental and control groups. Both groups were administered a pretest at the beginning of the study to determine initial group equivalence. After the treatment, the sample students were administered a posttest to find out that the problem solving method was really effective in students' achievement. To show statistically, the data obtained was analyzed by using independent samples *t* test. Findings of the study showed that the achievement of the students who received problem solving method were better than that of students who did not. Thus, this study recommended that the teachers should be encouraged to employ problem solving method that is contributed to sound foundation of teaching geometry at the middle school level.

**Keywords:** problem, problem solving method, geometry

### Introduction

In the era of globalization and technological revolution, education is critical for promoting sustainable development and improving the capacity of people to address environment and development issues. It represents a key component of adaptive capacity: knowledge, skill and behaviors

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necessary to adapt live and livelihood to a changing environment. In this nurturing and cultivating process, Mathematics has played a very important role in imparting and transmitting knowledge and skills for using in everyday life. It is prescribed as a compulsory subject in Basic Education level and geometry is one of the branches of Mathematics. It deals with the study of spatial relationships of physical objects and it encompasses a whole range of concepts in all science.

Although it is increasing expectation on students with regard to geometry, some students have serious difficulties in geometry concepts and have failed in their performance (Herbst, Cheah & Richard, 2016). Moreover, a study states that many students view mathematics as a string of procedures to be memorized and they emphasize right answers more than right thinking (Bikic, Maricis & Pikula, 2016). This type of learning creates neither quality knowledge nor the ability to solve the problems which leads to lack of interest in mathematics. In Myanmar, one of the objectives of teaching geometry is to help students learn the spatial relations of geometrical figures by experimenting and at the same time to develop logical reasoning and problem solving skills in real life situation (MOE, 2007). Consequently, it is important that the teachers' role is to facilitate learners by learning opportunities in which students can construct new knowledge in their own learning. Teachers should realize how to develop problems and help students to acquire the intentional cognition that they want them to develop. Therefore, this study is to explore the effects of problem solving method in teaching geometry at the middle school.

### **Purpose of the Study**

1. To investigate the effects of problem solving method in teaching geometry at the middle school level,
2. To compare the geometry achievement between the students who are taught by problem solving method and those who are taught by conventional method,
3. To give suggestions for developing teaching geometry based on the results of the study.

## **Research Hypotheses**

1. There is a significant difference between the geometry achievement of Grade Six students who are taught by problem solving method and those who are taught by conventional method.
2. There is a significant difference in the geometry achievement between students who are taught by problem solving method and those who are not in answering remembering level questions.
3. There is a significant difference in the geometry achievement between students who are taught by problem solving method and those who are not in answering understanding level questions.
4. There is a significant difference in the geometry achievement between students who are taught by problem solving method and those who are not in answering applying level questions.
5. There is a significant difference in the geometry achievement between students who are taught by problem solving method and those who are not in answering analysing level questions.

## **Review of Related Literature**

### **Problem Solving Method**

The education landscape of today's world is undergoing fundamental transformation with regard to method, content and space of learning. This offers new opportunities which may be less structured and more innovative approach for learning. Ausubel (n.d., cited in Zubair, 2012) stated that problem solving is an educational device that involves concept formation and discovery learning. Killen (2016) pointed that teaching through problem solving that engages learners actively and purposefully in learning by focusing their attention. It develops their thinking and reasoning skills including their ability to analyse situation to see a practical need for making sense of the subject they are studying. This method involves activities for students such as to find out the characteristics of the forwarded problems, to apply existing knowledge to solve the problems and to select suitable strategies to carry out the problem solving. In 1957, George Polya successfully established a mathematics model for problem solving. This model could be implemented in four stages: understand the problem, plan the problem solving strategy, implement the problem solving strategy and check the solution alternately. By applying these steps in solving

mathematical problems, students can promote critical thinking and problem solving skills (Sang, 2003). It is a way of behaving that also facilitates scientific thinking, cause and effect relationships to find evidence and proof (Collette & Chiappetta, 1989). Problem and puzzling situation which are normal features of a students' everyday life in school also. These problems grow in complexity as they grow older and older. Teacher need to help them how to thinks and reflect so that they are able to apply this to a varied real life problem. Thus, it is very important that problem solving must be encouraged in school life (Aggarwal, 2011). In problem solving method, the learners actively try to organize the new information and add it to their existing scheme in the process of assimilation. Learning is also socially constructed through interaction with peers, teachers and parents and so on. Therefore, it is best to adjust and construct the learning situation by encouraging group works and discussion through the process of accommodation (Muijs & Reynolds, 2011).

According to Vygotsky's cognitive development theory, learners can extend their zone of proximal development with the assistance of anyone who recognizes their current learning needs and is capable of lending the needed support (Kivunja, 2015). Thus, the constructivist teachers provide the pupils the necessary scaffolding while solving the problem and create learning environment in which pupils interact meaningfully with academic materials to develop their cognitive structure (Muijs & Reynolds, 2011). The procedure of problem solving method is almost like the project method. It can also take the form of inductive-deductive methods. The procedure involves the following steps.

1. Recognizing the problem
2. Defining, interpreting and delimiting the problem
3. Collecting relevant data
4. Organizing and evaluating the data
5. Formulating the tentative solution
6. Arriving the correct solution
7. Verifying the result (Mishra, 2009).

## Teaching Geometry

Geometry is a branch of Mathematics that deals with the study of measurement, properties and relationships of points, lines, angles, surfaces and solid elements that remain invariant under specified transformation. It is through geometry that children begin to develop an understanding of geometric shapes and structures and how to analyze their characteristics and relationships (National Council of Teachers of Mathematics, 2000). During the twentieth century, it has been recognized that geometry in some form has a vital role in the wider mathematics curriculum (French, 2004). To teach geometry effectively, it is important to ensure that students understand the concepts they are learning and the steps that are involved in particular process rather than only learning rules. The following three stages are suitable and useful for geometry teaching.

**1. The Practical Stage:** At this stage, the students will acquaint the common geometrical concepts and figures by handling geometric models. They will be taught and observed how to keep and handle the instruments of geometric figures. It is a period of experimentation, observation, recognition and construction.

**2. The Stage of Reasoning:** It is the stage to learn to prove theorems and exercises. The proofs will have to be presented in both the practical and theoretical forms to provide the flawless understanding. The students will be able to know the interesting theorems of plane geometry and to solve easy. It is important for the formal reasoning to this next stage.

**3. The Systematic Stage:** It is the stage of acquisition of mastery of reasoning. The reasoning will be more rigorous but properly suited to the mental age of the pupils. Practice in logical reasoning will be more important than convincing them that the facts are true (Sidhu, 1995).

## Research Method

In this study, experimental method, which is one of the quantitative research methods, was used.

## Sample

Participants in this study were randomly selected as intact groups from two classes of each school. The sample of this study were (122) Grade Six students from two Basic Education High Schools.

## **Research Instruments**

### **Pretest**

In this study, the pretest was used to determine group equivalence between experimental and control groups. It consists of (30) multiple choice items, based on Grade Five Mathematics Textbooks, volume II. To establish the reliability of the instruments, a pilot study was conducted at No. (1) Basic Education High School, Sagaing. After that, internal consistency among the pretest items can be analyzed by using Kuder-Richardson 20 and got the reliability level of KR-20 was .95.

### **Posttest**

The posttest consisted of three sections. They were 10 multiple choice items in Section A: five short questions in Section B and five long questions in Section C. This test was developed based on Chapter 7, Area and Volume, Grade Six Mathematics Textbook Volume (II) for measuring the four levels of Bloom Taxonomy. After the pilot period, items were analysed by reliability statistic with Kuder-Richardson 20 and got the reliability level of KR-20 was .97.

### **Procedure**

At the start of the study, two classes were randomly selected from each school as intact groups. These two groups were assigned the experimental and control groups. Then, two groups were administered to take a pretest to determine the level of performance of the subject for the purpose of comparison. The means of the groups were calculated by using independent sample *t* test to determine group equivalence. Procedures for problem solving method are developed by using the seven steps: recognizing the problem, interpreting and delimiting the problem, collecting relevant data, organizing and evaluating the data, formulating the tentative solution, arriving the correct solution, verifying the result (Mishra, 2009). And then the researcher also prepared the teaching materials. While experimental group was given by problem solving method, the control group was received by conventional method to the same content for the same period. After treatment, the posttest was administered to both groups. And then, the findings were presented based on groups' scores. The quantitative data was analysed by using Statistical Package for the Social Science (SPSS).

### Findings

To be able to determine whether the control and experimental groups were the same at the beginning of the study, the students were pretested.

Table 1. *t* Values for Pretest Geometry Knowledge Scores

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS 2	Experimental	30	23.17	3.06	0.51	0.737	57	.464
	Control	29	22.66	2.18				
BEHS 3	Experimental	31	19.35	2.88	-0.34	-0.401	61	.690
	Control	32	19.69	3.64				

Note. BEHS 2 = No. (2) Basic Education High School, Sagaing

BEHS 3 = No. (3) Basic Education High School, Sagaing

The mean scores of experimental and control groups showed that there was no significant difference between the achievements of students in pretest in both schools (Table 1). It can be interpreted that all of the students had the same level of their basic geometry knowledge in both groups.

Table 2. *t* Values for Overall Posttest Geometry Achievement Scores

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS2	Experimental	30	34.13	8.22	8.27	4.620	50	.000***
	Control	29	25.86	5.26				
BEHS3	Experimental	31	51.45	11.19	12.26	4.331	61	.000***
	Control	32	39.19	11.28				

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

Table (2) showed that the mean scores of experimental groups were significantly higher than the mean score of control groups in both schools. It

can be concluded that there was a significant difference in the geometry achievement of overall posttest scores between students who were taught by problem solving method and those who received by conventional method.

Table 3. *t* Values for Posttest Scores on Remembering Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS 2	Experimental	30	10.80	3.680	2.77	3.121	57	.003***
	Control	29	8.03	3.088				
BEHS 3	Experimental	31	10.06	3.720	2.15	3.125	61	.003***
	Control	32	7.91	3.226				

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

The mean scores of experimental groups were higher than the mean scores of control groups in both schools at remembering level questions. It can be interpreted that there was a significant difference in the geometry achievement between students who were taught by problem solving method and those who were not in answering remembering level questions on the posttest (see Table 3).

Table 4. *t* Values for Posttest Scores on Understanding Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS 2	Experimental	30	2.93	0.37	0.45	3.128	42.31	.003**
	Control	29	2.48	0.69				
BEHS 3	Experimental	31	2.97	0.19	0.18	2.304	42.25	.026*
	Control	32	2.78	0.42				

Note. \*\* $p < .01$

The mean scores of experimental were significantly different from the mean scores of control groups in both schools. It showed that there was a significant difference in the geometry achievement between students who

were taught by problem solving method and those who were not in answering understanding level questions on the posttest.

Table 5. *t* Values for Posttest Scores on Applying Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS 1	Experimental	30	3.48	0.68	1.58	6.501	78	.000**
	Control	29	1.90	1.37				
BEHS 2	Experimental	31	2.75	1.06	0.87	2.943	78	.004**
	Control	32	1.88	1.56				

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

The mean scores of experimental groups were significantly different from the mean scores of control groups in applying level of each school (see Table 5). It can be indicated that there was a significant difference in the geometry achievement between students who were taught by problem solving method and those who were not in answering applying level questions. Therefore, the use of problem solving method in teaching geometry could improve the students' ability to apply their knowledge to a new learning situation.

Table 6. *t* Values for Posttest Scores on Analysing Level Questions

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig. (2-tailed)
BEHS 2	Experimental	30	4.00	0.983	0.66	2.846	57	.006**
	Control	29	3.34	0.769				
BEHS 3	Experimental	31	3.97	0.983	0.72	3.179	61	.002**
	Control	32	3.25	0.803				

Note. \*\* $p < .01$

Table 6 showed that the mean scores of experimental groups were higher than the mean scores of control groups in both schools. The results

can be summarized that the problem solving method could develop the procedural knowledge of students learning activities in teaching geometry.

### **Discussion**

According to the above results, problem solving can be used as an effective method in teaching Geometry at the middle school level. The values of *t* test revealed that the mean scores of experimental groups were significantly different from the mean scores of control groups in both schools for the combination of posttest question. These results support the first hypothesis. This result consistent with the finding of Ali, Hukamdad, Akhter and Khan (2010) who investigated that problem solving is more effective method of instruction for teaching and learning mathematics and makes improve the achievement of the students than traditional method of teaching. At the comparison of mean scores on remembering and understanding levels, the results showed that the performance of experimental groups were better than the performance of control groups in both schools. Therefore, the hypotheses that there is a significant difference in the geometry achievement between students who are taught by problem solving method and those who are not in answering remembering and understanding level questions are accepted. Moreover, the findings showed that the text-based extended problems could be more difficult for some students who did not receive problem solving method in answering at applying and analyzing level questions. It indicated that the use of problem solving through teaching could bring better achievement and higher cognitive level of Bloom's Taxonomy. Thus, the fourth and fifth hypotheses are accepted.

### **Suggestions**

Based on the study, the problem solving method is a reasonably suitable approach for geometry teaching at the middle school level. Teacher should create visual stimulus for students' cognitive formation in their learning geometry. This can make meaningful learning for students and increase the chance they will actively engaged in problem solving. By using problem solving in teaching geometry, teacher can promote students' curiosity and inquiry. This makes students learning by doing. It is important for progressive organization of geometric ideas and the information process of cognitive structure on learning.

Routine and non-routine problems should be deliberately structured around a common theme. When students recognize the way in which it is similar and different from the previous problems, they will understand to think about the different concepts embedded in each problem and will apply this knowledge in their solution. In addition, teacher will need to identify students' previous knowledge before using problem solving approach in teaching geometry. If necessary, teacher should teach them the necessary concept in their field of study to start their problem solving. This will develop spatial relationship in geometrical facts and will apply that understanding with confidence to new learning situation. In addition, teacher should notice that most of the students actually inhabit through problem solving in Myanmar. Thus, mathematics teacher should encourage team work among students in order to discuss problems, listen to explanation of other students and learning and thinking scaffolds for each other. Although problem solving method can improve the students' academic achievement, it needs to be carefully planned and conducted to use allocated time effectively and efficiently.

### **Conclusion**

The main purpose of this study was to investigate the effects of problem solving method on the achievement of Grade Six students in teaching geometry. Quantitative research method was used to compare students' achievement in remembering, understanding, applying and analysing level questions between experimental groups and control groups in both schools. The design adopted in this study was one of the quasi-experimental designs, nonequivalent control group design and the instruments for this study were pretest, lesson plan and posttest.

According to the research findings, there was a significant difference in the achievement of overall posttest scores between experimental groups and control groups in both schools. The students who were taught through problem solving are more likely to take academic risks and a better understanding of their learning from which they can transfer their knowledge to other situation. It can provide students an interesting, stimulating and great satisfaction through their own learning. Teacher can get the opportunities for evaluating students' learning and thus the special talent of the students can be nurtured. With the 21st century skills, students will be prepared to think, learn, work, solve problem, communicate,

collaborate and contribute effectively through their lives. These skills are essential for all students today. Therefore, to be able to adapt in 21st century technology, teachers need to emphasize on problem solving as vehicle method for effective contribution to teaching geometry in middle school mathematics.

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# The Effectiveness of Group Learning Strategies in Teaching Physics at the High School Level

Padauk Win<sup>1</sup> & Phyo Wai Myint<sup>2</sup>

## Abstract

The purpose of this research was to study the effectiveness of group learning strategies in teaching physics at the high school level. In this study, one of the Quasi-Experimental Designs; Nonequivalent Control Group Design was used. An experimental study was conducted with 188-Grade Nine students from BEHS, Budalin and BEHS, NyaungGan in (2017-18) Academic Year. Before the treatment, two intact groups in each school were randomly assigned as the experimental and the control groups. Then, both groups were administered a pretest. According to the analysis of pretest scores, it was found that the groups were essentially the same before the treatment. During one month of the treatment period, the experimental groups were taught by team-based learning which is one of the group learning strategies and control groups were taught by conventional teaching methods. After the treatment, both groups were administered a posttest. Independent samples *t*-test was used to test whether there was a significant difference between the experimental and the control groups according to the Bloom's taxonomic level of cognitive domain. Research findings pointed out that the experimental groups were found to have equal or more positive effects than the control groups on the examination scores of the students at most of the cognitive levels. It can be interpreted that the use of group learning strategies in teaching physics was found to attain the achievement of higher cognitive skills and to enhance the students' physics achievement. Therefore, teachers should be encouraged to use group learning strategies in teaching physics to achieve better learning outcomes.

**Keyword:** Effectiveness, Group learning strategies

## Introduction

### Importance of the Research

Present age is known as the age of science; so science is considered as an important subject in school curriculum. In this era of science, large

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numbers of people are being employed in scientific pursuits and for this, they need knowledge of science.

Science and technology must become the essential components in any educational enterprises; they must be incorporated into all educational activity in order to help the individual control social energies as well as natural and productive ones - thereby achieving mastery over himself, his choice and his action and finally they must help man acquire a scientific turn of mind so that he will be able to promote science without being enslaved by it (Kumar, 1995). Thus, science education is essential as it is of immense value in the students' individual life.

Physics is the key to many doors of opportunity that open up to the challenging, meaningful and rewarding careers in industry, government, academia and the private sectors. Physics underlies all other basic science and is the basis for much of the technology because it is concerned with the most fundamental aspects of matter and energy as well as the laws that govern their interactions (Dayal, 2012). It also improves the quality of life by providing a basic understanding necessary for developing new instrumentation and techniques for educational applications. So, physics should be a required subject in all school curriculums.

Effective group work requires understanding of group dynamics and the planning and monitoring of appropriate group activities. The instructors need to consider the diverse needs of students and the development of the groups. Team-based learning is an extraordinary form of small group learning and similar to several types of group-based pedagogies being used in education, such as collaborative or cooperative learning. However, team-based learning has specific characteristics that can differentiate it as a unique instructional strategy. In collaborative learning, the focus is on the use of complementary skills to solve a small activity and in cooperative learning, the use of cooperative skills to solve a long-term project; where as in team-based learning the focus is beyond complementary or cooperative skills (Murzi, 2014).

Group learning is an effective instructional method in teaching physics. This study aims to investigate the effects of group learning strategies on students' physics achievement. The use of team-based learning as a form of small group learning can be more effective and more enjoyable. This paper would also contribute some insights into teaching of physics.

## **Purpose**

The purpose of this research is to study the effectiveness of group learning strategies in teaching physics at the high school level.

## **Objectives**

The objectives of this research are as follows;

1. To explore the effectiveness of group learning strategies in teaching physics at the high school level.
2. To highlight the difference between the performances of the students with group learning strategies and that of the students without group learning strategies.
3. To give suggestions and recommendations for the use of group learning strategies in teaching physics at the high school level.

## **Scope**

The following points indicate the scope of the research study.

1. This study was geographically limited to Budalin Township, Sagaing Region.
2. Participants in this study were 188-Grade Nine students from Basic Education High School, Budalin and Basic Education High School, NyaungGan in (2017-18) Academic Year.
3. This research is limited to the content area of Chapter (9), Reflection of Light, from Grade Nine physics textbook.
4. In this study, the experimental groups were taught by using team-based learning which is one of the group learning strategies and the control groups were taught by using conventional teaching methods.

## **Review of Related Literature**

### **Theoretical Grounding of Team-Based Learning in Constructivism**

An important question to explore is "How well does group learning follow the principles of constructivist learning theory?" Small group learning is widely accepted as an important learning strategy in education. It provides more scopes than lectures for learner involvement and participation. Personal involvement can also increase motivation and

interest in subject matter. Small group work promotes learning in providing opportunity to share and test ideas with others and to examine different perspectives on issues. The lecturers can get to know the students better, observe how they respond to the unit materials and learning activities and to diagnose learning problems and to clarify misunderstanding.

Team-based learning is a unique and powerful form of small group learning. It harnesses the power of teams and social learning combined with accountability structures and systematic instructional sequences to achieve powerful results. This method is used for large classes that are divided into smaller groups (referred to as teams) that have maximal diversity within the teams but relative evenness between the teams. This is accomplished by deciding what the key characteristics of individual members that would promote the success of a team are and then, distributing people with these qualities evenly between the teams (Michaelsen et al., 2008, as cited in Hrynchak& Batty). In that way, each team has a maximal diversity in the knowledge and experience of the members that can be drawn upon when collaboratively solving the analysis problems.

Team-based learning is solidly grounded in constructivism and is a promising method to strengthen education. In team-based learning, the teacher acts as a guide to learning by setting the educational objectives and developing study materials, tests and appropriate problems for the groups to solve. The instructor guides discussion that is generated by the learners. Strategies providing passive learning such as lecturing are reduced in this process. Student-centered principles and supportive scaffolding are important in constructivist learning theory. Team-based learning allows learners to compare their current understandings with those of the group and debate controversial points in the group readiness assurance tests and group application exercises (Hrynchak& Batty, 2012). This is consistent with a constructivist view that learning occurs by integrating information obtained by new experiences into existing mental schemes.

### **Research Method**

This study aims to investigate the effectiveness of group learning strategies in teaching physics at the high school level. Quantitative research method was used to compare students' achievement in learning physics between the two groups: experimental and control groups.

## Method

In this study, one of the Quasi-Experimental designs; “the Nonequivalent Control Group Design” was used.

## Findings

Findings and interpretations of the experimental study are to ascertain the effectiveness of group learning strategies in teaching physics at the high school level. To show the results of the study regarding the research hypotheses, the researcher presents the statistical data that was analyzed by using statistical program, SPSS (2011). Quantitative findings were based on the scores of physics pretest and posttest. Tables and graphs were also used to clarify and present the data with analysis and interpretation.

Table 1. Analysis on Pretest Means

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> ( <i>2tailed</i> )
School 1	Experimental	54	20.52	4.377	1.624	1.966	109	.052*
	Control	57	18.89	4.321				
School 2	Experimental	41	20.83	4.674	.857	.887	75	.378*
	Control	36	19.97	3.660				

Note: \* $p > .05$

Table (1) showed that there was no significant difference between the mean of the control and experimental groups in both schools before they are treated. According to this data, it can be interpreted that both groups in each school started with the same initial ability.

Table 2. Analysis on Overall Posttest Means

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2tailed)
School 1	Experimental	54	25.43	8.460	8.356	5.843	109	.000**
	Control	57	17.07	6.530				
School 2	Experimental	41	18.83	8.585	4.440	2.483	75	.015*
	Control	36	14.39	6.867				

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

Table (2) showed that the mean of the experimental group in each school was significantly higher than that of the control group. It also indicated that there was a significant difference at ( $p < .001$ ) in School 1 and at ( $p < .05$ ) in School 2 between the posttest scores of the two groups. This data is shown in Figure (1).

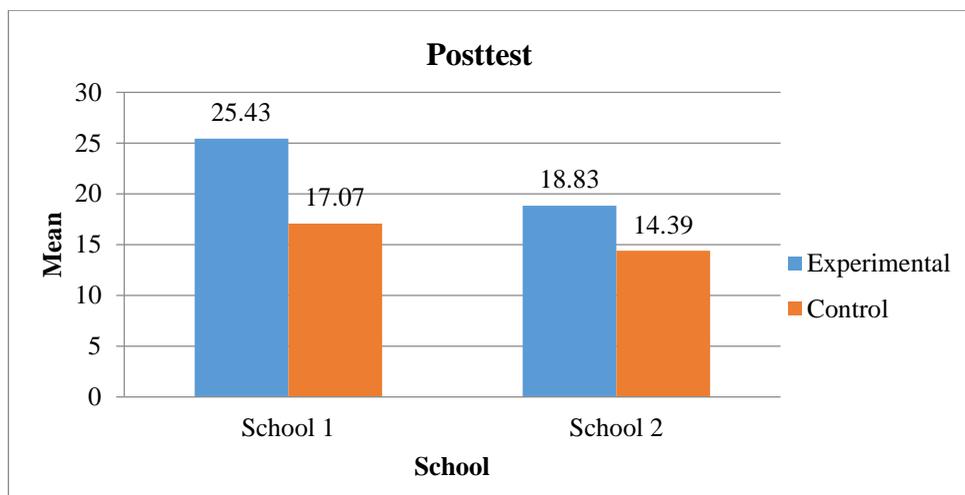


Figure 1. Graphic Illustration for Overall Posttest Means

From the above findings, it can be interpreted that the use of group learning strategies had a significant effect on students' physics achievement. Therefore, the students of the experimental groups gained a significant positive effect due to the group learning strategies at some

cognitive levels (i.e remembering, understanding, applying and analyzing level).

### Comparison of Posttest Means by Level of Cognitive Domain

Table 3. Analysis on Remembering Level Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)
School 1	Experimental	54	9.39	3.477	1.599	2.456	109	.016*
	Control	57	7.79	3.385				
School 2	Experimental	41	8.10	3.714	2.070	2.691	75	.009**
	Control	36	6.03	2.923				

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

Table (3) indicated that the means of the experimental groups was significantly higher than those of the control groups in both schools. At the remembering level, thus, there was a significant difference in the means of the two groups at ( $p < .05$ ) in School 1 and at ( $p < .01$ ) in School 2. Figure (4.2) illustrates the comparison of means between the groups.

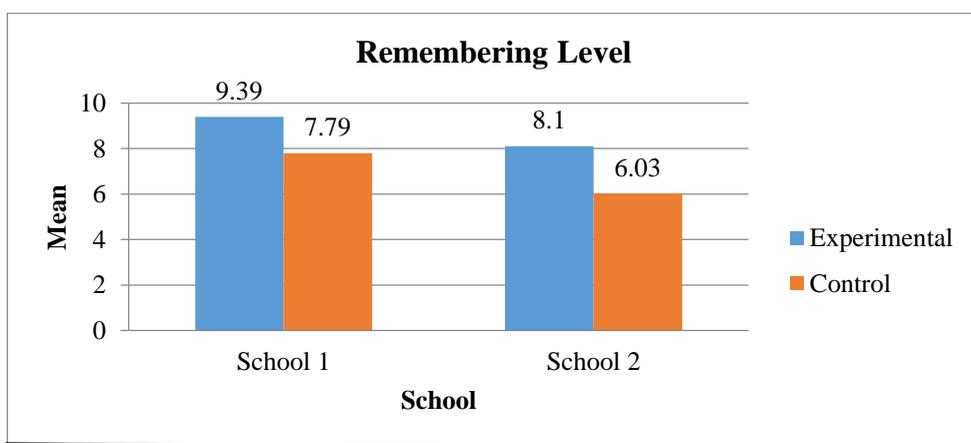


Figure 2. Graphic Illustration for Remembering Level Means

According to these findings, the groups of experimental students who received group learning strategies were found to have more effective

achievement than the groups of control students. Therefore, it can be interpreted that group learning strategies tend to be more effective for all students to recall the information they have learned previously.

Table 4. Analysis on Understanding Level Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)
School 1	Experimental	54	6.83	2.739	3.079	7.090	109	.000**
	Control	57	3.75	1.755				
School 2	Experimental	41	4.46	2.215	1.102	2.342	75	.022*
	Control	36	3.36	1.869				

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

Table (4) revealed that the experimental groups showed a clear superiority over the control groups in the mean score of understanding level questions in both schools. Thus, there was a statistically significant difference at ( $p < .001$ ) in School 1 and ( $p < .05$ ) in School 2 between the understanding level means of the two groups. It is also shown in Figure (3).

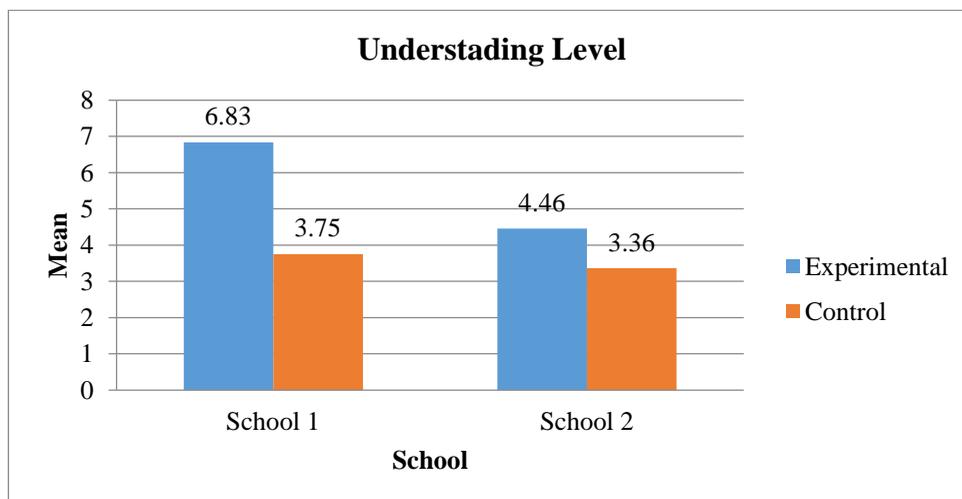


Figure 3. Graphic Illustration for Understanding Level Means

On the basis of findings, it can be interpreted that group learning strategies tend to be more effective than the conventional teaching methods for students to grasp the meaning of their learned materials. So, group learning that actively engage students in learning process can increase the conceptual understanding.

Table 5. Analysis on Applying Level Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)
School 1	Experimental	54	5.00	1.833	2.211	7.757	109	.000**
	Control	57	2.79	1.098				
School 2	Experimental	41	3.32	1.753	.706	1.925	75	.058*
	Control	36	2.61	1.420				

Note: \* $p > .05$ , \*\* $p < .001$

According to this table, the mean of the experimental group was significantly higher than that of the control group in School 1. But in School 2, the experimental group was not significantly higher than the control group in the mean of applying level questions. This indicated that there was a significant difference at ( $p < .001$ ) in School 1, but there was no significant difference in School 2 on the mean of application items. It can be seen in Figure (4).

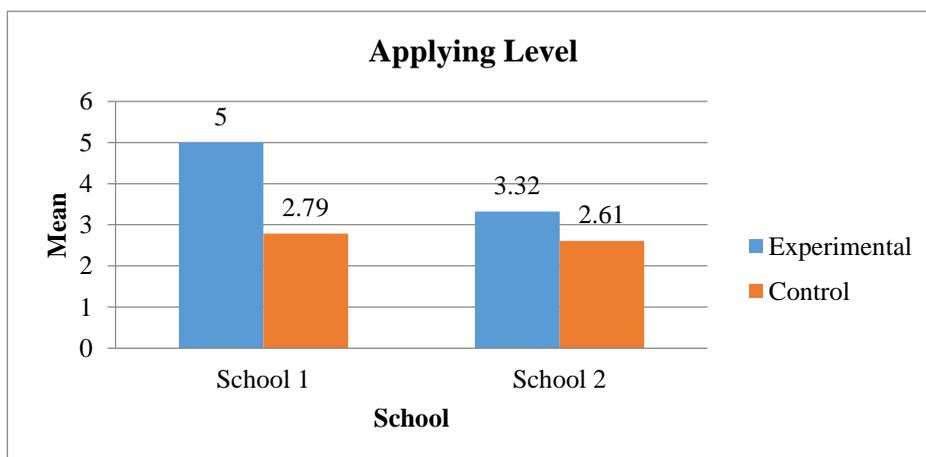


Figure 4. Graphic Illustration for Applying Level Means

The above findings proved that group learning strategies could bring the improvement of students' ability to solve physics problems, to apply physics concepts and skills in real life situations. But the experimental treatment did not show any significant effect in School 2. It can also be interpreted that group learning strategies can encourage students to utilize what they already known in solving problems.

Table 6. Analysis on Analyzing Level Component

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig.</i> (2-tailed)
School 1	Experimental	54	4.50	2.925	1.728	3.960	109	.000**
	Control	57	2.77	1.476				
School 2	Experimental	41	2.98	1.666	.587	1.625	75	.108*
	Control	36	2.39	1.479				

Note: \* $p > .05$ , \*\* $p < .001$

As shown in Table (6), the mean of the experimental group in School 1 was significantly higher than that of the control group but the mean of the experimental group in School 2 was not significantly higher than that of the control group. This also showed that there was a significant difference at ( $p < .001$ ) in School 1 but there was no significant difference in School 2 on the mean score of analysis items. The following figure illustrates it graphically.

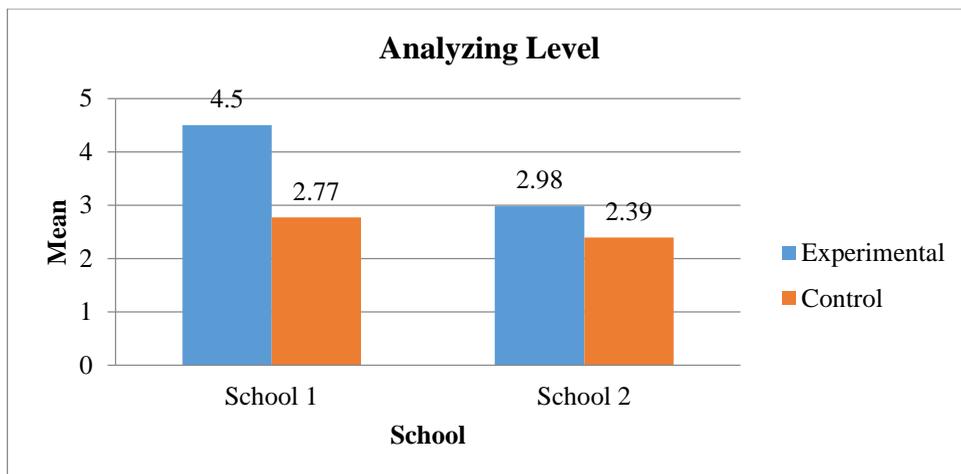


Figure 5. Graphic Illustration for Analyzing Level Means

From the above data, it can be interpreted that group learning strategies had a significant positive effect in School 1 but did not have in School 2 concerning the analyzing level scores. Therefore, group learning strategies can encourage students to be able to distinguish between facts and inferences, and to explain the relationships among the parts.

## Conclusion and Recommendation

### Conclusion

The main account in education should be on the awakening of curiosity, the stimulation of creativity, the development of proper interests, attitudes and values. In order to help learners reach full intellectual potential, there is a crucial need to teach in ways that require learners to use all their abilities. In fact, using group instructional strategies can enhance the effectiveness of teaching. Team-based learning is an instructional strategy that promotes active student learning through small group discussion and activities. The individual and group readiness assurance tests motivate students to prepare well by attempting to independently master knowledge contained in preparatory learning. Team-based learning's sequential strategy could also motivate learners to go beyond mere mastery of the essential facts. During the group application exercise, learners became more proficient in applying basic didactic knowledge to realistic situations. Thus, effective implementation of team-based learning

can enhance long term memory and meaningful learning that makes the transfer of learning.

### **Recommendation**

The findings of the current study present a number of implications for the teaching of physics. This study provides support for the use of team-based learning as an instructional strategy to achieve the better learning outcomes in physics students. Previous studies revealed that students working in small groups tend to learn more of what is taught and retain it longer than when the same content is presented in other instructional format (Cockrell et al., 2000, as cited in Hassanien, 2006). Group learning also promotes the development of social skills such as communication, presentation, problem solving, leadership, delegation and organization. It is clear that there is a wide variety of values that students can gain from their group work experience. They vary from behavioral skills to the accumulation of intellectual and personal skills. And group learning provides a very valuable experience that further develops students' learning and achievement.

Team-based learning is a learner-centered instructional strategy in which the student teams are engaged in meaningful problem-based tasks. Students are assigned into small teams in a manner that equally distributes student characteristics and resources across all groups. Team-based learning promotes both individual and group accountability through the use of Individual Readiness Assurance Tests and Team Readiness Assurance Tests that apply the content learned in preparation for the class. It focuses heavily on application of learning that increases the student's ability to critically think about and solve problems (Whittaker, 2014). For further research, the following recommendations are made:

1. Teachers should use not only the team-based learning but many other group learning instructional strategies at all levels of learning.
2. It is recommended that further research on team-based learning specifically should focus on academic outcomes beyond knowledge retention, such as critical thinking and application of knowledge which are core to the principles underlying this teaching strategy.
3. Having established some preliminary evidence for the effectiveness of team-based learning on improving students' academic learning

outcomes, it is also recommended that further research towards drawing conclusions on how and why the particular elements of team-based learning are effective in the way they are.

4. Teachers should develop better conceptual questions to assess the students' conceptual understanding, not just to see if they have the factual knowledge or procedural knowledge. And students should be provided with more problems to facilitate the transfer of their conceptual understanding to new problems.

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## **A Study on the Attitude of Pre-service Teachers towards Teaching Practice at Sagaing Institute of Education**

Saw Ohnmar<sup>1</sup> & Johnny Than<sup>2</sup>

### **Abstract**

This study is a descriptive survey which sought to study the attitude of pre-service teachers towards teaching practice. The sample comprised of (300) pre-service teachers who had teaching practice experience from Sagaing Institute of Education during the academic year 2013-14. The number of male and female was equal. To obtain the required data, the questionnaire having 40 Likert-type items and the demographic data were developed. The questionnaire was constructed on the basis of teachers' attitude questionnaires of Hussain (2004) and teaching practice questionnaires of Nwanekezi, Okoli & Mezieobi (2011) and Gujjar, Ramzan & Bajwa (2011). After developing the questionnaire, it was validated by experts and pilot test was held. The Cronbach's alpha internal consistency reliability was (0.73). Finally, the questionnaires were distributed to the respondents who were selected by using stratified random sampling procedure. The attitude of pre-service teachers towards teaching practice was compared by two variables: gender and teaching practice experience. The obtained data was analyzed by using descriptive statistics, independent samples *t*-test and one way analysis of variance (ANOVA). The findings revealed that the majority of pre-service teachers possess positive attitude towards teaching practice. The female pre-service teachers have more positive attitude towards teaching practice compared to the male pre-service teachers. The pre-service teachers who have more teaching practice experience have more positive attitude towards teaching practice than the others. Finally, suggestions and recommendation for further studies in the area of teaching practice were discussed.

**Keywords:** attitude, pre-service teachers, teaching, teaching practice

### **Introduction**

Every educational system in any identified human society requires highly skilled teaching staff to raise the standard of education. In this way, teachers are of central importance and should develop specific skills and vision to contribute to this goal. Teachers in any society play a vital role in the development of the individual child (Major & Tiro, 2012). This shows

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that it is imperative to invest in the preparation of teachers so that the future of a nation is secure.

The sole aim of a teacher education programme anywhere in the world is the preparation of professionally trained and qualified teachers who would confidently take up the teaching job (Jekayinfa, 2001). In order to attain this aim, the teacher education programme should be balance between theory and practice. In the part of theory, pre-service teachers are provided theoretical knowledge to be used in the classroom and in the part of practice; it constitutes the practical application of theoretical knowledge. Teaching practice is one of the essential elements in preparing future teachers. The attitude towards teaching practice is one of the important factors to be effective in actual teaching. Therefore, this study was conducted to study the attitude of pre-service teachers towards teaching practice.

### **Purposes of the Study**

The specific purposes of the study are as follows:

1. to express the attitude of pre-service teachers towards teaching practice,
2. to determine the attitude of pre-service teachers towards teaching practice in terms of gender,
3. to analyze the attitude of pre-service teachers towards teaching practice in terms of teaching practice experience, and
4. to give suggestions and recommendations for further research studies in the area of teaching practice.

### **Research Questions**

1. What is the attitude of pre-service teachers towards teaching practice?
2. Is there any significant difference between the attitude of pre-service teachers in terms of gender?
3. Is there any significant difference between the attitude of pre-service teachers in terms of teaching practice experience?

## **Review of Related Literature**

### **Attitude**

Attitudes express how an individual feels about something (Robbins, 1994, cited in Ustuner, Demirtas & Comert, 2009). The attitude plays a vital role in the success of teaching-learning process. Attitude is a necessary aspect of human personality. Teacher training institutions are in moral sense man-makers (Shah, 2002). Therefore, awareness about attitude becomes vital. All seem to agree that attitudes are not innate but learned. Every attitude has three components that are represented in what is called the ABC model of attitudes: A for affective, B for behavioural and C for cognitive. Although every attitude has these three components, any particular attitude can be based on one component more than another. Attitude theories have been categorized into four categories. They are consistency theories, learning theories, social judgment theories and functional theories (Simonson & Maushak, 2001).

### **Teaching Practice**

Teaching practice is an important component of becoming a teacher. The ultimate goal of teacher preparation is for teacher candidates to conduct quality instruction in the classroom. While it is crucial for teacher candidates to develop a solid understanding of educational theories and other knowledge about teaching in the college classroom, they must be capable of applying what they have learned to demonstrate competence as a practitioner in an authentic instructional setting (Cobb, 1999, cited in Liu, 2012).

### **Attitude towards Teaching Practice**

The process of education involves change in attitude. It means that attitude change is constantly occurring as a result of learning of the individual and situational influences. The important way of altering attitudes is to alter the individual's concept of the object towards which the attitude is expressed (Hussain, 2004). Attitude towards teaching is a complex of inter-linked attitudes. There has been a general agreement that the attitude of teachers towards teaching significantly correlated with teaching success.

Teaching practice provides the development of teaching skills for future teaching profession. And also, it develops an ability to manage the period of teaching. Teaching experiences during teaching practice

contributes to the extent to future professional lives. Cross (1960, cited in Hussain, 2004) reported the significant positive gains in attitudes of pre-service teachers during methods courses and during student teaching. Therefore, the positive attitudes of pre-service teachers towards teaching practice make their actual teaching effective.

### **Materials and Method**

In this study, one of the descriptive methods, questionnaire survey was used. The subjects were defined (300) pre-service teachers who had teaching practice experience from Sagaing Institute of Education. (100) pre-service teachers from each of Third Year (Senior), Fourth Year (Junior) and Fourth Year (Senior) were selected to respond to the questionnaire by adopting the stratified random sampling method. As for the instrument, a questionnaire for the attitude of pre-service teachers towards teaching practice was constructed on the basis of teachers' attitude questionnaires of Hussain (2004) and teaching practice questionnaires of Nwanekezi, Okoli & Mezieobi (2011) and Gujjar, Ramzan & Bajwa (2011). There are 40 Likert-type items in this instrument for four dimensions. The Cronbach's alpha internal consistency reliability was (0.73) according to the pilot test result. And then, the obtained data from the major survey was analyzed by using descriptive statistics, independent samples *t*-test, one way analysis of variance (ANOVA) and Post Hoc test by Tukey (HSD) method.

### **Findings**

#### **Descriptive Statistics for the Attitude of Pre-service Teachers towards Teaching Practice on each Dimension**

In order to determine the mean scores and standard deviation of the attitude of pre-service teachers towards teaching practice on each dimension, descriptive statistics was calculated.

Table 1. Mean Scores for the Attitude of Pre-service Teachers on each Dimension

No.	Dimension	N	Minimum	Maximum	<i>M</i>	<i>SD</i>
1	D1	300	18	50	37.79	4.824
2	D2	300	24	49	39.34	5.108
3	D3	300	23	48	38.47	4.544
4	D4	300	29	50	40.14	4.757
5	Total	300	115	187	155.73	14.316

Note. D<sub>1</sub>=Attitude towards teaching; D<sub>2</sub>=Attitude towards preparation for teaching practice; D<sub>3</sub>=Attitude towards performance in teaching practice; D<sub>4</sub>=Attitude towards contribution to future professional lives.

As the mean scores for each dimension are greater than the median score (30), it showed that pre-service teachers have positive attitude towards teaching practice for each dimension. In addition, the total attitude mean scores (155.73) of pre-service teachers are greater than the median scores (120). Therefore, it can be concluded that the attitude of pre-service teachers who had teaching practice experience from Sagaing Institute of Education is positive towards teaching practice.

### Findings Related to Pre-service Teachers' Attitude towards Teaching Practice in terms of Gender

In order to determine whether there was a statistically significant difference between male and female pre-service teachers' attitude towards teaching practice, the obtained data was analyzed by using independent samples *t*-test.

Table 2. *t* Values for the Pre-service Teachers' Attitude towards Teaching Practice in terms of Gender

Dimension	Gender	N	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>p</i>
D1	Male	150	36.28	5.061	-3.013	-5.686	298	0.000***
	Female	150	39.29	4.064				
D2	Male	150	37.12	5.177	-4.433	-8.332	298	0.000***

<b>Dimension</b>	<b>Gender</b>	<b>N</b>	<b>M</b>	<b>SD</b>	<b>MD</b>	<b>t</b>	<b>df</b>	<b>p</b>
D3	Female	150	41.55	3.957	-2.66	-5.294	298	0.000***
	Male	150	37.14	4.995				
D4	Female	150	39.80	3.593	-1.767	-3.268	298	0.001***
	Male	150	39.25	4.982				
Overall	Male	150	149.79	14.793	-11.873	-7.883	298	0.000***
	Female	150	161.67	11.023				

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

In overall finding, it was found that the mean scores of female pre-service teachers were higher than that of male pre-service teachers. According to the result of *t*-test, there is significant difference between the attitude of male and female pre-service teachers towards teaching practice. In other words, gender variable has the effect on the attitude of pre-service teachers towards teaching practice.

### **Findings Related to Pre-service Teachers' Attitude towards Teaching Practice in terms of Teaching Practice Experience**

There are three groups in this variable: Third Year (Senior) group, Fourth Year (Junior) group and Fourth Year (Senior) group. Third Year (Senior) group had 3 months and 2 weeks teaching practice experience, Fourth Year (Junior) group had 2 weeks and Fourth Year (Senior) group had 3 months and 3 weeks. In order to determine whether there is a significant difference between the attitude of pre-service teachers in terms of teaching practice experience, the collected data was analyzed by using one way analysis of variance (ANOVA).

Table 3. ANOVA Results of the Attitude of Pre-service Teachers on each Dimension

Dimension		SS	df	MS	F	p
D1	Between Groups	177.327	2	88.663		
	Within Groups	6781.02	297	22.832	3.883	0.022*
	Total	6958.347	299			
D2	Between Groups	413.887	2	206.943		
	Within Groups	7387.11	297	24.872	8.320	0.000***
	Total	7800.997	299			
D3	Between Groups	351.86	2	175.93		
	Within Groups	5820.87	297	19.599	8.977	0.000***
	Total	6172.73	299			
D4	Between Groups	453.887	2	226.943		
	Within Groups	6311.51	297	21.251	10.679	0.000***
	Total	6765.397	299			
Overall	Between Groups	4956.74	2	2478.37		
	Within Groups	56324.39	297	189.644	13.069	0.000***
	Total	61281.13	299			

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

According to Table 3, there was a statistically significant difference among three groups on the attitude of pre-service teachers towards teaching practice in terms of teaching practice experience. In other word, teaching practice experience (one of the variables) has an effect on the attitude of pre-service teachers towards teaching practice.

In order to examine which particular groups had the greatest differences, Post Hoc Multiple Comparison Test (Tukey HSD) was conducted.

Table 4. The Result of Tukey for the Attitude towards Teaching Practice by Teaching Practice Experience

Teaching Practice Experience (I)	Teaching Practice Experience (J)	MD (I-J)	P
Third Year (Senior)	Fourth Year (Junior)	1.150	0.825
	Fourth Year (Senior)	-7.990	0.000***
Fourth Year (Junior)	Fourth Year (Senior)	-9.140	0.000***

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

In order to determine which particular group had the greatest differences for overall component, Post Hoc Multiple Comparison Test (Tukey HSD) was also conducted. It was also found that Fourth Year (Senior) group who had 3 months and 3 weeks teaching practice experience have the most positive attitude among three groups.

### Discussion

In this study, female pre-service teachers have more positive attitude towards teaching practice than male pre-service teachers. It can be considered that female pre-service teachers are more interested in teaching than male pre-service teachers in general. It is not convenient for the actual teaching in the real classroom context without teaching practice. So, male pre-service teachers should be encouraged to be interested in teaching practice. Basic Education sector in Myanmar requires many male teachers. Teacher education institutions provide more chances for male pre-service teachers than female to enter in teaching profession. Teacher educators should train male pre-service teachers to have positive attitude towards teaching practice. If the attitude towards teaching practice is positive, there may be promises to be effective in teaching-learning process.

Another variable in this study is teaching practice experience. According to the obtained result, it was found that there was a statistically significant difference between the attitude of pre-service teachers towards teaching practice in terms of teaching practice experience. Fourth Year (Senior) group got the highest attitude mean scores in comparison with other groups. It had 3 months and 3 weeks teaching practice experience. It

can be considered that they will understand the benefits of teaching practice if they have much teaching practice experience.

### **Suggestions**

Teachers with positive attitude inculcate in the minds of students positive self-confidence and self-esteem. Therefore, teacher educators should train pre-service teachers to have positive attitude towards teaching in order to get meaningful success in their careers. They should motivate pre-service teachers not to fail to prepare. They should train pre-service teachers to be better performance in teaching practice. And also, pre-service teachers possess positive attitude towards contribution to future professional lives in this finding. It is so satisfactory for institutions. Although pre-service teachers have positive attitude towards contribution to future professional lives, teacher educators should focus on the practical component more than present practice. The duration of teaching practice should also be extended.

In this study, the subjects were selected who had teaching practice experience. A comparative research study of the attitude towards teaching practice of pre-service teachers who had teaching practice experience and pre-service teachers who had no teaching practice experience may be studied. This research was conducted on the attitude of pre-service teachers towards teaching practice. A further research should be conducted on the attitude of in-service teachers towards teaching practice. A comparative study should also be conducted on the attitude of pre-service and in-service teachers towards teaching practice.

### **Conclusion**

Attitude is an important variable in the implementation process of classroom teachers because there is a relationship between attitude and action (Cook, 2002, cited in Halawah, 2008). If pre-service teachers develop attitude towards teaching practice, they will develop creative thinking, the ability to prepare the lessons, motivate the students to participate in teaching-learning process more easily and be successful in the real classroom context. Therefore, this study finds out the attitude of pre-service teachers towards teaching practice whether they possess positive attitude or negative.

On the basis of the research findings, pre-service teachers possess positive attitude towards teaching, preparation for teaching practice, performance in teaching practice and contribution to future professional lives. The majority of pre-service teachers possess positive attitude towards teaching practice. And also, there was a significant difference between the attitude of pre-service teachers by gender. In this study, the female pre-service teachers have more positive attitude than the male pre-service teachers. Then, there was a significant difference between the attitude of pre-service teachers by teaching practice experience. Fourth Year (Senior) group who had 3 months and 3 weeks teaching practice experience have the most positive attitude among three groups.

This research points out the Institutes of Education and Education Colleges to perform in developing the attitude of pre-service teachers towards teaching practice. It may notice administrators and teacher educators to conduct no gap between theory and practice in teacher education programme. The results of the study provide a searchlight for the teacher educators in focusing their attention and efforts in the development of attitude towards teaching practice and confidence of pre-service teachers to enable them to solve the problems that will be faced in the real classroom context.

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# The Effectiveness of Constructivist Instructional Approach in Teaching Mathematics to Grade Ten Students

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## Abstract

The major purpose of this study was to investigate the effectiveness of constructivist instructional approach in teaching mathematics to Grade Ten students. Quantitatively, an experimental study was used to compare the mathematics achievements of the students who were taught by constructivist instructional approach and those who were taught by conventional methods of teaching. One of the Quasi-experimental designs, namely, the nonequivalent control group design was used. In this experimental study, the subjects were (147) Grade Ten students from two schools; Basic Education High School-Myoethit, Madaya and Basic Education High School-Salonphyu, Madaya. The two groups from each school were randomly divided into experimental and control groups. The subjects from the experimental group were taught by using constructivist instructional approach; 5Es learning model. The subjects from the control group were taught by using conventional methods of teaching. Before the treatment period, a pretest was administered to measure the basic mathematics knowledge of the students. After the treatment period, a posttest was administered to two groups. Independent samples *t* test was used to analyze whether there was significant difference between the two groups. It was found that the students who received constructivist instructional approach demonstrated significantly better than the students who received the conventional methods of teaching. The effect size of this study is larger than typical. Therefore, it was concluded that the constructivist instructional approach was more effective in raising the achievement level of the students than the conventional methods of teaching and it has positive contribution to mathematics teaching and learning at Grade Ten.

**Keywords:** constructivist instructional approach, 5Es learning model

## Introduction

The main aim of education is to help the children to earn their living and to make them self-dependent. To achieve such aim, mathematics is the most important subject than any other. However, most of the people thought

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that mathematics is a difficult subject to teach, understand and learn. This is because the teacher's teaching style in most of the classroom is only one the lecture method and the students are bored to learn mathematics. The pupils differ from each other in terms of physical and mental processes. Thus, the teacher should not use only one method. Mostly, student-centered approaches are more potential than teacher-centered methods in promoting students' active participation in teaching and learning mathematics. Among student-centered approaches, constructivist instructional approach plays a crucial role in creating meaningful mathematics learning situation and in implementing academic achievement of the students. For these reasons, this paper was conducted to investigate the effectiveness of constructivist instructional approach in teaching mathematics.

### **Purpose of the Study**

The main purpose of this research was to investigate the effectiveness of constructivist instructional approach in teaching mathematics to Grade Ten students.

### **Research Hypotheses**

The hypotheses of this research are:

1. There is a difference between the mathematics achievement of the students who are taught by constructivist instructional approach and those who are not.
2. There is a difference between the mathematics achievement of the students who are taught by constructivist instructional approach and those who are not in solving the cognitive level problems.

### **Scope of the Research**

This research is geographically restricted to Madaya Township, Mandalay Region. Participants are Grade Ten students from the selected schools in (2018-2019) Academic Year. This research is conducted with the content area of Circles, Chords and Tangents (Chapter-9) from the Grade Ten mathematics textbook.

## **Review of Related Literature**

Anderson et al (2000, cited in Slavin, 2006) stated that students must construct knowledge in their own mind. The teacher can facilitate this process by teaching in ways that make information meaningful and relevant to students, by giving students opportunities to discover or apply ideas themselves, and by teaching students to be aware of and consciously use their own strategies for learning. Constructivism is learners' construction of knowledge as they attempt to make sense of their environment.

Constructivist instructional approach is an approach to teaching and learning based on constructivism. So, constructivist instructional approach should be used in teaching learning mathematics. There are many models that construct by using constructivist instructional approach effecting for the learners. But this study used only 5Es learning model of constructivist instructional approach. Puacharearn (2004) stated 5Es learning model on the following.

### **5Es Learning Model**

This model suggests that a natural learning process contains five elements: Engage, Explore, Explain, Elaborate and Evaluate.

(1) Engage: This stage is designed to help students understand the learning task and make connections to past and present learning experiences. Students explore the questions raised after they gain more understanding of the topic and the tools needed to investigate the ideas. Typical activities in this stage include posing a question, defining a problem, or demonstrating a discrepant event, then using small group discussions to stimulate and share ideas. Teachers help students connect previous knowledge to the new concepts introduced in the unit.

(2) Explore: In the Exploration stage the students have the opportunity to get directly involved with phenomena and materials. Involving themselves in these activities they develop a grounding of experience with the phenomenon. As they work together in sharing and communicating. The teacher acts as a facilitator, providing materials and guiding the students' focus. The students' inquiry process drives the instruction during an exploration.

(3) Explain: In this stage, students are encouraged to explain concepts in their own words, ask for evidence and clarification of their explanation, and listen critically to one another's explanation and those of the teacher. At this stage teachers should provide definitions and explanations using students' previous experiences as a basis for this discussion. If students have unresolved questions, they may continue to look for solutions in the elaborate stage.

(4) Elaborate: In the Elaborate stage, students expand on what they have learned and apply their newfound knowledge to a different situation. They test ideas more thoroughly and explore additional relationships. Providing closure to the lesson as well as verifying student understanding is critical at this point.

(5) Evaluate: The learning cycle provides opportunities for the teacher to continually observe students' knowledge and/or skills, application of new concepts and a change in thinking. Teacher asks students to assess their own learning. More formal evaluation can be conducted at this stage. The assessment should be aligned with the styles and content of the learning experience.

## **Research Method**

Quantitatively, one of the Quasi-experimental designs was used in this study. The sample schools were Basic Education High School Myoethit and Salonphyu, Madaya in Mandalay Region There were two groups in each selected school. One group was identified as an experimental group that was taught mathematics by using constructivist instructional approach and the other group was defined as a control group that was taught mathematics by using conventional methods of teaching. The participants were (147) Grade Ten students from selected schools. The instruments used were a pretest and a posttest. The pretest consisted of (30) multiple choice items and the total scores were (30) marks. A pretest was conducted on both groups before the treatment is given to check the equivalence or not of the two groups. And both groups in each selected school gave treatment for four weeks. A posttest was conducted to measure students' achievement in mathematics after the treatment. There were three sections. Section (A) consisted of (5) multiple choice items, Section (B) consisted of five short questions and Section (C) consisted of five long questions. There was no choice item in each section.

This test was constructed based on revised Bloom's cognitive development. In order to find out whether there is a significant difference between the experimental and control groups, the posttest scores of the two groups were compared by using independent samples *t*-test.

## Research Findings

### Findings of Students' Mathematics Achievement on the Pretest

In order to examine whether there is an equivalence between two groups in each selected school, the independent samples *t* test was used. The results are shown in Table 1.

Table 1. *t* Values of Students' Mathematics Achievement on the Pretest by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2tailed)
HS (1)	Experimental	40	21.95	3.537	-.839	-	76	.250
	Control	38	22.79	2.839				
HS (2)	Experimental	35	20.94	4.151	1.237	1.236	67	.221
	Control	34	19.71	4.160				

In each selected school, the results showed that the means of two groups were nearly the same. According to the *t* values of HS 1 and HS 2 ( $t(76) = -1.152, p > .05$  and  $t(67) = 1.236, p > .05$ ), the results indicated that there was no significant difference between two groups for means on basic mathematical knowledge before the treatment period. This means that the two groups were equivalent in each school. Therefore, one group was randomly defined into experimental group and the other was defined into control group in both schools.

### Findings of Students' Mathematics Achievement on the Posttest

In order to find out the students' mathematics achievement according to revised Bloom's taxonomic levels of cognitive domain, different levels of questions were asked in the posttest.

### Findings of Students' Mathematics Achievement at Remembering Level on the Posttest

Table 2. *t* Values of Students' Mathematics Achievement at Remembering Level by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
HS (1)	Experimental	40	7.35	1.955	.166	.397	76	.693
	Control	38	7.18	1.722				
HS (2)	Experimental	35	7.09	1.884	.439	1.000	67	.321
	Control	34	6.65	1.756				

In answering remembering level questions, the results indicated that the means of the experimental groups were slightly higher than those of the control groups in both schools (see Table 2). According to the *t* values of HS 1 and HS 2 ( $t(76) = .397, p > .05$  and  $t(67) = 1.000, p > .05$ ), there was no significant difference between the experimental and control groups in each school. This means that both methods of instruction were found to be equally effective in recalling and remembering facts, ideas and basic concepts.

### Findings of Students' Mathematics Achievement at Understanding Level on the Posttest

Table 3. *t* Values of Students' Mathematics Achievement at Understanding Level by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
HS (1)	Experimental	40	3.59	.966	.401	1.710	76	.093
	Control	38	3.19	1.076				
HS (2)	Experimental	35	3.43	.884	.164	.670	67	.507
	Control	34	3.26	1.136				

In answering understanding level questions, the results showed that the means of the experimental groups were also slightly higher than those of

the control groups in both schools (see Table 3). According to the  $t$  values of HS 1 and HS 2 ( $t(76) = 1.710, p > .05$  and  $t(67) = .670, p > .05$ ), there was no significant difference between the experimental and control groups in each school. It can be said that both methods of instruction can create improvement students' ability to grasp and understand the meaning of learning materials.

### Findings of Students' Mathematics Achievement at Applying Level on the Posttest

Table 4.  $t$  Values of Students' Mathematics Achievement at Applying Level by School

School	Group	$N$	$M$	$SD$	$MD$	$t$	$df$	Sig.(2 tailed)
HS (1)	Experimental	40	13.51	4.464	8.126	8.462	76	.000***
	Control	38	5.39	3.211				
HS (2)	Experimental	35	10.86	4.888	2.083	1.964	67	.049*
	Control	34	8.77	3.519				

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

In answering applying level questions, the results showed that the means of experimental groups were slightly higher than those of the control groups in both schools (see Table 4). According to the  $t$  values of HS 1 and HS 2 ( $t(76) = 8.462, p < .001$  and  $t(67) = 1.964, p < .05$ ), there was a significant difference between the experimental and control groups in each selected school. It can be interpreted that constructivist instructional approach can enhance students' problem solving skills in real life situations.

### Findings of Students' Mathematics Achievement at Analyzing Level on the Posttest

Table 5. *t* Values of Students' Mathematics Achievement at Analyzing Level by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
HS (1)	Experimental	40	6.19	2.149	3.130	6.889	76	.000***
	Control	38	3.06	1.436				
HS (2)	Experimental	35	4.04	2.541	1.538	2.421	67	.016*
	Control	34	2.68	.716				

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

The results pointed out that the means of the experimental groups were significantly higher than those of the control groups in both selected schools (see Table 5). According to the *t* values of HS 1 and HS 2 ( $t(76) = 6.889$ ,  $p < .001$  and  $t(67) = 2.421$ ,  $p < .05$ ), there was a significant difference between the experimental and control groups at the analyzing level questions in each selected school. It can be said that constructivist instructional approach could bring about the progress of students' ability to analyze mathematical concepts or skills in real life situations.

### Findings of Students' Mathematics Achievement at Evaluating Level on the Posttest

Table 6. *t* Values of Students' Mathematics Achievement at Evaluating Level by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2-tailed)
HS (1)	Experimental	40	4.36	1.245	1.221	3.119	76	.006**
	Control	38	3.14	1.621				
HS (2)	Experimental	35	4.21	1.250	.986	2.169	67	.047*
	Control	34	3.22	1.700				

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

The results indicated that the means of the experimental groups were significantly higher than those of the control groups in both schools (see Table 6). According to the  $t$  values of HS 1 and HS 2 ( $t(76) = 3.119, p < .01$  and  $t(67) = 2.169, p < .05$ ), there was a significant difference between the experimental and control groups at the evaluating level questions in each selected school. It can be interpreted that constructivist instructional approach can positively enhance students' ability to make judgments about information, validity of ideas, or quality of work based on the criteria.

### Findings of Students' Mathematics Achievement at Creating Level on the Posttest

Table 7.  $t$  Values of Students' Mathematics Achievement at Creating Level by School

School	Group	$N$	$M$	$SD$	$MD$	$t$	$df$	Sig. (2tailed)
HS (1)	Experimental	40	5.00	.000	1.944	4.302	76	.000***
	Control	38	3.06	1.862				
HS (2)	Experimental	35	4.00	1.558	2.200	2.980	67	.001**
	Control	34	1.80	.837				

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

In answering creating level questions, the results showed that the means of the experimental groups were significantly higher than those of the control groups in both schools (see Table 7). According to the  $t$  values of HS 1 and HS 2 ( $t(76) = 4.302, p < .001$  and  $t(67) = 2.980, p < .01$ ), there was a significant difference between the experimental and control groups in each selected school. This means that constructivist instructional approach can highly create improvement of students' problem solving skills, logical and critical thinking skills, creativity and reflection, and self-directed learning.

### Findings of Students' Overall Mathematics Achievement on the Posttest

Table 8. *t* Values for Students' Overall Mathematics Achievement on the Posttest by School

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2tailed)
HS (1)	Experimental	40	34.65	12.695	14.545	6.115	76	.000***
	Control	38	20.11	7.522				
HS (2)	Experimental	35	28.86	10.138	7.092	3.348	67	.001**
	Control	34	21.76	7.161				
Total	Experimental	75	31.95	11.858	11.058	6.763	145	.000***
	Control	72	20.89	7.350				

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

In the overall mathematics achievement, the results showed that the means of the experimental groups were significantly higher than those of the control groups in both schools (see Table 8). According to the *t* values of HS 1 and HS 2 ( $t(76) = 6.115, p < .001$  and  $t(67) = 3.348, p < .01$ ), there was a significant difference between the experimental and control groups on overall mathematics achievement scores in each selected school. It can be interpreted that the use of constructivist instructional approach has a significant effect on the mathematics achievement of the students in each school. Therefore, constructivist instructional approach has an effective and positive contribution to teaching mathematics at the high school level.

### Discussion, Suggestions and Conclusion

#### Discussion

First of all, the results showed that the posttest means of the students who were taught by constructivist instructional approaches were significantly higher than those of students who were taught by conventional methods of teaching in each school. This finding accepts the first hypothesis. The result is consistent with the findings of Chowdhury (2016) in that students who learned in group activities by constructivist instructional approach indicated greater achievement than students in formal instruction. The effect size of

this study is also larger than typical. Therefore, constructivist instructional approach has an effective and positive contribution to teaching mathematics at the high school level.

In remembering level questions in both selected schools, there was no significant difference between the mathematics achievement of the students who were taught by constructivist instructional approaches and those who were not. It can be said that the conventional methods of teaching helped students to achieve lower level of cognitive skills. The result is in line with the findings of Ekon, Ekwueme, & Meremikwu (2014) that both methods of instruction were found to be equally effective in remembering and gaining factual knowledge.

The results indicated that there was no significant difference between the mathematics achievement of the students in both selected schools who were taught by constructivist instructional approaches and those who were not in answering understanding level questions. This result agrees with Akanwa & Ovute (2014) in which both methods of instruction stressed to demonstrate understanding of facts and ideas, to give descriptions and to state main ideas.

The mathematics achievements of the students who were taught by constructivist instructional approaches were significantly higher than those of students who were taught by conventional methods of teaching in answering applying level questions.. It was also found that the students who received the treatment by the teacher using constructivist instructional approach could easily resolve conflicts that arise during their learning process and solve the problems effectively. This is in harmony with Aydisheh & Gharibi (2015): students did better their work with happiness and remained positive in their direction during the activities in a cooperative group than the students who were taught by conventional methods of teaching.

The results indicated that there was a significant difference between the mathematics achievements of the students who were taught by constructivist instructional approaches and those who were not in answering analyzing level questions in each school. Lord (1999) compared 5Es learning model based on constructivist instructional approach with conventional instruction in environmental science course by two groups which consisted of college undergraduates. The findings showed that constructivist instructional approach could bring about the improvement of students' ability

to analyze and make inferences and to find evidence to support generalization.

It was found that the students in the experimental groups performed more effectively than those in the control groups in answering evaluating level questions. This result is in harmony with Akar (2003) who found that students learned through constructivist activities can criticize information, validity of ideas, or quality of work based on a set of criteria about the problems and solve the problems effectively.

Dealing with the comparison of means on creating level questions in both selected schools, there was a significant difference between students who were taught by constructivist instructional approaches and those who were not. It is consistent with Ayeni (2013); students did better critical, social and analytical thinking skills while working in a constructivist instructional approach than the students of conventional methods of teaching. Thus, the results in which applying, analyzing, evaluating and creating level questions accept the second hypothesis. As a result, students who were taught by using constructivist instructional approach had the potential to elevate past learning from superficial into the deeper learning that remains for a lifetime.

### Suggestions

According to the results of this research, the following suggestions are made. In order to implement the constructivist instructional approach in the classroom,

- Teachers should hold the constructivist views in teaching and learning mathematics classroom.
- Teachers should encourage students to engage themselves in thinking, understanding, and creative learning, rather than in rote learning and memorization.
- Teachers should provide opportunities to students for learning by exploring and reaching themselves to knowledge with their peers to enhance critical thinking and problem solving skills.
- Teachers should prepare the lessons well.
- Students should be asked to give reasons, suggestions and ideas about the solving problems.

- Teachers should only orientate students, and help them.
- Teachers should be careful about choosing teaching activities and working papers, and grouping the students before the class starts.
- Teachers should walk around the classrooms through the learning process in order to give suggestions when students have obstacles.
- Teachers should motivate students and provide them with suitable teaching-learning materials to help them explore knowledge, concepts and relations in the texts.

There are also many difficulties to implement constructivist instructional approach in classrooms. To overcome these difficulties, the following points should be considered in depth.

- The first difficulty to implement constructivist instructional approach is that class sizes are too large.
- The second is that the content of the syllabus is to be taught for the exam. Therefore, it is suggested that the focus of instruction and assessment system should be changed from teacher-centered to student-centered and from exam-oriented to the exploration of students' ideas and reasoning that emphasize understanding of mathematics concepts.
- Third is that there are not enough teachers' seminars, training programs and workshops to modify their knowledge about the subjects and education and to improve their professional skills.
- Finally, instead of giving information by heart, the teacher should use methods and techniques which allow the active participation of students in the teaching-learning process.

## Conclusion

Based on the results of research findings, generalization can be drawn. It can be concluded that if the purpose of instruction is to enhance critical-thinking skills, problem-solving skills, creativity, higher order thinking skills, and self-directed learning, then constructivist instructional approach is more beneficial than the conventional methods of teaching. Moreover, constructivist instructional approach makes students involve actively in the learning process and become interested in participating school activities.

Although constructivist instructional approach cannot solve all the problems faced by the teachers in teaching and learning mathematics, it is hoped that it can be useful to some extent for mathematics learning and to improve social skills by helping and supporting one another. Moreover, constructivist instructional approach can provide students with higher order thinking skills such as critical and problem solving to keep abreast with the challenges of the today's knowledge age. Therefore, constructivist instructional approach plays an important role in teaching mathematics to Grade Ten students in Myanmar.

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# The Effectiveness of Concept Attainment Model in Teaching Grade Nine Chemistry Students

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## Abstract

The major purpose of this study is to find the effectiveness of concept attainment model in teaching Grade Nine Chemistry. Experimental research method was used in the present study. In this study, quasi experimental design was employed. Two Basic Education High Schools: BEHS 2, Sagaing and BEHS 3, Sagaing were randomly selected for the study. The numbers of participants in this study were (127) Grade Nine Chemistry students. The two intact classes were selected and assigned to either control or experimental group. The experimental group was taught with concept attainment model while the control group was taught through the conventional teaching method. Both pretest and posttest scores were analyzed and used to answer the research questions. The available data from the pretest and posttest scores were analyzed by using independent samples *t*-test and ANCOVA. Based on the results, there were significant differences between concept attainment model and conventional teaching method on the achievement of students in teaching Grade Nine Chemistry according to Bloom's Taxonomic levels of cognitive domain. Therefore, the concept attainment model can improve the formation of knowledge and acquire the facts, information and concepts clearly. Students can gradually and comprehensively develop chemical concepts, ideas and laws, then finally solve the problems productively. Based on the results of the study, the concept attainment model should be applied in teaching chemistry and other subject areas for promoting effective science instruction and science education.

**Keywords:** concept, concept attainment, concept attainment model

## Introduction

Education is the foundation of our nation. The essence of education is that individuals become to have the ability of determining what is right or what is wrong which they come across in their daily lives. In order to train the students to become the critical thinkers in their real-life situations, they must have the sound educational foundation.

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Chemistry, one of the branches of science is also the fundamental major subject of science education. Teaching of Chemistry mainly rely on the scientific concepts, facts, ideas, principles, laws and theories. Concepts are the foundations of the thinking and communication process. The learning of concepts is crucial in school and in everyday life because concepts enable mutual understanding among people and provide the basis for interpersonal skills. Therefore, concept attainment model of teaching should be applied in teaching chemistry for becoming more comprehensive teaching-learning process among high school students.

### **Purposes of the Study**

- To investigate the effectiveness of concept attainment model in teaching Grade Nine Chemistry students,
- To compare the achievement between the students who were taught by using concept attainment model and those who were taught by conventional teaching method,
- To suggest teachers to use concept attainment model in teaching Grade Nine Chemistry for improving effective teaching learning process.

### **Research Question**

- Are there any significant differences between achievement of Grade Nine Chemistry students who are taught by applying concept attainment model and that of those who are taught by conventional teaching methods?
- Are there any significant differences between the achievement of the experimental group who are taught through concept attainment model of teaching and that of the control group who are taught through conventional teaching method on the knowledge level questions, the comprehensive level questions and the application level questions?

## Definition of the Key Terms

- **Concept:** Concepts are ideas that represent a class or category of events, objects or activities (Ciccarelli & White, 2014).
- **Concept attainment:** Concept attainment is the search for and listing of attributes that can be used to distinguish exemplars from non-exemplars of various categories (Bruner et al., 1967 as cited in Joyce & Weil, 1980).
- **Concept attainment model:** Concept attainment model of teaching is a model of teaching designed to teach concepts and to help students work together to learn information, build concept and solve problems (Joyce & Weil, 1980).

## Scope of the Study

This study is geographically restricted to Sagaing Township. Participants in this study are (127) Grade Nine Chemistry students selected from No.2 and No.3 Basic Education High Schools, Sagaing during the Academic Year 2018-2019. This study is limited to the content area of Chapter 14, Acids, Bases and Salts from Grade Nine Chemistry Textbook, 2018-2019.

## Review of Related Literature

### Theoretical Foundations

Every teaching-learning process should base on the sound theoretical foundations. No teacher can carry out instructional process without the philosophical and psychological foundation of education. Every teacher should interact and interrelate among educational theory, psychology and pedagogy.

Jerome Bruner has made at least two major contributions to science education. The first contribution is on concept learning and the second is on discovery learning; both focus on the active aspects of learning. Bruner's work on concept learning stresses the importance of helping students organize objects and events which permit them to reduce the complexity of the environment. The teachers who understand the work of Piaget and Bruner may even be able to broaden cognitive development and

conceptualization process and accelerate them in the instructional procedures (Collette & Chiappetta, 1989).

## Models of Teaching

A model of teaching is a plan or pattern that can be used to shape curriculums, to design instructional materials and to guide instruction in the classroom and other settings. The excellent model is the approach to teaching that will solve all educational problems (help every student learn everything in every way) (Joyce & Weil, 1980). The model of teaching addresses the teachers what to teach, how to teach, what action to take in instruction and how to evaluate the outcomes of learners (Zubair, 2012).

## Concept Attainment Model

This model of teaching is designed to help students learn concepts for organizing information and facts in order to become more effective in learning concepts. Jerom S. Bruner, Jacqueline Goodrow and George Austin developed this model in 1956. This model based on the assertion that human beings have the capacity to distinguish and categorize things into groups. Categorizing can able to reduce the complexity of the environment. All categorizing activities include identifying and placing events into classes on the basis of using the distinct criteria and ignoring others. Concept learning can facilitate further learning. There are three variations of the concept attainment model. They are (a)the reception model of concept attainment,(b)the selection model of concept attainment and (c)the unorganized model of concept attainment (Joyce & Weil, 1980).

## Types of Concepts

Bruner expounded on are conjunctive, disjunctive and relational concepts. **Conjunctive concepts** combine a given set of attributes and values together. The characteristics of the concept add together to specify a concept. Conjunctive concepts refer to a class of objects more than one feature in common. Sometimes called **“and”** concepts. **Disjunctive concept** combine sets of attributes in an **“or”** fashion. The disjunctive concept is one that contains alternative sets of attributes (Collette & Chiappetta, 1989). **Relational concepts** specify a relationship between the relevant attributes. To understand either of these concepts, one must know

the other, plus the relationship between them (Arends, 2007) and **Bruner** stated that any concept consists of five elements: name, examples (positive and negative), attributes (essential and non-essential), attribute values and rule.

### **Description of the Concept Attainment Model (Reception-oriented Model)**

According to Joyce & Weil, 1980, this model is described as the following.

- **Focus:** To help students learn concepts for organizing information and help them become more effective conceptual understanding at learning concept.
- **Syntax:** This model has three phases as the following (Reception Model).

In **phase one**, the teacher presents the relevant data to the learners by using the arranged examples or non-examples for the identification of the concepts. All the positive examples have in common that idea is informed to the learners. They develop a hypothesis about the concept. The teacher presents the instances that are labeled yes or no to the learners. The learners are asked to compare and contrast the attributes of the different examples for the justification of attributes of the concepts. Finally, they are asked to name their concept and state the rule or definition of the concept according to their essential attributes.

In **phase two**, students examine their attainment of the concept by correctly describing the unlabeled examples of the concept and then eliciting their own examples. After this, the teacher and students verify and check out their original hypothesis.

In **phase three**, they start to analyze the ways and means by which they acquire the deep understanding of concepts. They can become gradually to observe and improve the concept- building strategies.

- **Social System:** The model has moderate structure. Before teaching with reception model of concept attainment, the teacher selects concepts and establishes the required material into positive and negative examples and arranges the examples. The three major functions of the teacher during reception-oriented concept attainment activity are to record,

prompt and present additional data. Although teacher controls action, student interaction is encouraged.

- **Principles of Reaction:** The teacher helps the students emphasize in formulating hypothesis and also help them test their hypotheses against each other. The students are reinforced to focus on the essential features and attributes of examples and concepts. The teacher gives support in discussing and evaluating the thinking strategies of the students.
- **Support System:** The teacher constructs the comprehensive environment for attaining the concept and carefully select and organize the material and data to be presented as a exemplars.
- **Instructional Effects:** The concept attainment strategies can accomplish several instructional objectives depending on the particular lesson. They are designed to teach the students about the specific concepts and nature of concepts. Students get practice in inductive reasoning and opportunities for altering and improving the concept-building strategies.
- **Nurturant Effects:** Especially with abstract concepts, the strategies nurture an awareness of alternative perspectives, a sensitivity to logical reasoning in communication and a tolerance of ambiguity.

## **Method and Procedure**

### **Research Design**

The method used in this study was experimental. The pretest - posttest nonequivalent control group design, one of the quasi-experimental designs was employed. This design involves random assignment of intact groups to the treatments (Gay, 2003).

### **Research Instruments and Procedures**

The instruments used in this study were lesson plans, pretest and posttest. The pretest was used to determine group equivalence between experiment and control groups. The pretest items were constructed based on the content from Grade Nine Chemistry textbook concerning with the areas: Chapter 8, Formula Writing and the Naming System, Chapter 11, Oxides and Hydroxides, Chapter 12, Hydrogen and Chapter 13, Water. The posttest items were constructed based on the content area selected from Grade Nine Chemistry textbook concerning with the area: Chapter 14,

Acids, Bases and Salts for this study. To examine knowledge, comprehension and application levels of achievement, TRUE/FALSE, Completion, Multiple Choice, Matching and Short questions were employed. The time allocation for the pretest and posttest was one and hours and the given marks were (50). Before using the tests in the main study, a pilot study was conducted with (30) Grade Nine Chemistry students at No.1 Basic Education High School, Sagaing. After that, the test items were analyzed by reliability statistics with Kuder-Richardson 20 (KR-20 method). Reliability Coefficients were 0.88 for the pretest and 0.87 for the posttest. In this study, learning materials for students were selected from Grade Nine Chemistry Textbook.

### **Procedures**

The intact experimental and control groups were assigned and the pretest was administered before the treatment. During the treatment, experimental group was taught through concept attainment model while the control group was taught by the conventional teaching method for two weeks. Each period was (45) minutes. After the treatment, the posttest was taken into the two groups.

### **Sample**

By using simple random sampling method, No (2) BEHS, Sagaing and (3) BEHS, Sagaing were chosen as sample schools. The participants from the selected schools were chosen as intact groups. They were divided into two groups: experimental group and control group in each school (Gay, 2003). There were (127) participants in this study.

### **Analysis of Data**

The quantitative data was analyzed by using statistical package for the social science (SPSS) to make the necessary interpretation of the findings. The means of the pretest scores were compared by using the independent samples *t*-test. According to this result, the analysis of covariance (ANCOVA) was employed for the analysis of posttest scores of the two groups after the treatment.

## Findings

The major purpose of the study is to investigate the effectiveness of concept attainment model in teaching Grade Nine Chemistry. Based on data obtained from the pretest and posttest scores, the comparison of achievement scores of the two groups will be carried out in terms of cognitive domain for expressing the effectiveness of concept attainment model in teaching chemistry.

### Analysis of Pretest Scores

The means of pretest scores between the groups of both selected schools were compared to determine the equivalence between the experimental and control groups before treatment.

Table 1. Analysis on Pretest Scores

School	Group	N	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	Sig. (2- tailed)
BEHS 2	Experimental	32	31.13	5.44	6.095	5.108	57.313	.000***
	Control	33	25.03	4.058				
BEHS 3	Experimental	30	31.57	4.66	5.567	4.903	60	.000***
	Control	32	26.00	4.27				

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

According to the results of table 1, the means in both groups are difference at the  $p < .001$  level. Thus, the posttest scores of the experimental and control groups were compared by using the analysis of covariance (ANCOVA).

### Analysis on Posttest Scores

To find the difference between the means of the experiment and control groups, the posttest scores were analyzed by using analysis of covariance (ANCOVA) was used. In this analysis, the pretest scores are considered as covariate, the methods (Groups) are independent variables

and the posttest scores of the two groups are the dependent variables (Pallant, 2013). The achievement scores of the experimental and control groups are calculated. It was found that there was significant difference between these two groups.

Table 2. The Summary of ANCOVA Source on the Posttest Total Scores in the selected schools

School	Group	N	M	SD	Adjusted Mean	F	Sig.
BEHS 2	Experimental	32	36	3.223	35.282 <sup>a</sup>	72.388	.000***
	Control	33	27.61	2.703	28.303 <sup>a</sup>		
BEHS 3	Experimental	30	35.77	3.339	34.901 <sup>a</sup>	38.783	.000***
	Control	32	27.66	3.94	28.468 <sup>a</sup>		

<sup>a</sup>Adjusted Mean; \*\*\* $p < .001$ , Covariates: Pretest Scores = 28.031, BEHS 2 and 28.69, BEHS 3

According to the results of table 2, the adjusted means in the groups are significant differences at  $F_{(1,62)}=72.388$ ,  $p < .001$  level for BEHS 2 and at  $F_{(1,59)}=38.783$ ,  $p < .001$  for BEHS 3. Thus, the experimental class did better than the control class on the posttest. It may be concluded that concept attainment model was found to be significantly higher than the conventional teaching method.

Table 3. The Summary of ANCOVA Source on the Posttest Knowledge Level Scores in the selected schools

School	Group	N	M	SD	Adjusted Mean	F	Sig.
BEHS 2	Experimental	32	20.78	2.587	20.463	35.703	.000***
	Control	33	16.30	1.794	16.612		
BEHS 3	Experimental	30	21.73	2.288	21.492 <sup>a</sup>	33.901	.000***
	Control	32	7.47	2.079	17.695 <sup>a</sup>		

<sup>a</sup>Adjusted Mean; \*\*\* $p < .001$ , Covariates: Pretest Scores = 28.031, BEHS 2 and 28.69, BEHS 3

According to the results of table 3, it showed that there were significant differences between the experimental group and control group on knowledge level questions in the selected schools. It can be interpreted that the use of concept attainment model of teaching is more effective in students' learning to remember previously learned materials than the conventional teaching method.

Table 4. The Summary of ANCOVA Source on the Posttest Comprehension Level Scores in the selected schools

School	Group	N	M	SD	Adjusted Mean	F	Sig.
BEHS 2	Experimental	32	9.03	1.121	8.784 <sup>a</sup>	35.255	.000***
	Control	33	6.64	1.168	6.876 <sup>a</sup>		
BEHS 3	Experimental	30	7.70	1.317	7.378a	11.906	.001***
	Control	32	5.66	1.558	5.958a		

<sup>a</sup>Adjusted Mean; \*\*\*p<.001, Covariates: Pretest Scores = 28.031, BEHS 2 and 28.69, BEHS 3

On the basis of the findings in the table 4, it indicates that there were a statically significant difference between the experimental and control groups for posttest scores on comprehension level questions in both schools. The use of concept attainment model can impart the scientific concepts to the students and bring about the comprehensive understanding the meaning of the learning materials for the students. It can help the students to improve conceptualization and to categorize data and write the chemical formula and equations concerned with the teaching information and ideas.

Table 5. The Summary of ANCOVA Source on the Posttest Application Scores in the selected schools

School	Group	N	M	SD	Adjusted Mean	F	Sig.
BEHS 2	Experimental	32	6.19	1.768	5.980 <sup>a</sup>	6.896	.011*
	Control	33	4.52	1.523	4.716 <sup>a</sup>		
BEHS 3	Experimental	30	6.4	1.545	6.092 <sup>a</sup>	9.282	.003*
	Control			1.437	4.788 <sup>a</sup>		
			32	4.5			

<sup>a</sup>Adjusted Mean; \* $p < .05$ , Covariates: Pretest Scores = 28.031, BEHS 2 and 28.69, BEHS3

From the results of table 5, it may be concluded that concept attainment model was found to be significantly superior in compared with the conventional teaching method in the achievement of the students. The experimental class did better than the control class. The results can be interpreted that the use of concept attainment model in teaching chemistry could create and implement the students' ability to apply the scientific concepts in their real-life situations.

### Discussion

On the basis of the results of the study, the adjusted means of experimental group were significantly higher than that of the control group in both schools when the pretest scores were taken as covariates. According to this finding, the experimental classes performed better than the control classes. There was a significant difference between the achievement of students who were taught through the concept attainment model and that of students who were taught by the conventional teaching method.

For the analysis of knowledge level questions, there was a significant difference between the achievement of experimental group and that of control group in each school. The concept attainment model is an inductive thinking process that helps the students to organize data according to the previously learned concepts. The students well identified, categorized

and stated the learned material. They could be promoted in the retention of the concepts of the lesson.

It was found that the concept attainment model is superior to the conventional teaching method in answering comprehension level question in both schools. The teaching concepts gave the students experiences in conceptual thinking and students engaged in the conceptualizing the facts. They came to grasp and share the meaning of the lesson and reflect upon their thinking.

It was seen that there was a significant difference between the achievement of experimental group and that of control group in answering application level questions in both schools. Concept attainment model gives the wide opportunities to students for acquiring concepts, interpreting data and applying them in new and differential situations.

This teaching model gives the productive effectiveness in teaching Chemistry. According to the results of the study, concept attainment model can contribute to the teaching of chemistry at the high school level. This concept attainment model can help the students to relate new information and facts to the materials which they have previously learned. This can promote the retention of the subject matter for the students. It can give great contribution for concept attainment model should be used in order to deep understanding of the concept.

### **Conclusion**

According to the research findings, there were significant differences between the total achievement scores of the two groups on the Bloom's taxonomic levels of cognitive domain for the selected schools. Thus, it was found that the experimental classes did better perform than the control classes. Concept attainment model was found to be effective in influencing the achievement of Grade Nine Chemistry students.

To sum up, concept attainment model helps in strengthening the cognitive structure of the students. It also supports to clarify ideas and to introduce aspects of content. It is also designed for teaching specific concepts and on the nature of concepts. It also gives the activities in inductive reasoning and opportunities for promoting students' concept-building strategies. These strategies establish an awareness of alternative perspectives, a sensitivity of logical reasoning in communication and a

tolerance of ambiguity. The teacher should use the concept attainment model in teaching Chemistry and science at the high school level to acquire the meaningful and comprehensive understanding the basic concepts of the subject. Students will gradually become to improve the critical, logical and scientific thinking skills and solve the problems in and out of school situations.

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## **A Study of Grade Ten Students' Learning Styles and their Academic Achievement in Physics**

Swe Swe Nyunt<sup>1</sup> & Chan Nyein Khaing<sup>2</sup>

### **Abstract**

The main purpose of this study is to investigate students' learning styles and their academic achievement in Physics. The aim of any education Physics curriculum is not only to educate in Physics but also to educate through Physics. To meet this expectation in Physics, teachers, as the facilitator of their students' learning, need to develop insight into the aspects relating to how learners learn from both theoretical and practical perspectives. The theory of learning styles maps the differences in how learners learn new things. The specific objectives of the study were: (1) to study different learning styles of Grade Ten students, (2) to explore Grade Ten students' achievement in physics by their different learning styles, and (3) to study the relationship between students' learning styles and their academic achievement in Physics. In line with those objectives, quantitative research method was employed and research procedures were carried out accordingly. Honey and Mumford Learning Style Questionnaire (2010 version), which is used in this study, identifies four distinct learning styles: Activist, Reflector, Theorist, and Pragmatist. The findings indicated that there was a significant difference in learning styles of Grade Ten students who are learning Physics ( $F(4, 595) = 6.994, p < 0.001$ ). It was also found that learning style influences the achievement. Moreover, the correlation between students' learning styles and academic achievement was found to be positive at the significant level of 0.05 and 0.001. Therefore, learning style is a factor that should be taken into account to improve the educational process of Physics and to increase the motivation of students to learn Physics.

**Keywords:** learning style, academic achievement, motivation, Physics

### **Introduction**

Education begins from the time of birth and continues throughout one's whole lives. Education plays an important role in promoting correct perspective among people. Human society keeps on changing. In this ever changing society, it is undoubtedly necessary that education should be oriented towards helping learners to adapt to the society. Science plays an

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important role in the changes of the modern society. Physics is the branch of physical science. In this present age called “The Age of Science”, knowledge of Physics is essential for everybody because of its immense value in individuals’ daily life. Physics teachers are responsible to give their students effective instruction so as to help their students gain meaningful learning experiences. Meaningful experiences can occur when learners actively involve in their learning process. To produce such active engagement on the part of the learners, teachers must create learning opportunities that are conducive to their learning. This implies that individual learners should enjoy their learning. Learners’ satisfaction in their learning can be gained via addressing and meeting their needs. Therefore, it would be of great help for teachers if they can identify their students’ differences and take these differences into account while designing their instruction. Students can be diverse in many ways. One of the most important categories of diversity lies in that students can have different learning styles (Felder, 2005). Learning styles have effects on educational process and how students perform (Gordon, 1998). For this reason, this study is aimed to explore students’ learning styles and their academic achievement in Physics.

### **The Purposes of the Study**

The main purpose of this study is to investigate Grade Ten students’ learning styles and their academic achievement in Physics. The specific objectives are:

- (1) To study different learning styles of Grade Ten students by using a questionnaire based on Honey and Mumford’s Learning Style Model (2010 version)
- (2) To explore Grade Ten students’ achievement in Physics by their different learning styles
- (3) To study the relationship between Grade Ten students’ learning styles and their academic achievement in Physics

To make suggestions upon teachers’ knowledge about students’ learning styles and for improving students’ academic achievement in Physics

## Definitions of Key Terms

- Learning styles are the characteristic strengths and preferences in the way individuals take in and process information (Felder&Spurlin, 2005).
- Knowledge attained or skills developed in the school subjects, usually designated by test scores or by marks assigned by teachers, or by both (Good, 1959).
- Physics is the scientific study of natural forces such as energy, heat, light, etc (Walter, 2004).

## Review of Related Literature

The simplest definition of learning styles is the learning strengths and preferences of a student (Pandya, 2010). Learning styles are the educational conditions in which a student is likely to learn. Felder discussed that some students might focus on facts while others prefer theories or that some students learn better visually and others verbally, in other words, learning style may be defined as a habitual pattern or preferred way of acquiring knowledge or doing something (Pandya, 2010).

## Honey and Mumford's Learning Style Model

According to Honey and Mumford (1982), learning involves the four stages of concrete experience, reflection, theory building (drawing conclusions), and application, the last leading into a new cycle(cited in Mumford, 2002). Derived from the idea is that learning styles differ according to the stages of the process which they prefer or are best at (Mobbs, 2003).Peter Honey and Alan Mumford identified four distinct learning styles or preferences: Activist, Theorist, Pragmatist, and Reflector (see Figure 1).



Figure 1. The Learning Cycle and Styles

Source: Mumford, 2002, Effective Learning

Activists learn best from doing things; from short here and now tasks; in carrying out plans and experiments; being involved in new experiences; through trial and errors or taking risks; with other people. They learn less well from situations involving a passive role such as listening to lectures or reading (Mumford, 2002). They are gregarious people constantly involving themselves with others, but in doing so, they seek to center all activities around themselves. They tackle problems by brainstorming.

Reflectors learn by observing and thinking about what happened. They may avoid leaping in and prefer to watch from the sidelines. Thus, reflectors learn best when standing back, listening, observing; from collecting information and thinking it through, through different perspectives and grasping the big picture; by sharing and discussing ideas with others; through searching for meaning with other people. They learn less well when they are rushed into things without the opportunity to plan (Mumford, 2002).

Theorists like to understand the theory behind the actions. They need models, concepts and facts in order to engage in the learning process. They think problems through in vertical, step-by-step logical way. They prefer to analyze and synthesize, drawing new information into a systematic and logical 'theory'. They like reassurance of relevance. They are interested in and absorb ideas even where they may be distant from current reality. They prefer to maximize certainty and feel uncomfortable with subjective judgments, lateral thinking and anything flippant (Mumford, 2002).

Pragmatists need to be able to see how to put learning into practice in the real world. Abstract concepts and games are of limited use unless they can see a way to put the ideas into action in their lives. They are experimenters, trying out new ideas, theories and techniques to see if they work. They learn best when integrating theories and practice; in the workshop or laboratories using skills/learning and testing theories and applying common sense; with clear goals and rewards; with things rather than people (Honey & Mumford, 1992; cited in Dawn, Harkin & Turner, 2001).

## **Implication of Learning Styles in Teaching and Learning**

Every learner filters instruction through a set of individual difference filters or lenses. Individual difference filters may prevent the mental assimilation or accommodation of ideas by the learner.

According to the results of Aptitude Treatment Interaction (ATI) research, learners with different traits will not respond similarly to each form of instruction (Jonassen, 2011). The implication of this research is the adaption of instruction to learners' different ways of learning to optimize learning. The adaption includes three forms of matches: preferential match, remediation match, and compensatory match. Preferential match teaches to the learners' strengths. An approach that teaches to a learner's most effective traits will allow that learner to more freely consider and assimilate the content of the lesson without a lot of cognitive effort. Remediation match is eliminating deficiencies in learner traits. Providing strong verbalizers with instruction on how to interpret visuals is an example of a remediation match. Compensatory match is supplanting skills of learner traits. Essentially, supplanting a learner trait involves an instructional method that is, itself, a model of the deficient skill. The instructional method replaces the deficient ability in the learner.

Irvine and York (1995) claimed that by making an effort to consider students learning styles, teachers may be able to reap satisfaction from reinventing their teaching practices, hence high academic achievement (cited in Nzesei, 2015). To this end, learning styles stand out as an important concept in teaching and learning.

## **Learning Styles and Academic Achievement**

Students' achievement scores were significantly higher when they studied with strategies congruent, rather than incongruent with their learning style preferences (Clark & Thayer, 1988, cited in Dunn & Griggs, 2000). In a study of Castro and Peck (2005) on learning styles and learning difficulties of foreign language students, they claimed that the preferred learning style of the student can be a help or a hindrance in the success of the student in the foreign language classroom (cited in Nzesei, 2015). A student's style of learning, if accommodated, can result in improved attitudes toward learning and an increase in thinking skills, academic achievement, and creativity (Irvine & York, 1995, cited in Nzesei, 2015). Most researchers in the field of learning styles agree that enabling

learners to reflect on how they learn best helps to develop their meta-cognition.

Learning style consideration in learning is therefore an approach that is directed at meta-learning, similar to setting goals, choosing appropriate strategies and monitoring progress which are more effective ways of improving learning outcomes and achievement than those which simply aim to engage learners at the level of presenting information or understanding and use.

### **Research Method**

A descriptive research design was used in this study. The questionnaire for identifying students' learning styles based on Honey and Mumford's Learning Style Model (2010 version) was used and consists of 40 items. A Physics Achievement Test was also used in this study. The study was conducted in Yangon Region. The sampling technique used in this study was random sampling technique. The number of participants in the study were (600) Grade Ten students from the selected Basic Education High Schools in four districts in Yangon Region.

### **Procedures**

First of all, the relevant literature concerning with the research was explored. Secondly, in order to get the required data, the instruments were constructed under the guidance of the supervisor. After preparing the instruments, expert review was conducted by three experienced teachers. The pilot testing for the instruments was conducted at No (2) Basic Education High School, Yakin, in November 2018. The internal consistency of the questionnaire was (.786) and for Physics achievement test was (.799) by Cronbach's Alpha. Based on the pilot testing, some items were modified to adapt the students' understanding. After the pilot testing, the major survey was conducted in December 2018. The modified instruments were distributed to all the participants of the twelve sample schools and administered with the help of the teachers from those schools in December 2018. After the data were collected, the data were analyzed by using the Statistical Package for the Social Science (SPSS 22).

### Research Findings

The learning styles questionnaire used in this study includes four dimensions with four different learning styles. The means of the participants for each learning style are presented in Table (1).

Table 1. Mean Comparison of Students' Learning Styles

Learning Styles	N	Mean	SD
Activist	600	35.11	4.364
Reflector	600	39.42	4.401
Theorist	600	37.23	4.390
Pragmatist	600	37.15	4.397

### Percentage of Students' Different Learning Styles

The percentage of students' different learning styles was illustrated in Figure (2).

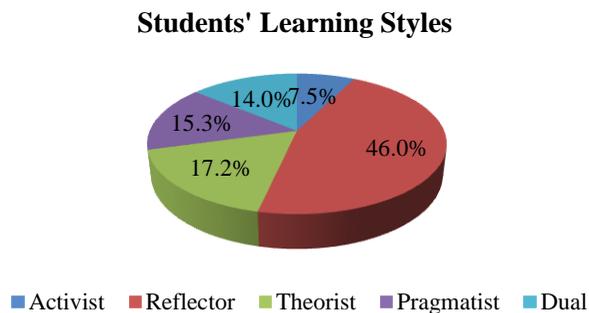


Figure 2. The Percentage of Students' Learning Styles

### Descriptive Statistics for Students' Learning Styles

The mean values for students' learning styles are presented in figure 3.

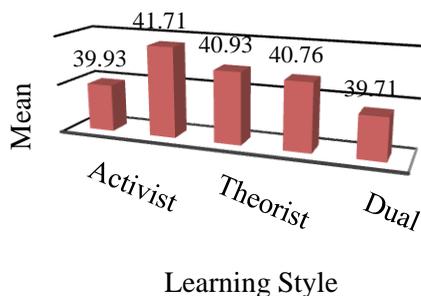


Figure 3. The Comparison of Mean Values for Students' Different Learning Styles

In order to know whether the differences among mean values of students' learning styles is actual or just by chance, one-way ANOVA was conducted (see Table 2).

Table 2. The ANOVA Result for Students' Learning Styles

Groups	SS	df	MS	F	Sig.
Between Groups	336.166	4	84.042	6.994***	.000
Within Groups	7149.594	595	12.016		
Total	7485.760	599			

Note. \*\*\* The mean difference is significant at 0.001 level.

It is evident from table (2) that  $F$  value (6.994) was significant at 0.001 level. Therefore, it can be concluded that there exists a significant difference among students' learning styles. It may, therefore, be said that students learn Physics in different ways.

### Comparison of Students' Physics Achievement by their Different Learning Styles

The mean comparison of students' Physics achievement by their different learning styles is presented in figure (4).

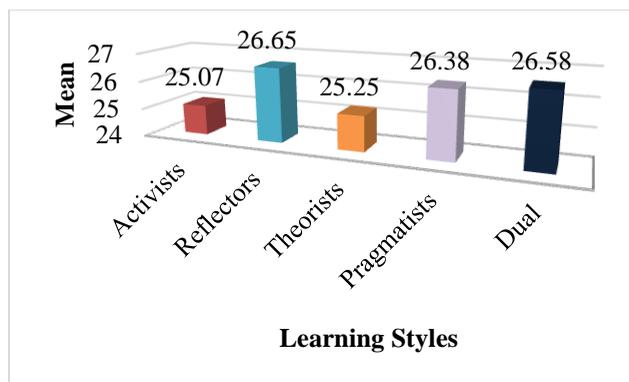


Figure 4. Comparison of Students' Physics Achievement by their Different Learning Styles

Figure (4) confirmed that the mean score of reflector was the highest, followed by dual learning style, then by pragmatist and the last by theorist and activist (see Figure 4). Thus, it can be concluded that learning styles influence the academic achievement of students. It may, therefore, be said that there exists a significant difference in different learning styles in relation to their Physics achievement.

### Relationship between Students' Different Learning Styles and their Physics Achievement

The correlation between students' different learning styles and their academic achievement in Physics was analyzed by using the Pearson product-moment correlation (see Table 3).

Table 3. Relationship between Students' Different Learning Styles and their Physics Achievement

Learning Styles	Academic Achievement		
	No. of Students	Pearson Correlation	Sig.
Activist	45	.357*	.016
Reflector	276	.570***	.000
Theorist	103	.557***	.000
Pragmatist	92	.365***	.000

Learning Styles	Academic Achievement		
	No. of Students	Pearson Correlation	Sig.
Dual	84	.590***	.000

\*Correlation is significant at the 0.05 level.

\*\*\*Correlation is significant at the 0.001 level.

Correlations demonstrated that there was a significant positive correlation between reflector, theorist, pragmatist, dual learning style and their Physics achievement at the 0.001 level. The correlation between activist, and their achievement in Physics was significant at the 0.05 level. It means that there is no good or bad learning style. One learning style is neither preferable nor inferior to another, but is simply different with different characteristics strengths and weakness (Felder & Spurlin, 2005). What matters is to arrange learning activities that are in accordance with the learning style of the student.

### Discussion

Teaching and learning are the main components of the system of education. They are not inseparable. Effective teaching involves more than the simple transmission of information and includes motivating students and creating a positive environment as well. Effective teaching paves the way for effective learning. Teaching is, in fact, intended for learning. Educators need to find ways for learning to be effective.

The style by which one learns and applies knowledge is an important characteristics to consider in the aggregate educational processes (Kolb & Kolb, 2009, cited in Gokalp, 2013).The learning style of an individual could facilitate instructional operations to understand different subjects and define remedies to improve excellence in these subjects. With this intention to improve students' excellence in Physics, this study was conducted.

The findings showed that achievement of the students with reflector learning style was the highest while the mean score of activist was the lowest. In most of the classroom in Myanmar, students are still engaged in listening and then in reflective thinking, but little opportunity is given to students to participate in concrete experiences first (Hayden & Martin, 2013). This might be due to the classroom practice which favors the

reflectors, but is unresponsive to the learning needs of activists. Sticking to one teaching style will create a monotonous learning environment, so not everyone will enjoy the lesson. Therefore, teachers should try to match learning activities to learners' preferences.

One learning style is neither preferable nor inferior to another, but is simply different with different characteristics strengths and weakness (Felder & Spurlin, 2005). All learning styles are of equal value and importance and they only present different ways of acquiring knowledge in different persons. Therefore, it is important for Physics teachers to note that one way to enhance their students' achievement is to identify each student's learning style and to teach them accordingly.

### **Suggestions**

Learning is individual and idiosyncratic. Transfer of learning occurs when individuals take responsibility of their own learning.

Thus, it is vital for Physics teacher to understand that all learners will not perform equally in a particular learning situation as students have strengths and weaknesses, that is, students have different learning styles which create a landscape by which the students will either maintain or restrain their intentional cognition. Thus, knowing how students learn is critical during the design and application of educational systems in order to get the best output. Therefore, teachers should identify each student's different learning styles and take these learning traits into account in planning and delivering their instruction.

Teachers should try to prepare learning experiences that are directed towards developing students' self-esteem, by planning the learning activities based on their preferred learning styles. When instruction is aligned with the learners' learning styles, achievement will increase together with affective and motivational advantage. However, it is also important to help learners develop the skills to learn effectively in their non-preferred learning styles, so that learners can develop a full range of learning skills. Teachers should help the students learn more effectively by encouraging them to develop secondary and tertiary strengths. While doing so, teachers should remediate weak cognitive skills by providing additional support and encouragement so that students' attention in the learning task can be retained.

It is the responsibility of Physics teacher to know their students' strengths and weakness and create learning environments where their students can learn effectively and efficiently. The aim is academic equality, the elimination of individual differences, and the maximization of all learners' outcomes.

### **Conclusion**

Learning style is essential for both students and teachers. Informing the teachers about the results and the preferred activities for each learning style could cross the gap by helping them in planning the courses and modulating their teaching styles to match the variations of students' learning styles. Teachers can also encourage the students to use their predominant learning style without directing them to the formal way of instruction. The findings of this study confirmed that students do learn Physics in different ways and these differences in students' learning, that is, their learning styles influence on their achievement. Therefore, it can be concluded that learning style is a factor that should be taken into account in teaching and learning so that students' academic success can be achieved. It is hoped that the findings from this study will benefit teachers in an effort to understand their students and to maximize their students' learning in Physics. It is hoped that this study will be a stimulating accomplishment for further study to improve the educational process of physics.

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# The Effectiveness of Reasoning by Analogy in Teaching Physics at the High School Level

Mg Kyaing<sup>1</sup> & Wai Wai Kyi<sup>2</sup>

## Abstract

The purpose of this study was to investigate the effectiveness of reasoning by analogy in teaching Physics at the high school level. This study was conducted by using a quasi-experimental design involving a pretest and a posttest. The experiment was undertaken with 188 Grade Nine students from the two selected Basic Education High schools in Patheingyi Township in (2017-2018) Academic Year. During the four weeks of the treatment period, the experimental groups were taught with reasoning by analogy and the control groups were treated with conventional methods of instruction. After the treatment, both groups took the posttest. Independent samples *t* test was applied to test whether there were differences in the Physics achievement between the two groups according to revised Bloom's Taxonomic levels of cognitive domain. The research findings showed that the experimental group taught with reasoning by analogy performed better than the control group taught with conventional methods of instruction. Based on the results of this study, it can be concluded that reasoning by analogy can encourage students' engagement and promote students' achievement and it should therefore be used as a viable instructional approach.

**Keywords:** reasoning, analogy, physics, achievement

## Introduction

### Background of the Study

Myanmar education standard is in its infancy state, demanding improvements in almost every level of education system. Education is one of the most important factors for the development of human civilization in Myanmar. Through education, society can formulate its own purposes, can organize its own means and resources, and thus shape itself with definiteness. The key to future progress for mankind lies in the realization of science and technology for society, and in society. With the shift to the knowledge-based society, the creation of new knowledge is an increasingly

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important aspect in every sector. It is derived from science. Physics is one of the most fundamental natural sciences based on facts which are objective and verifiable. It can help students develop intellectual skills and positive attitude, satisfy curiosity and creativity, develop social skills and receive opportunities of vocational values (Kumar, 1995). So, it is absolutely important for the students to appreciate the nature and importance of Physics.

### **Significance of the Study**

Although there are several effective teaching methods that teachers can practice in teaching physics concepts, the methods based on the students' real life experiences really help students learn the new concepts. This research is significant in the sense that it examined the effectiveness of the use of analogy technique which is one of the most effective ways of how the teachers do this (Glynn, 1996, cited in Kilic & Topska, 2011). Analogies can be useful tools in teaching Physics. The use of analogies in particular has been found to be very effective in promoting students to build understanding either hands-on interactions with tangible resources or by making conceptual links with familiar objects, scenarios or events (Hagkund et. al, 2012, cited in Sharma, 2015). Research findings about using analogy in teaching physics have shown good results. This paper will help teachers study about using analogies in teaching. This study is aimed to explore the effectiveness of using analogies in teaching physics at the high school level. There have been few researches about using analogy. However, this paper would contribute some insight into teaching physics.

### **Purpose of the Research**

The purpose of this research is to investigate the effectiveness of reasoning by analogy in teaching Physics at the high school level.

### **Objectives**

The objectives of this research are as follows:

- (1) To study the effect of using analogy on the students' physics achievement,
- (2) To compare the physics achievement of the students who are taught by using analogy with that of students who are taught with conventional methods of teaching,

- (3) To express the effectiveness of using analogy in Physics, and
- (4) To give suggestions for improving Physics teaching and learning at the high school level.

### **Definition of Key Terms**

**Reasoning** - Reasoning combines past experiences to solve a problem which cannot be solved by mere reproduction of earlier solutions (Munn, 1967, cited in Manjal, 2004).

**Analogy** - Analogy refers to transferring knowledge from past problem solving episodes to new problems that share significant aspects with corresponding past experience and using the transferred knowledge to construct solutions to the new problems (Carbonell, 1986, cited in Zaho & Maher, 1988).

## **Review of Related Literature**

### **Background Theory**

Constructivist theories are based around the idea that students construct their own meaning by building on their previous knowledge and experience. New ideas and experiences are matched against existing knowledge, and the learner incorporates these to make sense of the world. The use of analogy fits in well with constructivism. So, this study, the effectiveness of reasoning by analogy in teaching Physics at the basic high school level is based on the theory of constructivism.

### **Role of Analogy in Physics**

Analogies are most often used in an educational setting, especially in Physics, to help students understand new information in terms of already familiar information and to help them relate that new information to their already existing knowledge structure (Venville & Treagust, 1997, cited in Orgill, 2005). There are several roles that analogies can play in promoting meaningful learning physics concepts. First, they help learners organize information or view information from a new perspective. The use of analogies can also result in better student engagement and interaction with a topic. Some studies have shown benefits of using analogies during classroom instruction (Dagher, 1995). Finally, analogies can play a role in

promoting conceptual change by helping students overcome existing misconceptions (Venville & Treagust, 1996, cited in Orgill, 2005).

### Concepts of Reasoning

Reasoning is the most basic act of humanity and plays a significant role in one's adjustment to one's environment (Manjal, 2004). It is a careful, thoughtful, and logical process that allows people to take in all the appropriate data available to them and to come up with an answer. Reasoning is not only a mental process or thinking but, it is also a productive thinking. Reasoning is a hallmark of human thought, supporting the process of discovery that leads from what is known or hypothesized, to what is unknown or implicit in one's thinking (Barbey & Barsalou, 2009).

## Research Method

### Method

This study used a quasi-experimental design, non-equivalent control group design in particular, involving pretest-posttest in particular, in which the two intact classes were randomly assigned as the experimental and control groups.

### Subjects

Two Basic Education High Schools from Pathein Gyi Township were randomly selected by the use of simple random sampling method. Participants were 188 Grade-Nine students from the selected schools.

Table 1. Population and Sample Size

Name of Schools	Population Size	Sample Size		
		Group	Number of Subjects	Total
HS 1	210	Experimental	52	103
		Control	51	
HS 2	85	Experimental	31	85
		Control	54	

## Design of the Study

The design applied in this study was a quasi-experimental design as follows:

Table 2. Quasi-Experimental Design

Group	Pretest	Treatment	Posttest
Experimental	T1	Use of Reasoning by Analogy	T2
Control	T1	Use of Conventional Method	T2

Two intact classes were administered a pretest at the start of the study. After that, the experimental groups were taught with reasoning by analogy and the control groups were taught with conventional methods of teaching. After being taught, all groups took a posttest.

## Instrumentation

In this study, a pretest was used to determine group equivalence between control and experimental groups in their physics achievement. The items covered Chapter (10), Electricity and Magnetism from Grade-Nine physics textbook. The posttest was constructed to measure the physics achievement of the students. The items were categorized according to cognitive levels of revised Bloom's Taxonomy (Krathwohl, 2002).

## Research Findings

Table 3. Analysis on Overall Posttest Achievement Scores

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
HS1	Experimental	52	31.81	6.24	10.59	8.19	101	.000***
	Control	51	21.22	6.87				
HS2	Experimental	31	27.03	5.71	5.51	3.09	83	.003**
	Control	54	21.52	8.92				
Total	Experimental	83	30.04	6.42	8.65	8.10	186	.000***
	Control	105	21.39	7.87				

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

The mean of the experimental group was significantly higher than that of the control group in each school (Table 3). It showed that there was a

significant difference between the experimental and the control groups on physics achievement in both schools. It can be seen in Figure 1.

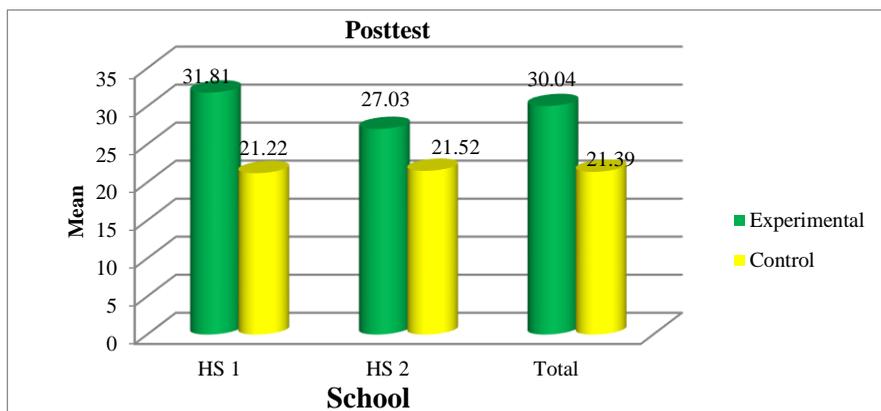


Figure 1. Comparison of Means for Overall Posttest Achievement Scores

Based on the above findings, it can be interpreted that the reasoning by analogy had a significant effect on the overall physics achievement of the students. So, it can be interpreted that teaching physics with reasoning by analogy can make students' learning effective in cognitive skills.

Table 4. Analysis on Remembering Level Questions

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
HS 1	Experimental	52	15.77	2.38	3.30	6.18	101	.000***
	Control	51	11.84	3.90				
HS 2	Experimental	31	13.32	2.91	3.03	3.03	83	.001***
	Control	54	10.3	4.52				
Total	Experimental	83	14.86	2.84	3.76	6.96	186	.000***
	Control	105	11.1	4.22				

Note: \*\*\* $p < .001$

According to the results of the remembering level questions, the mean of the experimental group was significantly higher than that of the control group in both schools in remembering level questions. Thus, it can be interpreted that teaching with reasoning by analogy/analogical reasoning

had significant effects on students' physics achievement at remembering level. Figure 2 illustrates the comparison of means between the two groups.

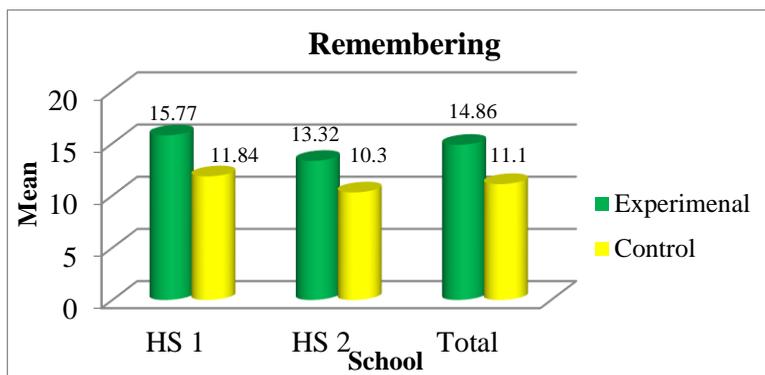


Figure 2. Comparison of Means for Remembering Level Questions

Based on the findings, it can be interpreted that reasoning by analogy was more conducive to effective students' learning, to remember previously learned materials than conventional methods of teaching. Teaching with reasoning by analogy could increase the students' memory retention.

The students from the experimental groups who were taught with reasoning by analogy can absorb the context through the comparison of similar features of the target and the analog that the students already know. So, they can recall the previously learned materials more than the students taught by conventional methods of teaching.

Table 5. Analysis on Understanding Level Questions

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
HS1	Experimental	52	13.71	4.13	5.67	7.47	101	.000***
	Control	51	8.04	3.55				
HS2	Experimental	31	11.65	3.14	1.64	1.70	83	.092
	Control	54	10	4.82				
Total	Experimental	83	12.89	3.85	3.97	6.68	186	.000***
	Control	105	8.92	4.19				

Note: \*\*\*  $p < .001$

According to the results of the Table 5, the mean of the control group in HS1, was nearly the same as that of the experimental group in understanding level questions. But, the means of both experimental groups were significantly higher than those of both control groups. Therefore, it indicates that teaching with reasoning by analogy has greater effects on the students' understanding in physics concepts than teaching with the conventional methods of teaching. It is also shown in Figure 3.

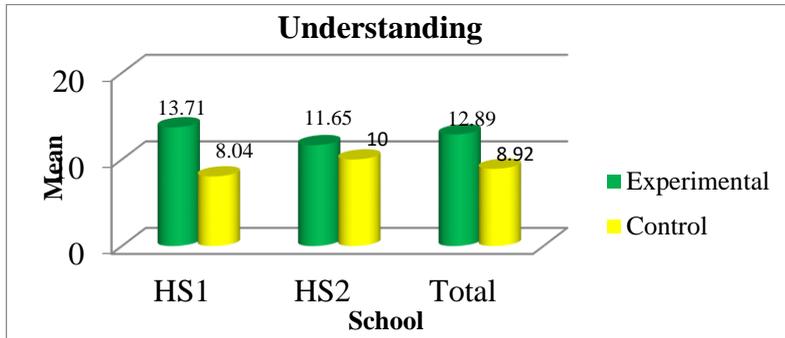


Figure 3. Comparison of Means for Understanding Level Questions

On the basis of the findings, it can be interpreted that teaching with analogical reasoning tends to be more effective in students' learning to grasp the meaning of the learned materials than conventional methods of teaching. Through reasoning by analogy, the students get the chance to construct their own meaning based on their existing knowledge. Because of their own creation, the students who were taught with reasoning by analogy can understand the concepts better than the students taught by conventional methods of teaching.

Table 6. Analysis on Applying Level Questions

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
HS1	Experimental	52	1.96	1.70	0.63	1.86	101	.066
	Control	51	1.33	1.73				
HS2	Experimental	31	1.74	1.44	0.85	2.47	83	.014*
	Control	54	0.89	1.59				
Total	Experimental	83	1.88	1.60	0.77	3.22	186	.002**
	Control	105	1.1	1.66				

Note: \* $p < .05$       \*\* $p < 0.01$

The results of the applying level questions showed that the experimental group from HS1, was not clearly superior to the control group in the applying level questions. However, the total mean of the experimental groups in both schools on the applying level questions was higher than that of the control groups. It can be seen in Figure 4.

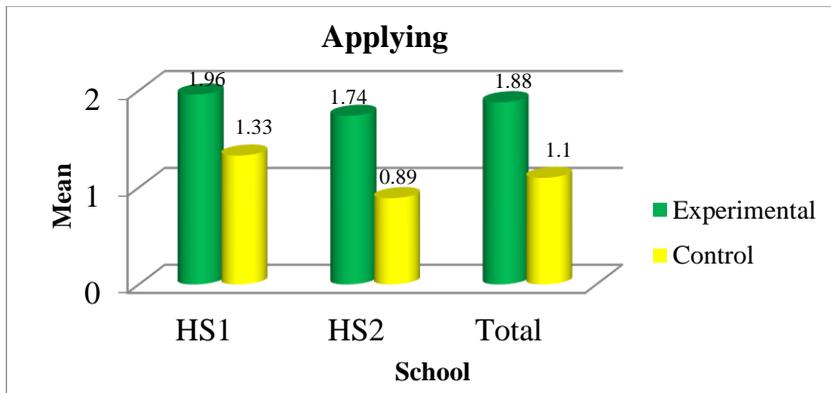


Figure 4. Comparison of Means for Applying Level Questions

The above findings proved that the total mean of the experimental groups was significantly higher than that of the control groups. It meant that the results of using analogical reasoning were better than the results of using conventional methods of teaching in applying level questions. In other words, the students who were taught with analogical reasoning were able to apply knowledge obtained in the science context to real life situations.

Table 7. Analysis on Analyzing Level Questions

School	Group	<i>N</i>	<i>M</i>	<i>SD</i>	<i>MD</i>	<i>t</i>	<i>df</i>	<i>Sig</i> (2-tailed)
HS1	Experimental	52	0.38	0.93	0.38	2.95	101	.004**
	Control	51	0	0				
HS2	Experimental	31	0.29	0.87	-0.04	-0.23	83	.821
	Control	54	0.33	0.87				
Total	Experimental	83	0.35	0.88	0.18	1.61	186	.110
	Control	105	0.17	0.64				

Note: \*\* $p < .01$

The physics achievement of the students in the experimental group in HS1, was distinguishable from that of the students in the control group in that school. But, regarding with the total mean on the analyzing level questions, the physics achievements of the experimental students in both schools were indistinguishable from that of the control students.

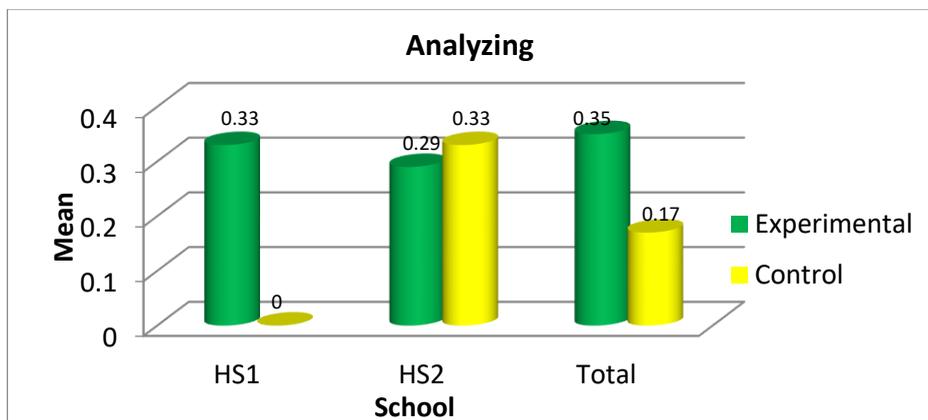


Figure 5. Comparison of Means for Analyzing Level Questions

The above findings showed that teaching with analogical reasoning could not bring significant improvement of students' learning to analyze the learning materials on their own.

## Suggestions and Conclusion

### Suggestions

It was found that reasoning by analogy was more effective than the conventional methods of teaching according to the results of the study. Therefore, it is suggested that physics teachers should agree that the most important single factor influencing learning is what the learner has already known. They should therefore strive to teach in such a way as to resolve the conflict between alternative conceptions and scientific views they are presenting to the students using such instructional model as analogy. Policy makers and curriculum planners should try to organize seminars to train in-service science teachers on how to make effective use of such constructivist-based teaching approaches as analogy in bringing about conceptual understanding in physics in students. This study was geographically limited to two Basic Education High Schools in Pathein Gyi Township.

## Conclusion

The current study aims at investigating the effectiveness of reasoning by analogy in teaching physics at the high school level. To achieve the main purpose of the study, the researcher applied the randomized pretest-posttest control group design in which the two non-equivalent groups were employed: the experimental and control groups. According to the research findings, the students who were taught with reasoning by analogy performed better than the students who were taught with conventional methods of teaching. This study supported that reasoning by analogy had positive effects on the students' physics achievement. Teachers must practice several effective teaching methods in teaching physics that can impart scientific facts, knowledge and concepts of nature, between and among the natural phenomena. In teaching physics which embodies abstract concepts, reasoning by analogy increased the students' engagement in the learning activity. This was because the teaching learning process is based on the students' real life experiences. So, reasoning by analogy is a viable and effective instructional approach that can improve the students' reasoning ability in teaching physics.

## Acknowledgements

We would like to express our respectful gratitude to Dr. Saw Pyone Naing, Rector and Dr. Myat Myat Thaw, Pro-rector, Sagaing University of Education, for their kind permission to carry out this thesis. Our honorable thanks go to Dr. Soe Than, Retired Professor and Head and Dr. Wai Wai Oo, Associate Professor and Head, Department of Methodology, Sagaing University of Education, for their guidance and suggestions to smooth the completion of the piece of work through their invaluable advice. We also wish to extend a special word of thanks to the principals, teachers and students from selected Basic Education High Schools in Pathein Gyi Township for their accommodation to my research.

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## **A Study of Grade Seven Students' Achievement in Teaching History by using Cooperative Learning**

Thin Thin Khaing<sup>1</sup> & Khaing Zaw Oo<sup>2</sup>

### **Abstract**

The main purpose of this research is to study Grade Seven students' achievement in teaching history. In this research, 60 Grade Seven students from No. (3) Basic Education High School, Hlaing Thar Yar Township, Yangon Region, was selected to study the effect of cooperative learning. Posttest only control group design was used in this study. According to the results of data analysis, there was no significant difference between the experimental group and the control group in the pretest. And then, the control group was given a treatment by using traditional lecture method and the experimental group was given a treatment by using cooperative learning. At the end of treatment, a posttest was administered to both groups. The results were analyzed by using the independent samples *t*-test. There was a significant difference between the experimental group and the control group. The score of the experimental group is higher than that of the control group. Students from experimental group become more interested in learning historical events. Thus, it can be said that the scores obtained from application of the cooperative learning method are higher than those obtained from application of the traditional lecture method.

**Keywords:** History, Cooperative Learning, Interpersonal skills

### **Introduction**

Education is about teaching and learning skill and knowledge. Education also means helping to learn how to do things and encouraging students to think about what they learn. It is also important for educators to teach ways to find and use information. Through education, the knowledge of society, country, and of the world is passed on from generation to generation. Through education, children and adults are supposed to learn how to be active and effective citizens. More specific, education helps and guides individuals to transform from one class to another (Talekau, Nayak & Harichandan, 2015).

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The subject matter content is not an end in itself. It must act as a vehicle through which the more lasting intellectual abilities are developed. The teacher can adopt any method of teaching for instruction in the classroom teaching like story telling method, lecture method, cooperative learning approach, project method and collaborative method and so on. Here, cooperative learning approach is used to enhance students' interests and motivation in history teaching. In this method, students learn more by doing something actively than by simply watching and listening.

History is the study of the past as it is described in written documents. Events occurring before written record are considered as prehistory. It is an umbrella term that relates to past events as well as the memory, discovery, collection, organization, presentation and interpretation of information about these events (Sing, 2009). Cooperation is working together to accomplish share goals. Within cooperative situation, individuals seek outcomes that are beneficial to themselves and beneficial to all other group members.

### **Purposes of the Study**

The purposes of the study are

1. To study the cooperative learning techniques.
2. To apply the cooperative learning in teaching history and
3. To examine students' achievement between experimental group and control group by using cooperative learning strategies.

### **Research Question**

The research questions of this study are as follows:

1. Are there any significant differences students' achievement between experimental group and control group by using cooperative learning strategies?
2. Are there any significant differences students' achievement between traditional method and cooperative learning?

## Scope of the Study

This study is emphasized on using cooperative learning. No (3) Basic Education High School in Hlaing Thar Yar was selected as the sample school. The topics on “The Fall of the Third Myanmar Naingngan” (Myanmar History) and “National Countries and National Monarchy” (World History) from Grade 7 History were used as sample lessons.

## Definition of Key Terms

**History;** History is the study of the political, physical, religious, economic, cultural, industrial, technological and scientific fields, right from the beginning of human life up to the present day.

**Cooperative Learning;** Cooperative learning is critical in enabling students to gain a sense of belonging and exercise control over their own learning, especially by working with and helping others.

**Interpersonal Skills;** Interpersonal skills are the qualities and behaviours a person uses to interact each other in proper ways. Interpersonal skills range from communication and listening to attitude and deportment.

## Review of Related Literature

Organizing students to work together in small groups is an ancient practice in education through the world. While practice varies widely within the various countries, there is a sharp distinction between the approaches to cooperative learning prevalent in the United States and those prevalent in Europe, Israel, and the British Commonwealth. In the United States, cooperative learning most frequently takes the form of cooperatively structured programs focused on mastery of skills, concepts, and information. The purpose of the activity is at least as much socialization and general, higher-order thinking or problem solving skills as it is the learning of specific subject matter content. Research on these different approaches to cooperative learning also differ sharply. This entry presents a research on cooperative learning involving comparisons of cooperative and traditional approaches (Jacobs, Lee & Ball, 1997).

## **Options in Cooperative Learning**

There are many ways that cooperative learning can be implemented. An educator's philosophy plays a key role in determining how cooperative learning is used.

### **Student-Centered Vs Teacher-Centered**

The issue here is the role of students in shaping the classroom. Student-centered, also called learner-centered, means that students provide input into what the class does and how it does. This includes decisions about what to study, how to study (eg. reading, field trip, discussion, lecture), choice of group mates, how often group work is done, which group activities are conducted, how assessment is conducted, and what rewards and punishments – if any – are given.

In a teacher-centered situation the above decisions are made exclusively by the teacher. Teachers are the bosses, leaders, and creators while students are the employees, followers, and users. What to learn and how to learn are preplanned by the teacher. When students are in groups, they are studying material chosen by the teacher. The teacher decides who is in which group, gives groups time limits for completing their tasks, and does all the assessment.

### **Intrinsic Motivation – Extrinsic Motivation**

The issue here is how students become motivated to learn and cooperate. Intrinsic motivation comes from within students. For example, they want to learn for the joy of learning because they are very interested in the topic, or to improve themselves. Helping other student flows from the desire to be altruistic and the enjoyment of collective effort. Students learn together without the use of grades, team award certificates, and other rewards or punishments to encourage them.

On the other hand, extrinsic motivation comes from outside students. For example, they learn in order to receive praise, grades, other rewards from teachers, parents, classmates and others. They may not help one another learn if there are no outside incentives. When rewards or treats of punishment are not there, students may be less eager to learn and to help one another.

## **Knowledge Construction – Knowledge Transmission**

This issue involves the process by which students learn. Knowledge construction, a concept from cognitive psychology, is the idea that learners construct their own networks of knowledge by connecting new information with their past knowledge and interests. Each person is different; they will come away from the same lesson with different construction of the ideas presented. Teachers can facilitate this construction work, but the key is what happens in each individual's mind. The use of open-ended questions is consistent with knowledge construction. In this view, collaborative interaction in groups provides students with many opportunities to build and try out their developing knowledge.

Knowledge transmission, a concept from behaviorist psychology, sees knowledge flowing directly from the teacher to the students, just like the teacher is pouring knowledge into the students' heads. What the teacher teaches should go into each learner's head without being filtered by what is already there. Close-ended questions tend to predominate in this type of instruction. The main role of groups from this perspective is to make sure group members master the material transmitted by the teacher.

### **Loose – Structured**

This issue refers to the extent which teachers believe groups of students will work together intervention. Those teachers who trust students to get it right, now or eventually, may be looser about structuring group activities and teaching collaborative skills. On the other hand, other teachers feel that they need to be like social engineers, structuring group interaction, or else students will not reap the benefits of working together.

The issues discussed above are also heard when some people contrast the terms “collaborative learning” and “cooperative learning”. At the same time, it should be pointed out that other educators use the two terms interchangeably. However, for those who are interested, a number of references on collaborative learning are provided (Johnson, Johnson & Holubec, 1998).

### **Foundation of Cooperative Learning**

Four cooperative learning methods were discussed in this paper, along with their conceptual foundations are:

1. Group-Investigation (G-I), developed by Shlomo Sharan and colleagues, based in part on the philosophy of John-Dewey;
2. Students Teams Achievement Divisions (STAD), developed by Robert Slavin and colleagues, based in part on behaviorist psychology;
3. Learning Together, developed by David and Roger Johnson, and Jigsaw, developed by Eliot Aronson and colleagues, both based in part on theories in social psychology; and
4. MURDER, developed by Donald Dansereau and colleagues, based in part on cognitive psychology.

### **Five Basic Elements of Cooperative Learning**

There are five fundamental elements involved in cooperative learning. In fact, these five elements distinguish cooperative learning from other forms of group learning. These elements can be thought of as pieces in a puzzle. When all of these elements are presented in a learning situation, the result is a cooperative learning group. The five basic elements of cooperative learning are:

1. Positive interdependence
2. Individual and group accountability
3. Interpersonal and small group skills
4. Face-to-face promotive interaction
5. Group processing

#### **1. Positive Interdependence**

This means the group has a clear task or goal so everyone knows they sink or swim together. The efforts of each person benefit not only the individual, but also everyone else in the group. The key to positive interdependence is committing to personal success as well as the success of every member of the group.

#### **2. Individual and Group Accountability**

Since the group is accountable for achieving its goals, each member is accountable for contributing a fair share of work toward the group goal. No one can “hitchhike” on the work of others. The performance of each individual must be assessed and the results must be given back to the group.

### **3. Interpersonal and Small Group Skills**

Interpersonal and small group skills are required to function as part of a group. These are basic teamwork skills. Group members must know to provide effective leadership, make decisions, build trust, communicate, complete tasks, appreciate group members and manage conflict.

### **4. Face-to-Face Promotive Interaction**

This means that students promote each other's success by shearing resources. They help, support, encourage, and praise each other's efforts to learn. Both academic support and personal support are part of this mutual goal.

### **5. Group Processing**

Group members need to feel free to communicate openly with each other to express concerns as well as to celebrate accomplishments. They should discuss how well they are achieving their goals and maintaining effective working relationships (Jacobs, et al, 1997).

## **Method**

The purpose of this paper is to study the effects of using cooperative learning method for Grade-7 History. Quantitative research methodology was used to compare student's achievement in history between two groups: the experimental group and the control group. Two sections were selected from No.(3) Basic Education High School in Hlaing Thar Yar Township, Yangon Region. There were two sections of Grade-7 in which (30 females) students from section (A) and (B) and (30 males) students from section (A) and (B) were selected.

### **Experimental Design**

The experimental design adopted in this study was one of the true experimental designs, namely, the posttest only control group design.

### **Sample Size**

The sample of this study consists of the 60 Grade-7 students from No.(3) Basic Education High School in Hlaing Thar Yar Township, Yangon Region. 60 students were selected and divided into two groups: experimental group and control group. They were randomly selected from the two sections of Grade-7 students. Table 1 shows the sample size.

Table 1. Sample Size

<b>Group</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
Section (A)	15	15	30
Section (B)	15	15	30
Total	30	15	60

Two sections were selected from No.(3) Basic Education High School in Hlaing Thar Yar Township, Yangon Region. There were two sections of Grade-7 in which (30 females) students from section (A) and (B) and (30 males) students from section (A) and (B) were selected.

## **Instruments**

### **(a) Pretest**

The purpose of pretest is to measure the basic knowledge of history of the selected sample students. The pretest items were constructed based on Social and Cultural Affairs of Third Myanmar Naingngan, Literature of Third Myanmar Naingngan and Colonization of Dutch from Grade-7 History. There were (14) items including completion items, multiple choice items, short answer questions and essay type questions.

### **(b) Posttest**

The purpose of posttest is to measure the history achievement of students. The posttest items were constructed based on the lessons (The Fall of Third Myanmar Naingngan) and (National Countries and National Monarchy). There were various items, such as completion items, multiple choice items, short answer and essay type questions. After preparing the test items, expert review was conducted for face validity and content validity by experienced teachers whose services were above ten years from No.(12) Basic Education Middle School Hlaing Thar Yar, and No.(4) Basic Education High School Hlaing Thar Yar. After the test items were modified again, marking scheme for the posttest was drawn.

## **Procedure**

To get a reliable test for measuring student's basic knowledge of history, items were selected by pilot testing. In order to measure the basic knowledge of history of the selected sample students, a pretest was

administered before treatment was provided. The experimental group was given a treatment by using cooperative learning method and the control group was given a treatment by traditional lecture method. Each class was taught ten periods. It takes 45 minutes for each period. At the end of the treatment, a posttest was administered to both groups. The data obtained from the posttest were analyzed by using the independent samples *t*-test.

### Findings and Interpretations

This section deals with the analysis of the data, findings and interpretations of the study.

#### Findings for Pretest

The data obtained from the pretest were recorded systematically. And then these scores were analyzed by using the independent samples *t*-test. The mean scores of experimental and control groups were presented as follows.

Table 2. *t*-Value of Pretest Scores on Basic Knowledge of History

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig (2tailed)
B.E.H.S (3) Hlaing Thar Yar	Experimental	30	18.80	2.45	.200	.323	58	0.748(ns)
	Control	30	18.60	2.34				

Note: ns= no significance

Based on the result, the mean score of the pretest for control group was 18.60 and experimental group was 18.80. There was no significant difference between the control group and the experimental group for pretest. The finding for pretest showed that there was no statistically significant difference between the experimental group and the control group on basic knowledge of history before the study started. This means that the two groups were equivalent. The graphic illustration was shown as follows.

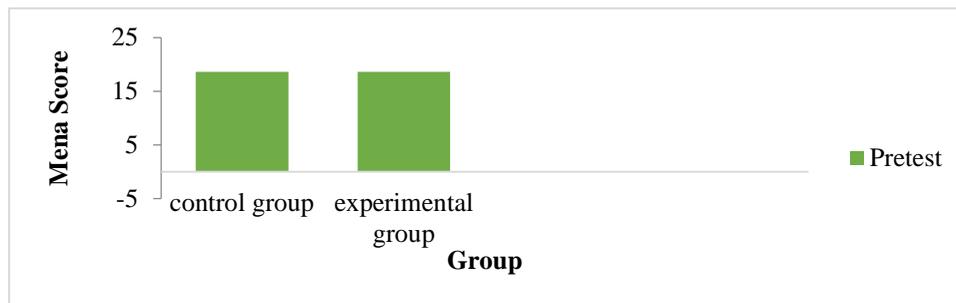


Figure 1. Mean Comparisons for Pretest Scores on History Achievement

### Finding for Posttest

At the end of treatment period, posttest was administered. The data from the posttest were recorded systematically. Then, the data were analyzed by the independent samples *t*-test to describe the effect of cooperative learning. The results of the *t*-test, the mean scores, standard deviations and mean differences of both groups were presented as follows.

Table 3. *t*-Values for Scores on Posttest

School	Group	N	M	SD	MD	<i>t</i>	<i>df</i>	Sig (2tailed)
B.E.H.S (3) Hlaing Thar Yar	Experimental	30	21.60	2.88	3.664	5.792	58	0.000***
	Control	30	16.00	4.44				

Note:\*\*\* $p < .001$

The result showed that the mean score of the experimental group was significantly higher than that of the control group. It can be interpreted that there was a significant improvement by using cooperative learning method in teaching history for Grade 7 students.

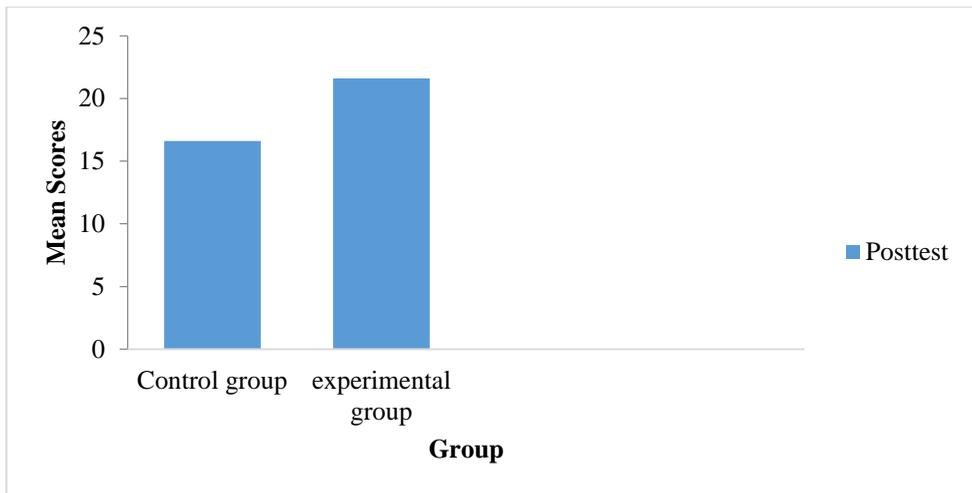


Figure2. Mean Comparisons for Posttest Scores on History Achievement

The result of students can be interpreted that cooperative learning could bring about the students' achievement in critical thinking and ability to remember information and recognize fact.

### Conclusion

The objective of teaching history is to develop knowledge, understanding, critical thinking, practical skills, interests and attitude. Cooperative learning helps students to learn more effectively because they have more fun and develop many other skills. Students' achievement in teaching history can be improved by using cooperative learning. Group tasks can make clear the concepts more than individual learning. It also makes learning interesting and it provides fun.

Training and continuous professional development is needed for teachers, and collaboration among teachers should be encouraged through holding regular meetings, both formal and informal. Teachers can learn from each other and can examine the strengths and weaknesses of the instruction that has been implemented, and their experience can be shared with each other to produce better work. Needless to say, cooperative learning can be effective way to deal with the problems faced by history teachers in class. In conclusion, it is cooperative learning that can create a comfortable non-stressful environment for learning history.

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## **Factors Influencing on Teachers' ICT Skills and Their Use of ICT in Sagaing University of Education**

Tun Tun Naing<sup>1</sup> & Wai Wai Oo<sup>2</sup>

### **Abstract**

The purpose of this study is to investigate the factors influencing on the teachers' ICT skills and their use of ICT at Sagaing University of Education (SUOE). To collect the required data, questionnaires were distributed to 46 teachers ranking from Tutor/Demonstrator to Professor, whom were selected by stratified random sampling method. To analyze the collected data, descriptive and inferential statistics were utilized with SPSS software. The results in the study showed that the variables in teachers' ICT skills have means of between two and three on 1-4 rating scale and most of the teachers from SUOE are approximately moderate users of ICT in their work. Teachers who had relatively high ICT skills were very likely to have high ICT integration in their work at SUOE. Teachers' ICT skills, attitudes towards ICT and ICT anxiety significantly influence teachers' use of ICT in their work when all six variables are included. As the results of the study, SUOE teachers have positive attitudes towards ICT and the institution should provide the adequate ICT devices and internet access in order for their students to acquire both theoretical and practical knowledge of effective teachers.

**Keywords:** ICT, ICT integration, teacher education

### **Introduction**

In the age of information and communication technologies, modern instructional devices and knowledge of integrating these devices into education take an important educational and scientific role. The impact of ICT technologies can be positive and negative, depending on the ways of using these technologies. Therefore, for teachers and learners to prepare for applying ICT technologies effectively in their daily works is one of the major requirements of this technology age.

With the changing educational conceptions, the role of teacher educators should be redefined to be the model for the pre-service teachers.

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Teacher educators should demonstrate the use of technology to the learners, colleagues and parents, as well. Teacher educators themselves should be up-to-date with the latest technological development and give suggestions to the institutions concerning technology advancements and upgradation.

The impact of teachers' ICT skills, the difficulties and challenges of teachers' use of ICT in their work, and the factors influencing these situations were investigated by the different types of research (Player-Koro, 2012; Drent & Meelissen, 2008; Zhang & Martinovic, 2008; Cherry Htun, 2017). The present study focuses on the teachers' characteristics and the relating factors with their ICT skills and their use of ICT in their work, such as teachers' attitudes, level of ICT knowledge and the relationships among these variables.

### **Background of the Study**

In Myanmar educational society, teacher-centered approach is basically traditional structure of imparting knowledge from teacher to students. In the National Education Strategic Plan 2016-2021, it is mentioned that Ministry of Education has to implement teacher quality assurance and management policies, processes and systems to address the key challenges of teaching profession today.

### **Statement of the Problem**

Although there are many studies on the role of ICT in education, a small number of studies about ICT and influencing factors on the use of ICT in teacher education were found in Myanmar. Very few researches were found in examining these variables such as their ICT skills, their attitudes towards ICT, their use of ICT in their work, relationships among these variables and the influencing factors on teachers' use of ICT.

### **Research Questions**

The main purpose of the study is to investigate the factors influencing the teachers' ICT skills and their use of ICT in Sagaing University of Education.

To achieve this purpose, the following research questions were developed.

1. What are the levels of teachers' ICT skills at SUOE?

2. What are the teachers' attitudes towards ICT at SUOE?
3. To what extent do SUOE teachers integrate ICT in their work?
4. What are the relationships among the five variables; position, attitude towards ICT, teachers' ICT skills, institutional leadership, and teachers' ICT integration?
5. How well does the combination of age, teaching experience, institutional planning and leadership, attitudes, anxiety, and ICT skills influence the teachers' use of ICT at SUOE?

### **Significance of the Study**

The participants in this study, teacher educators from Sagaing University of Education, get benefits such as improving the awareness of the importance of ICT in teacher education, being motivated to integrate ICT devices and technologies in their work and considering their students' level of ICT knowledge by participating in this study. Moreover, this study can provide the evidence of teacher educators' ICT skills and their use of ICT in their work in making teacher education policies for the universities of education as well as education colleges in Myanmar. This study can also add an important research literature in the field of teacher education in Myanmar, especially in the field of educational technology and the quality of teachers and teacher educators.

### **Literature Review**

In order to engage students fully in deep learning in the 21<sup>st</sup> century, they need to be motivated, curious learners who are in classrooms that scaffold engagement through visualization, democratization of knowledge, and participatory learning (Lemke, 2010). In these processes of activities, ICT devices and knowledge to use effectively are crucial in the 21<sup>st</sup> century.

In order to make sure the quality of teachers, teacher education institutions are responsible for equipping pre-service teachers with a set of competencies for the actualization of the envisioned classrooms. Therefore, developing teachers' competencies in the pedagogical use of technology such as ICT-based administration and communication may be better addressed during both pre-service and in-service periods (Lim, Chai & Churchill, 2010).

## **Factors Influencing Teachers' ICT Skills and Use**

Madsen, Thorvaldsen and Archard (2018) claimed that teacher educator's use of technology is correlated and predicted by their attitude and their level of competence. Therefore, teachers' attitude and level of competence play an important role in order to examine the teachers' ICT skills and their use of ICT at SUOE.

### **Method**

This study was conducted at Sagaing University of Education situated in the upper Myanmar. At SUOE, there are (160) teaching staff with different positions from tutor/demonstrator to professors, and 2500 students studying for teaching profession in different courses. Teachers' ICT skills and influencing factors were investigated in order to inform and promote their ICT skills and technologies.

### **Participants**

The sampling procedure used for this study was stratified random sampling method. As there are five different position levels - Tutor/Demonstrator, Assistant Lecturer, Lecturer, Associate Professor and Professor - in teaching staff at SUOE, the participants were selected from each stratum. There are (152) teachers at SUOE, the total population for this study, and (46) teachers (30%) of all the teachers (152) were selected.

### **Research Instruments**

The questionnaire examining the factors influencing on teachers' ICT skills and their use of ICT was used in this study. Primarily, this questionnaire was developed by a researcher, Cherry Htun (2017), to explore the same research problem at Yangon University of Education. In order to obtain participating teachers' information; gender, age, position levels, years of teaching experience, education, and belonging department are asked by using multiple choice item format in part one. For the questions in part two of the questionnaire, multiple choice format with two options and four-point Likert scale format are used to collect the data of teachers' ICT skills and their use of ICT at SUOE.

### **Data Collection and Procedures**

The data was collected through the questionnaire and data collection process took place from January 2019 to February 2019. Questionnaires

were distributed to the participants by the researchers and collected when they completed the questionnaire. The procedure did not disrupt the participants' normal, daily, classroom activities.

### Data Analysis

Two methods of quantitative data analysis were used in this study. The answers to the questionnaires were analyzed using descriptive statistics and inferential statistics. Statistical analysis using Statistical Package for the Social Sciences (SPSS) software (Version 22) was conducted to identify the frequency and percentage of teachers' responses to the questions, the number of participants, minimum, maximum, means, standard deviations, and intercorrelations among the variables of teachers' ICT skills and use of ICT at Sagaing University of Education.

## Results

### Teachers' ICT Skills

The first research question is, 'What are the levels of teachers' ICT skills at SUOE?' Teachers' ICT skills were examined by the use of the questionnaire with four ratings (1=Poor, 2=Fair, 3=Good, and 4=Very Good) scales. Table 1 shows the number of participants, minimum, maximum, mean and standard deviations for six different ICT skills which are commonly used in a teacher's work. It shows that the variables in teachers' ICT skills have means of between two and three on 1-4 rating scale. The teachers' skills of using email ( $M=2.23$ ) and spreadsheet ( $M=2.37$ ) are slightly lower than other skills. File navigation skill ( $M=2.7$ ) is the highest at SUOE teachers' ICT skills.

Table 1. Means and Standard Deviations of Teachers' ICT Skills

ICT Skills	<i>n</i>	<i>Minimum</i>	<i>Maximum</i>	<i>Mean</i>	<i>SD</i>
File Navigation	46	1	4	2.70	0.78
Word Processing	46	1	4	2.68	0.78
Presentation	46	1	4	2.47	0.97
Spreadsheet	46	1	4	2.37	0.93
Internet	46	1	4	2.53	0.89
Email	46	1	4	2.23	1.01

## Teachers' Attitudes towards ICT

To get the valid answer for the second research question, 'What are the teachers' attitudes towards ICT at SUOE?' the mean values of the teachers' attitudes scales towards ICT skills were computed. The number of participants, minimum, maximum, mean and standard deviations are presented in table 2. The mean values of each variable were also computed based on the results of five points Likert scale (1=Strongly Disagree, 2=Disagree, 3 Undecided, 4= Agree, and 5=Strongly Agree).

Table 2. *Means and Standard Deviations of Teachers' Attitudes towards ICT Skills*

<b>Attitude Scale</b>	<b>n</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
ICT for inquiry based learning	46	2	5	4.15	0.56
ICT for efficient presentation and communication tools	46	3	5	4.20	0.45
Valuable resources for student learning	46	2	5	4.20	0.62
ICT has limited capacity in the classroom	46	1	5	3.39	0.98
Interesting the challenges of new technology	46	1	5	3.76	0.82

The mean values of the teachers' attitudes towards ICT for inquiry based learning ( $M=4.15$ ), ICT for efficient presentation and communication tools ( $M=4.20$ ), and valuable resources for student learning ( $M=4.20$ ) are slightly larger than four on 1-5 rating scale. Although the mean values of two other variables are slightly lower than the above three, their mean values are larger than 50% of the average mean, ICT has limited capacity in the classroom ( $M=3.39$ ), and interesting the challenges of new technology ( $M=3.76$ ).

## Integration of ICT in the Teachers' Work

This study investigated how often SUOE teachers use ICT in an academic year. The participating teachers rated on the four self-rating

scales; Never, Occasionally, Moderately and Extensively. Table 3 and table 4 show the results of the descriptive analysis of teachers' responses.

Table 3. Frequency and Percentage of the Teachers' Integration of ICT

	<b>Never</b>	<b>Occasionally</b>	<b>Moderately</b>	<b>Extensively</b>
Browsing the internet	- (0%)	5 (10.9%)	21 (45.7%)	20 (43.5%)
Using email	12 (26.1%)	10 (21.7%)	22 (47.8%)	2 (4.3%)
Using spreadsheet to analyse student achievement	15 (32.6%)	11 (23.9%)	9 (19.6%)	11 (23.9%)
Using word processing	6 (13.0%)	5 (10.9%)	23 (50.0%)	12 (26.1%)
Using spreadsheet for teaching	9 (19.6%)	14 (30.4%)	17 (37.0%)	6 (13.0%)
Using presentation tools	4 (8.7%)	11 (23.9%)	20 (43.5%)	11 (23.9%)

According to table 3, 43.5% of teachers extensively browse the internet for preparing or teaching lessons to the students and there is nobody who never uses the internet for teaching. However, using email for instructional process has only 4.3% of extensive users. Among the different kinds of integration ICT in teaching, browsing the internet is the biggest percent in the scale; Never (0%), Occasionally (10.9%), Moderately (45.7%) and Extensively (43.5%).

Table 4. Means and Standard Deviations of Teachers' Integration of ICT in their Work

<b>Attitude Scale</b>	<b><i>n</i></b>	<b><i>Minimum</i></b>	<b><i>Maximum</i></b>	<b><i>Mean</i></b>	<b><i>SD</i></b>
Browsing the internet	46	2	4	3.33	0.67
Using email	46	1	4	2.30	0.95
Using spreadsheet to analyse student achievement	46	1	4	2.35	1.19
Using word processing	46	1	4	2.89	0.95
Using spreadsheet for teaching	46	1	4	2.43	0.96
Using presentation tools	46	1	4	2.83	0.90

In table 4, the number of participants, minimum, maximum, mean and standard deviations are presented. Browsing the internet has the highest mean ( $M=3.33$ ) and using email has the lowest mean ( $M=2.3$ ). It means most of the teachers in SUOE are approximately moderate users of ICT in their work.

### **Relationships among Five Variables: Position, Attitudes towards ICT, Teachers' ICT Skills, Institutional Leadership, and Teachers' ICT Integration**

The relationships among five variables; position, attitude towards ICT, teachers' ICT skills, institutional leadership, and teachers' ICT integration were computed by the Pearson correlation to examine the intercorrelations of the variables. Table 5 shows that three of ten pairs of variables were significantly correlated. The strongest positive correlation, which would be considered a very large effect size according to Cohen (1988, as cited in Morgan, Leech, Gloeckner & Barret, 2013), was between the ICT skills and ICT integration,  $r(44)= .66, p<.001$ . This means that teachers who had relatively high ICT skills were likely to have high ICT integration in their work. ICT integration was also positively correlated with attitudes towards ICT ( $r=.40$ ), and attitudes towards ICT was positively correlated with ICT skills ( $r=.41$ ); these are medium to large effect sizes or correlations according to Cohen (1988, as cited in Morgan et al., 2013).

Table 5. Intercorrelations, Means, and Standard Deviations for Five Variables (N=46)

<b>Variable</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>SD</b>
1. Position	--	.17	-.13	.21	-.00	2.57	1.00
2. Attitudes	--	--	.41**	.07	.40**	3.94	0.40
3. ICT skills	--	--	--	-.16	.66**	2.50	0.83
4. Institutional leadership	--	--	--	--	-.12	2.70	0.79
5. ICT integration	--	--	--	--	--	2.69	0.67

Note. \*\* $p < .01$

### The Influence of Some Variables on Teachers' Use of ICT

Simultaneous multiple regression was conducted to investigate the best prediction of teachers' use of ICT in their work. The means, standard deviations, and intercorrelations can be found in Table 6a. The combination of variables to predict teachers' use of ICT from age, teaching experience, teachers' ICT skills, attitudes towards ICT, institutional planning and leadership, ICT anxiety was statistically significant,  $F(8,37) = 4.96$ ,  $p < .001$ . The beta coefficients are presented in Table 6b. It is noted that teachers' ICT skills, attitudes towards ICT and ICT anxiety significantly predict teachers' use of ICT in their work when all six variables are included. The adjusted  $R^2$  value was .413. This indicates that 41% of the variance in teachers' use of ICT in their work was explained by the model. According to Cohen (1988, as cited in Morgan et al., 2013), this is a large effect.

Table 6(a). Means, Standard Deviations, and Intercorrelations for Teachers' Use of ICT and Predictor Variables (N = 46)

Variable	Mean	SD	Age	Teaching experience	ICT skills	Attitudes	Planning and leadership	ICT anxiety
Teachers' ICT integration	2.69	.67	-.16	-.06	.66**	.40**	-.12	-.47**
Predictor variables								
Age	2.78	.99	--	.88**	-.32*	-.03	.25*	.22
Teaching experience	2.83	.95		--	-.24	.08	.15	.19
ICT skills	2.50	.83			--	.41**	-.16	-.73**
Attitudes	3.94	.40				--	.07	-.29*
Planning and leadership	2.70	.79					--	.17
ICT anxiety	2.64	.95						--

Note. \* $p < .05$ ; \*\* $p < .01$ .

Table 6(b). Simultaneous Multiple Regression Analysis Summary for Age, Teaching Experience, ICT Skills, Attitudes, Planning and Leadership, ICT Anxiety Predicting Teachers' Use of ICT (N=46)

Variable	<i>B</i>	<i>SE B</i>	$\beta$	<i>t</i>	<i>p</i>
Age	.14	.21	.20	.64	.525
Teaching experience	-.01	.19	-.01	-.03	.980
ICT skills	.47	.15	.58	3.17	.003
Attitudes	.29	.23	.17	1.26	.216
Planning and Leadership	-.15	.13	-.17	-1.19	.243
ICT anxiety	.02	.12	.03	.19	.852
Constant	-.37	1.10			

Note.  $R^2 = .52$ ;  $F(8,37) = 4.96$ ,  $p < .001$ .

### Suggestion and Discussion

As information and communication technology (ICT) has emerged as an important part of most organizations and businesses, ICT will be an important part of education for the next generation (Bingimlas, 2009). At the same time, teacher educators' ICT skills and accessibility to ICT and internet should be promoted by several ways, such as training programs for teacher educators, providing ICT devices, and proper management of the institution.

As the discussion with the administrative members and teaching staff of SUOE and sharing experiences with the experts from developed countries can help the process of developing ICT accessibility at SUOE, SUOE should invite the experts and professors from developed countries and find out the ways for promoting the professional development of the teachers.

Without having sufficient time, effective training, and technical support, teachers' ICT skills and their use of ICT in their work cannot be promoted. According to the results of the study, lack of ICT accessibility and internet at SUOE makes teachers' instructional process follow the

traditional teaching styles. Therefore, SUOE should provide ICT devices for the teachers and, on the other hand, teachers should be prepared ICT skills well before entering teaching profession. Recommendations about more integration of ICT by the teachers in their work should be taken into consideration through the current situations of ICT devices and internet access.

### **Conclusion**

The aim of this study was to investigate the factors influencing the teachers' ICT skills and their use of ICT at Sagaing University of Education. The findings of this study indicate that teachers who had relatively high ICT skills were likely to have high ICT integration in their work at SUOE. Since the relationship between teachers' ICT skills and their use of ICT shows positive correlation, SUOE and the individual teachers need to be supported adequate provision for their daily work.

As the people in 21<sup>st</sup> century accept that technologies have a great impact for improving different aspects in everyday life, ICT plays a key role in the education systems all over the world. It shows that ICT literacy is very much important for teacher educators, and the teacher education institutions are highly required to promote knowledge, critical thinking and problem solving skills of the staffs through ICT literacy. Moreover, if teacher educators, pre- and in-service teachers, students and parents have basic ICT literacy skills, the standard of education and the standard of living of any country could be promoted successfully and conveniently.

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# **A Study of the History Teachers' Pedagogical Content Knowledge in Teaching History**

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## **Abstract**

The main purpose of this paper was to explore the History teachers' pedagogical content knowledge (PCK) for teaching history in Myanmar. In this study, a questionnaire survey method was employed. The subjects were the teachers who were attending BED correspondence course at Sagaing University of Education (SUOE). The number of participants in this study was (280). As for the instrument, a questionnaire for history teachers, that would be as easy to response as possible was constructed on the basis of PCK scale developed by Aksu, Metin & Konyalioglu, (2014). The questionnaire included five point Likert-type items for four dimensions. The value of Cronbach's alpha for the questionnaire was 0.93. Descriptive analysis, independent samples *t* test, and one way ANOVA were applied to analyze each research question. The results reveal that history teachers from SUOE, correspondence course have high confidence in their PCK in teaching history. Although there was no significant difference in teachers' PCK by gender and year of study, there was a significant difference in terms of designation. In addition, the results showed that there was a significant impact of teaching experiences and different types of teachers training on the development of teachers' pedagogical content knowledge.

**Keyword:** History, History teachers, Pedagogical Content Knowledge (PCK)

## **Introduction**

### **Importance of the Research**

Every teacher endeavors to make an effective teacher. Effective teachers refer to those teachers who have consistently produced good results, an average pass rate of 80% and above (Sibuyi, 2012). However, only possessing subject matter knowledge or content knowledge, teachers

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cannot be effective in their work. To improve the quality of teachers' teaching workforce, they must fulfill themselves professional knowledge.

There are many factors that can impact on teachers' quality: content knowledge, pedagogical knowledge, and pedagogical content knowledge. Another, less studied, indicator of teacher quality is the pedagogical content knowledge (PCK) of teachers.

In order to achieve the teaching objectives, history teachers possess PCK in teaching History and then they have to promote students' knowledge, concepts, and finally generalization and application of the subject knowledge in their daily lives.

This study was conducted to investigate History teacher's PCK who attend in the correspondence course in Sagaing University of Education (SUOE). As a result of this study, participating teachers' attitudes towards their teaching qualification would improve their profession. Another goal of the study was to explore the weaknesses and current situation of history teachers and to be able to give suggestions for their professional development.

## **Purpose**

The main purpose of this study is to study History teachers' pedagogical content knowledge for teaching History in Myanmar.

## **Objectives**

The specific objectives of the study are:

1. To explore the difference of History teachers' PCK in terms of gender, year and designation,
2. To find out the impact of the duration of teaching experiences for the development of PCK,
3. To examine the impact of different teacher training for the development of PCK.

## Research Questions

1. Are there any differences in History teachers' PCK in terms of gender, year and designation?
2. Is there any significant impact of the duration of teaching experience for the development of PCK?
3. Is there any significant impact of different teacher training for the development of PCK?

## Definition of Key Terms

### History

: a subject that the study of past events in school and university, and those events that took place from the beginning and during the development of a particular place, activity, and institution, etc. (Kochhar, 1998).

### History Teachers

: those teachers who teach History subject in any school.

In this study, History teachers refer to those teachers who attend BEd correspondence course in Sagaing University of Education.

**Pedagogical Content Knowledge (PCK)** : Knowledge of the pedagogy or the teaching practices that are appropriate for a subject. This also includes knowledge of pedagogical methods, knowledge of the challenges any given area presents, as well as an understanding of students' preconceptions and misconceptions regarding a specific area content. Expertise in a particular area involves more than problem-solving skills and knowing the content (Bransford, Brown, and Cocking, 2000).

## **Review of Related Literature**

### **Importance of Pedagogical Content Knowledge in Effective Teaching**

Shulman (1987) identified (PCK) as one of the most important knowledge that teachers should possess in order to teach effectively. PCK include knowledge of learner and their characteristics, knowledge of educational contexts, knowledge of educational ends, purposes and values and their philosophical and historical bases (Shulman, 1987).

### **Components of Pedagogical Content Knowledge**

The components of pedagogical content knowledge, according to Shulman (1986), comprise knowledge of the specific subject matter; knowledge of instructional strategies; knowledge of learners' conceptions; and an understanding of what makes the learning of a specific topic difficult or easy for learners.

### **Pedagogical Knowledge**

Pedagogical knowledge (PK) is concerned with the teaching process and methods also include knowledge about classroom management, developing lesson plan, evaluation in order that students are able to learn. PK can be seen as necessary knowledge for teachers to have to know in depth the application of teaching and learning methods. This knowledge contains knowledge about understanding how students learn, planning an instruction, assessing students and general classroom management skills. Pedagogical knowledge includes knowledge about methods and strategies used in the classroom. It is also accepted as an essential formation of the knowledge to understanding learners' qualities and their learning (Koehler & Mishra, 2009).

### **Content Knowledge**

This contains the knowledge of the subject which is taught or learnt (Mishra & Koehler, 2006). Content knowledge (CK) is a type of knowledge which covers concepts related to the teaching topic, operations, evidence and proof and problem solving skills (Shulman, 1986).

### **Pedagogical Content Knowledge**

The PCK elements involved the use of analogy, representation using symbols, examples, explanation or demonstration that were suitable for

providing conceptual and procedural explanation or description as well as noting the ways in which the teachers stimulated the teaching process.

## **Research Method**

### **Participants**

The sample of this study was (180) teachers who were in the first year and (100) teachers who were in the second year B.Ed correspondence course at Sagaing University of Education (2018-19) academic year. Totally (280) teachers are those who learnt History as the specialized and were taught History at the respective schools in Myanmar. The participants were selected by using a purposive sampling method to carry out the research work.

### **Instrument**

As for the instrument, a questionnaire was constructed on the basis of pedagogical content knowledge scale developed by Aksu, Metin, & Konyalioglu, (2014). The questionnaire included five points Likert-type items for four dimensions: Pedagogical knowledge (PK), Content knowledge (CK), Pedagogical content knowledge (PCK), and Knowledge of educational contexts (KoEC).

### **Procedure**

First of all, the relevant literature concerning with the research was collected. Secondly, in order to get the required data, an instrument was constructed. For the validation of the instruments, the questionnaire for teachers' PCK was distributed to three experienced teachers. The instrument was modified before the preliminary survey according to the advice and guidance of the teachers. After getting the validation, a preliminary survey was taken. For the internal consistency reliability, Cronbach's alpha coefficient was .93. And then, the major survey was conducted at Sagaing University of Education, BEd correspondence course. Finally, the obtained data were analysed.

### **Analysis of the Data**

The participating teachers' responses to the questionnaire were analyzed by using SPSS (version-20). To interpret the teachers' PCK, the mean values of each component in PCK were presented as the descriptive statistics data. Among the inferential statistics independent samples *t* test

was also used to discover the differences between gender, year and designation. Analysis of Variance (ANOVA) was used to examine of the length of teaching experience and the different levels of teacher training affected in the development of teachers' PCK.

### Research Findings

#### Findings of History Teachers' Pedagogical Content Knowledge in SUOE, BEd Correspondence Course

Firstly, to find out History teachers' pedagogical content knowledge, descriptive statistics was used. The results for all (280) participants were presented in Table 1.

Table 1. Descriptive Statistics for History Teachers' Pedagogical Content Knowledge (PCK)

Variable	N	No. of Items	Min	Max	Mean	SD
Pedagogical Content Knowledge	280	50	77	250	205.42	19.078

As shown in Table 1, the result is satisfactory, because of the total mean 205.42 is greater than the theoretical mean 150. This means that the history teachers have enough pedagogical content knowledge in teaching their subject matter.

#### History Teachers Pedagogical Content Knowledge in terms of Gender

To know the extent of PCK between male and female teachers, descriptive analysis was conducted. According to the result, Pedagogical content knowledge of male teachers were higher than that of female teachers. To examine whether these differences were significant or not, the independent sample *t* test was conducted. As mentioned in Table 2, the result of *t* test indicated that there was no significant difference between male and female teachers in PCK.

Table 2. The Result of Independent Samples *t* test for History Teachers' PCK in terms of Gender

Variable	Gender	N	t	df	p	MD
PCK	Male	32	.821	278	.413	2.94
	Female	248				

### History Teachers' Pedagogical Content Knowledge in Terms of Year of Study

To find out the differences between first year and second year BED correspondence teachers' PCK, the independent samples *t* test was conducted. The results of *t* test were described in Table 3. The results of *t* test indicated that there was no significant difference between first year and second year BED correspondence teachers' PCK.

Table 3. The Results of Independent Samples *t* test for History Teachers' PCK in terms of Year

Variable	Year	N	t	df	p	MD
PCK	1 <sup>st</sup> Year	180	-1.102	278	.271	2.621
	2 <sup>nd</sup> Year	100				

### History Teachers' Pedagogical Content Knowledge in terms of Designation

In order to know the differences between junior teachers and senior teachers' PCK, the independent samples *t* test was conducted. The results were described in Table 4. The results of *t* test indicated that there was a significant difference between junior and senior teachers' PCK ( $p < .01$ ).

Table 4. The Results of Independent Samples t test for History Teachers PCK in terms of Designation

Variable	Designation	N	t	df	p	MD
PCK	Junior Teacher	175	2.727**	278	.007	6.341
	Senior Teacher	108				

Note. \*\*The mean difference is significant at 0.01 level.

### History Teachers' Pedagogical Content Knowledge in terms of Teaching Experience

The researcher investigated whether there was a significant difference in History teachers PCK among the groups which is divided by teaching experience, one-way ANOVA was used. It was found that there was a significant difference among the groups ( $F=3.238$ ,  $p=.041$ ).

Table 5. ANOVA Results for History Teachers' PCK in terms of Teaching Experience

Variables	Sum of Squares	df	Mean Square	F	p
Between Groups	2319.718	2	1159.859	3.238	.041
Within Groups	99228.707	277	358.226		
Total	101548.425	279			

### History Teachers' Pedagogical Content Knowledge in terms of Teacher Training

Table 6. ANOVA Results for History Teachers' PCK in terms of Teacher Training

Variables	Sum of Squares	df	Mean Square	F	p
Between Groups	263.685	2	131.843	.361	.698
Within Groups	101284.740	277	365.649		
Total	101548.425	279			

The researcher explored whether there was a significant difference in History teachers' PCK among the groups which is organized by different teacher training, One-way ANOVA was used. The results pointed out that there was no significant difference among the groups ( $F=.361$ ,  $p=.698$ ). But, according to mean value of teachers' PCK in terms of teacher training, the teachers who had long term teacher training were to a certain impact on the development of their PCK.

## **Discussion, Suggestions and Conclusion**

### **Discussion**

The purpose of this study is to explore History teachers' pedagogical content knowledge in teaching History. To support this purpose, three specific objectives and three research questions concerning History teachers' PCK were formulated by the researcher. A descriptive research design was used to collect the required data and to answer research questions.

The results of the study indicate that the history teachers have enough pedagogical content knowledge in teaching History. Although there was no significant difference of History teachers' PCK in terms of gender, there was a slightly significant difference in the PCK between first year and second year History teachers. In addition, there was a significant difference of History teachers' PCK in terms of designation. Junior teachers' PCK was higher than senior teachers'.

According to ANOVA results, it was found that there was a significant difference among the groups which is divided by teaching experiences. The results showed that the experienced teachers' PCK was higher than the beginning teachers' PCK.

In order to explore the impact of the level of teacher training on the development of teachers' PCK, descriptive analysis and ANOVA test was computed. As the result, it was interpreted that there was statistically significant impact of teacher training on the development of history teachers' PCK.

## Suggestions

Based on the result of the study, there are some suggestions for further research. To acquire accurate data of teachers' PCK, all History teachers from the two universities of education should be included. In addition, the similar research should be conducted with all senior History teachers from all basic education high schools in Myanmar. In collecting the required data, classroom observations should be employed. Moreover, this study did not find out the relationship of teachers' PCK level and students' achievement on a specific topic or subject. Therefore, further research should be conducted on both teachers and students sides, and the different grade level of teaching History.

## Conclusion

Based on the research findings of this study, it can be concluded that History teachers who are attending B.Ed. correspondence course have high confidence of their PCK in teaching history. Although there was no significant difference of teachers' PCK in terms of gender and year of study, it could be seen the difference in teachers' PCK in terms of designation. And then, it was found that there was a significant impact of the length of teaching experience for the development of their PCK.

Finally, according to the research findings, the teachers who had long term teacher training were to a certain extent impact on the development of their PCK. Thus, representative person and policy makers should consider how to select and appoint a new teacher. Teachers should be encouraged and provided in advance the adequate professional development activities such as short term and long term teacher training program by the government in order to improve their pedagogical content knowledge.

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## **Difficulties Perceived by Teachers and Students in Teaching and Learning Grade 9 Biology**

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### **Abstract**

The purpose of this research is to study the difficulties perceived by teachers and students in teaching and learning Grade 9 Biology. The sample consists of 23 Biology teachers and 640 biology students of Grade 9 from the basic education high schools in Kyaukpadaung Township. The survey questionnaires were used to investigate difficult topics, nature of textbook, difficulty of language and terminology perceived by the teachers and the students. Data were analyzed and presented as topic difficulty index, frequency, mean and standard deviation. Topics of tissues are difficult for teachers and systems of a toad for students. Although there are fourteen topics that teachers do not have difficulty to teach, biology topics are more or less difficult for students to learn. It was found that although students perceived biology content is vast, 80.2% of students are interested in learning biology and their teachers responded that the contents are at the students' understanding level. Both teachers and students perceived that some topics are abstract and require much thinking time. Although 87.0% of teachers do not have language difficulty in biology, almost all teachers (91.3%) need reference books to explain some biological terms thoroughly. Moreover, 91.7% of students pointed out that biology text contains a lot of unknown and unfamiliar words and 76.9% of students have difficulty in pronouncing and memorizing these words.

**Keywords:** perception, difficulty, language, terminology

### **Introduction**

Education prepares individuals for the future. Young people and children must be given through education the tools to deal with the different tasks that they will need to perform in their lives. Nwosu (2005, cited in Oyovwi, 2015) observed that learning biological knowledge provides students a platform to develop the ability to apply science concepts and principles in solving everyday life problems. However, Diki (2013) pointed out that biology is a subject that is difficult to learn. The difficulty affects students' achievement. In addition, the difficulty makes students less

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motivated to learn the subject. As a result, it is difficult for them to achieve a good result of their studies. There are many reasons why students have difficulties in learning biological concepts. The nature of science itself and its teaching methods are among the reasons for the difficulties in learning science, while according to Lazarowitz and Penso (1992, cited in Cimer, 2012), the biological level of organization and the abstract level of the concept make learning biology difficult. Overloaded biology curricula, the abstract and interdisciplinary nature of biological concepts, and difficulties with the textbooks are the other factors preventing students from learning biology effectively (Chiapetta and Fillman, 1998; Tekkaya et al., 2001, cited in Cimer, 2012). For this reason, it is important for us to investigate the difficulties perceived by teachers and students in teaching and learning Grade 9 Biology.

### **Aim and Objectives**

The aim of this research is to study the difficulties perceived by teachers and students in teaching and learning Grade 9 Biology.

The specific objectives of the research are:

1. To describe the topics that students and teachers have difficulties in teaching and learning Grade 9 Biology.
2. To find reasons why students and teachers have difficulties in teaching and learning Grade 9 Biology.
3. To give suggestions and recommendations based on the results of the study.

### **Research Questions**

1. To what extent are biology topics difficult for teachers and students and which are the most difficult ones?
2. What are the biology teachers' and students' perceptions on the nature of biology textbook?
3. To what extent are language used and biological terms difficult for teachers and students in Biology?

## Literature Review

In this section, how textbook can be characterized as a good one, common misconceptions in biology, difficulties encountered by biology learners are described.

### Characteristics of Good Science Textbook

According to Mahmood (2011), some characteristics of good science textbook are:

1. **Conformity to curriculum policy and scope:** statements included in the form about coverage of the contents and objectives of the National Curriculum, and intention of the nation.
2. **Vocabulary and format:** statements regarding, content organization, level of the vocabulary used in the textbook, page layout, relevance of the pictures and illustrations, print style and size, readability of the content etc., were included in the Form.
3. **Acceptability:** statements about students' diverse environment and socio-economic background, relevance of examples with students' daily life, quality of paper, printing and binding of the book, authors' credentials, attractiveness of the title, were included.
4. **Text reliability:** statements regarding accuracy of the content and data, adequacy of the content, historical correctness of the facts and figures, free of misconceptions contents, and updated data.
5. **Cognitive development and creative thinking:** the nature, relevance and level of learning activities included in the textbook.
6. **Learning and Assessment:** difficulty and understanding level of end of chapter assessments and alignment with objectives of enacted National Curriculum. End of chapter assessments are according to the content given in the textbook and to student's mental development level.

### Difficulty of Language and Terminology

In learning biology, one such difficulty relates to 'language inabilities'. There are several kinds of language problems encountered by biology learners when the medium of instruction is not their mother tongue. These include: the absence in the learners' own language of a word or expression equivalent to one in the medium of instruction; the absence in

the learners' own language or culture of a necessary concept (this is a more difficult problem than the absence of a word for it often results in linguistic relativity whereby the same physical events gives rise to a very different interpretation, depending on the language used); lack of familiarity on the part of the learner with the common biological terminology derived from Greek or Latin; and general unanalyzed difficulties of mutual comprehension between teacher and taught resulting in lack of mastery of an economic notation for biological conceptual computation and conversion to an understandable and personally meaningful experience (UNESCO, 1986).

### **Method**

The research method for this study was survey method which is one of the descriptive research methods.

### **Subjects**

There were eight basic education high schools and eleven basic education branch high schools in Kyaukpadaung Township, Mandalay Region. Among them, six basic education high schools and nine basic education branch high schools were geographically selected as the subjects. There are 23 biology teachers and 1612 biology students in these sample schools. In this study, all biology teachers and 640 (40%) students were randomly selected.

### **Instruments**

In this study, the survey questionnaires for biology teachers and students were used to investigate difficulties perceived by teachers and students in teaching and learning Grade 9 Biology in Kyaukpadaung Township. These questionnaires were concerned with Difficult topics, Nature of Textbook, and Difficulty of Language and Terminology. The first dimension consists of 50 topics and rating scales are: 1 = Easy, 2 = Moderate, 3 = Difficult and 4 = Not studied. For the second dimension (Nature of Textbook), and the third dimension (Difficulty of Language and Terminology), each consists of 10 items which are negative statement and rating scales are: 1 = Strongly Disagree, 2 = Disagree, 3 = Undecided, 4 = Agree and 5 = Strongly Agree.

## Procedure

First of all, the related documents were collected from the library and the Internet sources. Secondly, the survey questionnaires were constructed. After getting the validation, a pilot test was conducted to see the appropriateness for the target group. To measure the reliability of the questionnaires, the Cronbach's Alpha value was used. The major survey was conducted. Finally, the obtained data were collected, analyzed and presented.

## Analysis of the Data

After collecting the required data, data analysis was carried out. The data were analyzed by using Topic Difficulty Index formula of Johnstone& Mahmoud (1980) and Statistical Package for the Social Science (SPSS) to find frequency, mean and standard deviation.

## Results

In this section, Grade 9 biology topics that the teachers and students perceived as difficult in their teaching and learning are presented according to the values of topic difficulty indexes, and their perception on the biology textbook, the use of language and learning biology terms are also described.

### Grade 9 Biology Topics with the difficulties perceived by Teachers and Students

Fifty topics included in Grade 9 biology textbook with their difficulty indexes are compared in Table 1.

Table 1. Comparison of Topic Difficulty Index Values Perceived by Teachers and Students

No.	Topics	Topic Difficulty Index	
		Teacher	Student
1	The science of biology	4.35	0.31
2	How biology is studied	4.35	2.66
3	Divisions of biology	4.35	2.81
4	Life and its characteristics	4.35	9.12

No.	Topics	Topic Difficulty Index	
		Teacher	Student
5	Cells	17.39	3.28
6	Comparison of animals and plants	26.10	17.19
7	Classifications of plants and animals	0	14.86
8	Non-flowering plants and flowering plants	0	8.44
9	Invertebrates and vertebrates	0	12.97
10	Meristematic tissues	21.74	12.88
11	Simple tissues	39.13	12.75
12	Complex tissues	56.52	30.81
13	Epithelial tissues	52.17	34.77
14	Connective tissues	52.17	29.24
15	Muscular or contractile tissues	56.52	25.65
16	Nervous tissues	43.48	12.09
17	Different shapes and grouping of bacteria	4.35	11.13
18	Structure of bacteria	4.35	8.68
19	Life functions of bacteria	13.04	17.35
20	<i>Spirulina</i>	8.7	14.36
21	A filamentous green alga	4.35	16.23
22	<i>Spirogyra</i>	8.7	19.43
23	Protozoa	17.39	13.23
24	<i>Amoeba</i>	39.13	15.65
28	Fungi ( <i>Rhizopus</i> )	8.7	12.88
26	Mushroom	4.35	24.07
27	A tapeworm ( <i>Taeniasolium</i> )	17.39	18.25
28	Life cycle of <i>Taeniasolium</i>	39.13	28.73
29	Liverworts and Mosses	0	10.15

No.	Topics	Topic Difficulty Index	
		Teacher	Student
30	A liverwort ( <i>Riccia</i> )	0	14.92
31	A moss (Funaria)	0	19.66
32	A fern ( <i>Adiantum</i> )	0	17.64
33	An Earthworm ( <i>Pheretima</i> )	13.04	19.17
34	Insects	0	9.03
35	Characteristics of a bony fish	0	12.37
36	External features of a bony fish	0	19.24
37	Muscular system and swim bladder of a bony fish	0	16.44
38	Digestive system of a bony fish	8.7	14.39
39	Circulatory system of a bony fish	30.43	21.85
40	Respiratory system of a bony fish	13.64	25.43
41	Excretory system, Nervous system and Reproductive system of a bony fish	14.29	35.77
42	Characteristics of an amphibian	0	22.0
43	External features of the toad	0	32.91
44	Skeletal system and Muscular system of the toad	16.67	40.0
45	Digestive system of the toad	35.29	31.71
46	Circulatory system of the toad	29.41	34.21
47	Respiratory system of the toad	41.18	48.48
48	Nervous system of the toad	11.76	39.29
49	Excretory system of the toad	17.65	51.85
50	Reproductive system of the toad	0	38.46

As shown in Table 1, teachers responded that such topics as complex tissues, muscular or contractile tissues, epithelial tissues, connective tissues, nervous tissues are the most difficult ones because they have the large values of difficulty index. There are fourteen topics (difficulty index of zero) that the teachers have no difficulty in teaching.

According to students' responses, the internal systems of the toad: Excretory system, Respiratory system, Skeletal system and Muscular system, Nervous and Reproductive systems of the toad are the most difficult for students in learning biology.

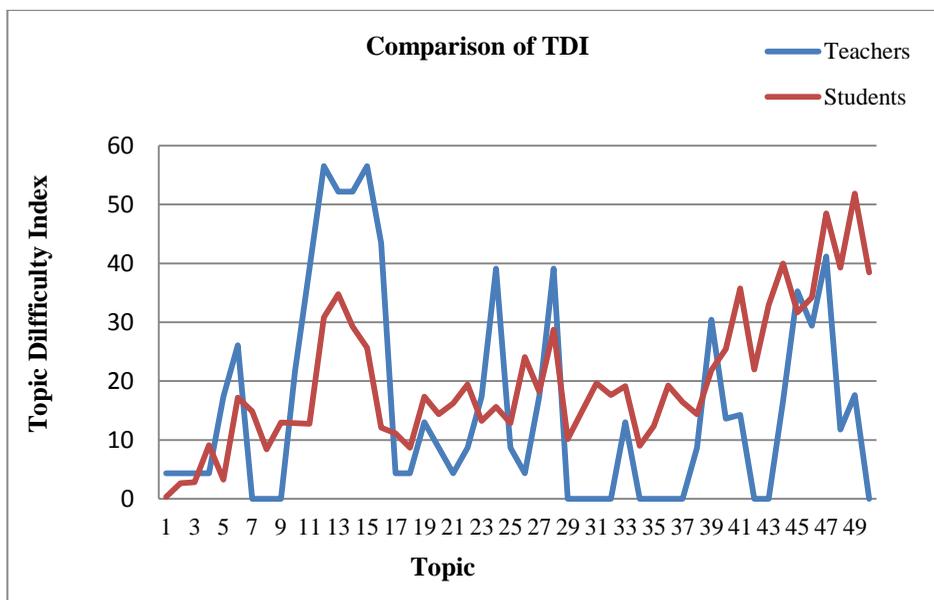


Figure 1. Comparison of Topic Difficulty Index Perceived by Teachers and Students

It was also found that students have difficulty in learning every topic at different levels of difficulty. Some topics (18 topics) are more difficult for teachers to teach than students to learn them. Some topics (32 topics) are more difficult for students to learn than teachers to teach them. This can easily be seen in the above figure.

### Perception of Teachers and Students on the Nature of Textbook

Teachers and students responded how they perceive the nature of Biology textbook. Table 2 and Table 3 show it.

Table 2. Teachers' Perception on the Nature of Textbook

No.	Content	N	Percentages				
			SD	D	UD	A	SA
1	Vest syllabus	23	4.3	43.5	17.4	8.7	26.1
2	Insufficient pictures	23	13.0	39.1	-	43.5	4.3
3	Unclear diagrams	23	8.7	60.9	-	21.7	8.7
4	Abstract topics	23	26.1	13.0	8.7	43.5	8.7
5	No explanation with examples	23	4.3	56.5	4.3	30.4	4.3
6	Insufficient textbook	23	30.4	47.8	4.3	17.4	-
7	Not relating with real life situations	23	17.4	65.2	4.3	13.0	-
8	Too complex content	23	17.4	52.2	8.7	17.4	4.3
9	Taking long time to understand	23	4.3	30.4	8.7	43.5	13.0
10	Not at the level of understanding of the students	23	8.7	65.2	8.7	13.0	4.3

As shown in Table 2, above 50% of the teachers perceive that some topics of Grade 9 biology textbook are abstract and it takes a long time to understand biological contents for a student. However, they responded that diagrams in the text are clearly and neatly labelled (69.6%). The contents in biology are not too complex to understand (69.6%) and at the level of student's understanding (73.9%). The contents can be explained with local examples (60.8%). One point to be considered is that 17.4% (nearly one fifth of sample) of teachers do not know if the syllabus is vast.

Table 3. Students' Perception on the Nature of Textbook

No.	Content	N	Percentages				
			SD	D	UD	A	SA
1	Vest syllabus	640	2.0	10.9	20.3	42.2	24.5
2	Insufficient pictures	640	9.4	30.2	38.0	16.9	5.6
3	Unclear diagrams	640	22.0	36.3	17.2	17.7	6.9
4	Abstract topics	640	2.8	9.4	14.1	50.8	23.0
5	No explanation with examples	640	17.5	32.3	22.7	20.5	7.0
6	Taking time to memorize	640	3.0	7.5	5.2	40.9	43.4
7	Forgetting quickly	640	5.2	23.4	12.8	34.1	24.5
8	Not interesting content	640	37.5	42.7	11.3	5.2	4.3
9	Not relating with real life situations	640	6.6	17.0	35.8	30.0	10.6
10	Too complex content	640	7.2	24.8	21.7	32.5	13.8

The students' perception on the biology textbook they have to learn is described in Table 3. According to Table 4, 66.7% of the students perceive that syllabus is vest and some topics are abstract and it takes them for a long time to memorize biological facts and content (84.3%). Moreover, some students (58.6%) responded that they forget biology content quickly. However, most of the students (80.2%) expressed that the contents in Biology are interesting.

Generally, the teachers' and students' perception on the Grade 9 biology textbook can be seen in Table 4.

Table 4. Descriptive Statistics for Teachers' and Students' Perceptions on the Nature of Textbook

Participants	N	Minimum	Maximum	Mean	SD
Teacher	23	1.00	4.00	2.66	.68
Student	640	1.00	5.00	3.16	.52

According to Table 4, while the teachers are likely to perceive the Biology textbook as a good one (mean score=2.66, SD=0.68), the students perceive that the Grade 9 Biology textbook is the one which has weakness (mean score=3.16, SD= 0.52).

### Perception of Teachers and Students on the Difficulty of Language and Terminology

The perception of teachers and students on the difficulty of language and terminology in Biology was examined by using ten items. The results are displayed in Table 5, Table 6 and Table 7.

Table 5. Descriptive Statistics for Teachers' and Students' Perceptions on Difficulties of Language and Terminology

<b>Participants</b>	<b>N</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>SD</b>
Teacher	23	1.00	4.00	2.85	.68
Student	640	2.00	5.00	3.35	.56

In Table 5, it is found that the teachers do not have difficulty in teaching Grade 9 Biology with respect to language and terms, on the other hand, the students have difficulties of language and terminology in learning biology.

Table 6. Teachers' Perception on the Difficulty of Language and Terminology

<b>No.</b>	<b>Content</b>	<b>N</b>	<b>Percentages</b>				
			<b>SD</b>	<b>D</b>	<b>UD</b>	<b>A</b>	<b>SA</b>
1	Unknown and unfamiliar words	23	13.0	30.4	8.7	47.8	-
2	Median of language	23	8.7	78.3	-	13.0	-
3	Memorizing new words	23	17.4	52.2	4.3	26.1	-
4	Memorizing scientific names	23	17.4	34.8	-	43.5	4.3
5	Correct pronunciation	23	4.3	43.5	4.3	47.8	-
6	Glossary of terms	23	13.0	34.8	13.0	39.1	-

No.	Content	N	Percentages				
			SD	D	UD	A	SA
7	Not relating with real world situation	23	17.4	47.8	8.7	26.1	-
8	Explaining terms thoroughly	23	13.0	26.1	8.7	52.2	-
9	Needing reference books	23	-	8.7	-	52.2	39.1
10	Taking time to read content	23	13.0	43.5	8.7	21.7	13.0

As shown in Table 6, almost all teachers (91.3%) responded that they need some books as a reference for effective biology teaching and 52.2% of them have difficulty in explaining some biological terms thoroughly. However, 87.0% claim that the medium of language does not make them difficult to understand biological concepts. They can relate biological terms to real world situation (65.2%).

Table 7. Students' Perception on the Difficulty of Language and Terminology

No.	Content	N	Percentages				
			SD	D	UD	A	SA
1	Unknown and unfamiliar words	640	3.1	3.1	2.0	46.7	45.0
2	Median of language	640	2.5	18.4	16.6	47.7	14.8
3	Memorizing new and unfamiliar words	640	2.5	12.3	8.0	55.0	22.2
4	Memorizing scientific names	640	3.4	19.1	8.6	52.3	16.6
5	Correct pronunciation	640	4.1	11.9	7.2	53.3	23.6
6	Taking time to retain terms	640	8.4	25.6	17.5	36.3	12.2
7	Glossary of terms	640	4.4	13.3	21.1	45.2	16.1
8	Not relating with real life situations	640	10.0	26.4	28.8	26.1	8.8
9	Rote learning	640	17.2	27.7	10.5	29.2	15.5
10	Not explaining thoroughly	640	50.5	32.3	7.2	5.0	5.0

For students, 91.7% perceive that biology contains a lot of unknown and unfamiliar words and over 70% cannot memorize these words, they also have difficulty in reading some biological terms with correct pronunciation and 62.5% claim that the medium of language is difficult for them to understand biological concepts. However, they expressed that their teachers explain biological terms thoroughly.

### **Discussion**

There are many research studies that report concept difficulties and misconceptions in science topics in secondary and university levels (Bahar & Polat, 2007). Therefore, this research investigated the difficulties perceived by teachers and students in teaching and learning Grade 9 Biology.

Results showed that the difficulties can be found in teachers as well as in students. For teachers, there are fourteen topics which are not difficult in teaching Grade 9 Biology. Five topics such as Complex tissues, Epithelial tissues, Connective tissues, Muscular or contractile tissues and Nervous tissues are the most difficult for teachers to teach Grade 9 Biology. For students, every topic has difficulty in learning. Among them, some internal systems of the toad such as Excretory system, Respiratory system, Skeletal system and Muscular system, Nervous and Reproductive systems of the toad are the most difficult to learn for students. This result indicated that some lessons are abstract and complex, for example tissues for teachers to teach and the internal systems for students to learn. This result was relevant with the view of Beard (1969, cited in Chu, 2008) stated that learning should be based on concrete concepts or on the learners' own experiences. According to Selepeng et al., (2000, cited in Chu, 2008), the abstract nature of the science concept was one of the reasons of difficulties and problems of learning science.

Textbooks play an important role in teaching learning process especially in developing countries. In many Asian countries textbooks are often prescribed by the authority and constitute the only resource for teaching/learning of biology. It is essential, therefore, that teachers should evaluate such materials in order to determine their suitability and appropriateness for better and more effective teaching and learning (UNESCO, 1986).

In this study, although Grade 9 Biology Textbook prescribed in Myanmar is a good one for teacher in teaching, not for students to learn. Thus, it indicated that biology encompasses a large amount of topics, concepts and issues that students have to learn. According to Chiepetta and Fillman (1998, cited in Cimer, 2012), the overloaded biology curricula may not contribute to students' achievement and lead them to learn the material through memorization. This, of course, prevents meaningful learning. So there should be greater participation of teachers in the actual writing of the textbooks.

In learning biology, one such difficulty relates to 'language inabilities'. There are several kinds of language problems encountered by biology learners when the medium of instruction is not their mother tongue (UNESCO, 1986). The teachers indicated that they have no difficulty concerning with language and terminology. But for students, they have difficulty concerning with language and terminology. According to Cimer (2012), as biology contains many Latin and foreign terms and many concepts, definitions, terms, principals, and topics, this makes it harder and more complex for students to understand biology. In consequences, students cannot learn biological knowledge in a meaningful way and retain it in their memory. So they try to memorize biological knowledge without thinking about their meaning and functions.

### **Suggestions**

Textbook should be an aid for teachers and students in teaching learning process. The content in textbook can uplift the students' morality and ethics. The overloaded content of textbook should be reduced and the required content should be explained in more detail. Photographs should be clearer, good quality and illustrated in color.

The language and terminology in Grade 9 biology textbook is not easy for students. So there should be provided biological terms with glossary in textbook. And some reference books and different kinds of biology dictionary such as Illustrated Dictionary of Biology, Color Oxford Dictionary and Thesaurus, etc. should be provided for both teachers and students.

In this study, sample schools were selected from Kyaukpadaung Township. Further researches should be done in other states and regions as

well. The emphasis of this research is on difficulties perceived by teachers and students in teaching and learning Grade 9 Biology for 2016-2017 AY.

### **Conclusion**

In teaching Biology the first task facing the teacher is to determine the quantity of subject matter to be taught under each of the broad topics listed in the syllabus. For this reason, it is important for us to investigate the difficulties perceived by teachers and students in teaching and learning Grade 9 Biology. According to the topic difficulty index (TDI) value, both teachers and students have difficulty in teaching and learning Grade 9 biology. Unlike the students, the teachers generally indicated little difficulty in teaching most of the topics. But in few topics, teachers have a higher level of TDI than students. Generally, both teachers and students have difficulty in teaching and learning abstract topics. Grade 9 Biology Textbook prescribed in Myanmar is a good condition for teacher. However, there are many requirements for students to learn effectively. Most of biological terms are rooted from Latin words. This makes biological knowledge difficult for teachers and students. It is not uncommon to hear students complaining that a course they are following is "difficult". "Difficult" is a very disturbing word. If it could be detected where, how and why exactly a particular topic is difficult to learn, remedial steps could be taken (UNESCO, 1986).

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## **A Study of Teachers' Teaching Performances in Primary Schools**

Nu Nu Htwe<sup>1</sup> & Cho Cho Sett<sup>2</sup>

### **Abstract**

The objectives of this research are 1) to analyze teachers' level of teaching performances on lesson preparation, 2) to examine teachers' level of teaching performances on lesson implementation, and 3) to analyze teachers' level of teaching performances on lesson evaluation. The mixed method (quantitative and qualitative) was employed in this study. A total of four-hundred and eighty teachers from Yangon City Development Area were selected as subjects, using the equal stratified random sampling. The required data for quantitative study were collected by using a set of questionnaire for teachers. Interview, documentation, and observation checklists were used for qualitative study. Descriptive statistics was used to analyze the data in the study. The level of teachers' teaching performances on each dimension was moderately high.

### **Introduction**

Knowles (1980) stated that the role of primary school teachers is vital as they are prime and essential resources for education reforms, and primary education has the need to be exceptionally established as it lays the foundation for children in their future year after year. Importantly, the primary school teachers are crucial resources to build a very basic foundation for the development of every nation's education. Such development can be undoubtedly attained by improving teachers' teaching learning performances. Therefore, it is necessarily important to analyze teachers' level of teaching performances on lesson preparation, to examine teachers' level of teaching performances on lesson implementation, and to analyze teachers' level of teaching performances on lesson evaluation. Hopefully, the teachers' teaching performances in this study were not envisioned as provision benefits solely to the researched schools but were intended to provide a reference for all primary schools.

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## **Aim of the Research**

The aim of the research is to analyze teachers' teaching performances in primary schools.

## **Specific Objectives of the Research**

The specific objectives of this study are as follows.

1. To analyze teachers' level of teaching performances on lesson preparation
2. To examine teachers' level of teaching performances on lesson implementation
3. To analyze teachers' level of teaching performances on lesson evaluation

## **Research Questions**

The research questions of this study are as follows.

1. What is the level of teachers' teaching performances on lesson preparation?
2. What is the level of teachers' teaching performances on lesson implementation?
3. What is the level of teachers' teaching performances on lesson evaluation?

## **Theoretical Framework**

The study of teachers' teaching performances has advanced in a holistic approach to teaching practices and takes into consideration of dimensions such as designing the instruction (or) lesson preparation, delivery of the instruction (or) lesson implementation, and assessment of the instruction (or) lesson evaluation. The concepts resulted from these dimensions were used to build a framework of teachers' teaching performances for this research, and were highlighted as follows.

## **Designing the Instruction**

It requires planning a logically organized course that aligns objective/ outcomes, learning experiences (content and delivery), and assessments based on sound principles from the learning subjects (NRC,

1999). The teacher plans using the school's curriculum, effective strategies, resources, and data to meet the needs of all students. According to Grow (1991), a teacher uses data of student learning to guide planning, plans time realistically for pacing, content coverage, and transitions, plans for differentiated instruction, aligns lesson objectives to school curriculum, develops appropriate long and short-range plans and is able to adapt plans when needed, as stated by Lieberman & Pointer Mace (2008), incorporates learning from professional growth opportunities into instructional practice, sets goals for improvement of knowledge and skills and engages in activities outside the classroom intended for school and student enhancement.

### **Delivery of the Instruction**

For effective delivery (implementation), the teacher must use a variety of methods, activities and contexts to achieve a robust understanding of material, as well as relevant, varied examples of the material and practice, all of which are aligned with outcomes and assessment methods (James, 2010). Tough (1971) stated that course management is judged on how well the learning environment is configured, resources and procedures necessary to student learning

The teacher effectively engages students in learning by using a variety of instructional strategies in order to meet individual learning needs. A teacher 1) engages and maintains students in active learning; 2) builds upon students' existing knowledge and skills; 3) differentiates instruction to meet students' needs; 4) reinforces learning goals consistently throughout the lesson; 5) uses a variety of effective instructional strategies and resources; 6) uses instructional technology to enhance student learning; 7) communicates clearly and checks for understanding; 8) arranges the classroom to maximize learning while providing a safe environment; 9) establishes clear expectations, with student input, for classroom rules and procedures early in the school year; and 10) enforces them consistently, fairly; 11) maximizes instructional time and minimizes disruptions; 12) establishes a climate of trust and teamwork by being fair, caring, respectful, and enthusiastic; and 13) respects students' diversity and special needs.

## **Assessment of the Instruction**

It requires that the teacher designs and uses valid, reliable methods of (1) measuring student learning of the established objectives and (2) providing meaningful feedback to students (James, 2010). The teacher systematically gathers, analyzes, and uses data to measure student progress, guide instruction, and provide timely feedback. Mezirow (2000) points out that a teacher uses pre- assessment data to develop expectations for students and to document learning, creates or selects valid and appropriate assessments, aligns student assessment with established curriculum standards and benchmarks, uses a variety of formal and informal assessment strategies to guide instruction, uses assessment tools for both formative and summative purposes and gives constructive and frequent feedback to students on their learning.

## **Operational Definition**

Teaching performance: Teaching performance was included three fundamental facts such lesson preparation, lesson implementation and lesson evaluation. The teachers' teaching performances were analyzed based on these three fundamental elements.

## **Research Method**

Both quantitative and qualitative research methods were employed.

### **(i) Sample:**

For quantitative study, the sample schools included 67 Basic Education Primary Schools and 23 Basic Education Post-Primary Schools in total from downtown, inner suburban and outer suburban in Yangon City Development Area (YCDA). As using the equal stratified random sampling method, 160 teachers (33.33%) from each of the location- therefore 480 teachers in total were selected as subjects. Among the selected teachers, there were 24 (5%) male teachers and 456 (95%) female teachers. Purposive sampling method is used to choose the participant teachers for qualitative study. Among the selected schools, 4 schools from (Group I), the group with the highest mean scores, and 4 schools from (Group II), the group with the lowest mean. Therefore, 4 teachers from each school, thirty-two teachers in total were interviewed to know and observe their actual teaching and learning situations.

**(ii) Instrumentation:**

There were 31 items focused on three components such as “designing the instruction (items of 1-8), delivery of the instruction (items of 9-26) and assessment of the instruction (items of 27-31)” with specific indicators to analyze the extent of primary teachers’ teaching performances. The internal consistency ( $\alpha$ ) of the whole scale of the questionnaire for the teachers’ teaching performances was 0.93.

**(iii) Procedure:**

The researcher thoroughly reviewed related literature and received some pieces of advice and guidance for the questionnaires from the panel of experienced teachers. The use of words and content of items were modified. Discussion the modified ones with those experts was also conducted. With the permission from the Deputy Director General (Education) of Yangon Region, the questionnaires were delivered to the respondents between 11<sup>th</sup> July 2017 and 30<sup>th</sup> July 2017. The questionnaire was collected after two weeks and was completely answered. The complete response rate was obtained. Interviews were conducted with selected teachers to obtain much accurate information practices from November, 2017 to January, 2018.

**(iv) Data Analysis:**

Descriptive was used for quantitative data analysis. To analyze the qualitative data, the cyclical process was used.

**Findings**

Table 1. Mean Values and Standard Deviations of Primary Teachers’ Teaching Performances on Lesson Preparation Perceived by Teachers (N=480)

Items	Mean	SD
1) Preparing the lessons based on the instructions of the curriculum in order to deliver the main ideas of each lesson	2.65	1.06
2) Setting the objectives of the lesson with the discussion of colleagues to achieve SMART	2.80	.84
3) Choosing the teaching techniques to support and implement the determined objectives well	2.65	1.02

<b>Items</b>	<b>Mean</b>	<b>SD</b>
4) Discussing with the colleagues before teaching a lesson to elicit their ideas on some points	2.52	.68
5) Preparing and organizing things such as textbooks, teaching aids and other related materials for the substitute teacher	2.43	.91
6) Submitting prepared weekly lessons diaries to the principals	2.55	.960
7) Designing the activities in advance intended to give the students after teaching a lesson	2.52	.95
8) Giving the students the opportunities to share their views on the lesson they will have to learn before it is taught	2.42	.86
<b>Overall (Teaching Performances on Lesson Preparation)</b>	<b>2.57</b>	<b>.80</b>

1.00-1.75=never    1.76-2.50=sometimes    2.51-3.25=often

3.26-4.00=always.

Table 2. Mean Values and Standard Deviations of Primary Teachers' Teaching Performances on Lesson Implementation (N=480)

<b>Items</b>	<b>M</b>	<b>SD</b>
1) Teaching the lessons by using words and behaviors that help students understand well at their age	2.54	0.94
2) Praising immediately once the student has done an activity	2.56	0.98
3) Asking for the reflections from the colleagues on the lessons taught already	2.54	0.98
4) Creating different learning environments that can help improve students' learning abilities	2.70	0.81
5) Setting the students' learning pace on the students' abilities	2.66	0.92
6) Using the teaching approaches for students' co-operation	2.73	0.83
7) Designing an individual development plan for students based on their needs with the co-operation of parents	2.49	0.93

<b>Items</b>	<b>M</b>	<b>SD</b>
8) Planning the transition time not to waste the class time	2.69	0.79
9) Encouraging and helping students with less ability to keep abreast with other students	2.67	0.82
10) Maintaining teaching aids to be able to use them effectively in the classroom	2.67	0.93
11) Teaching the lessons in groups to build the habits of working in groups and co-operatively among students	2.65	0.85
12) Changing and organizing the classrooms based on the techniques to be used	2.44	0.89
13) Maintaining things and work that the students have not completely yet systematically	2.57	0.88
14) Using good summarizing techniques for the students to remember the lessons well	2.55	0.74
15) Discussing self-made teaching aids and techniques, and sharing their ideas with of their colleagues	2.17	1.01
16) Discussing difficulties and challenges of teaching with of their colleagues solving them together	2.47	0.67
17) Creating opportunities for the individual student to be able to share what they have learned with their classmates	2.51	0.65
18) Inviting participations of parents and communities to comment on their teaching	2.54	0.74
<b>Overall (Teaching Performances on Lesson Implementation)</b>	<b>2.56</b>	<b>0.70</b>

1.00-1.75=never      1.76-2.50=sometimes      2.51-3.25=often  
3.26-4.00=always

According to the descriptive statistics presented in Table 2, primary teachers' teaching performances on overall lesson implementation were found with the mean values between 2.51 and 3.25 as often practiced. Then, the descriptive statistics for primary teachers' teaching performances on lesson evaluation were presented in Table 3.

Table 3. Mean Values and Standard Deviations of Primary Teachers' Teaching Performances on Lesson Evaluation (N=480)

Items	Mean	SD
1) Evaluating the extent of students' learning according to the learning objectives	2.60	.73
2) Letting parents know the extent of learning abilities of each student and the achievement in their tests	2.54	1.00
3) Letting students know their results individually and discuss what they need to learn to improve the results with the teacher	2.52	.97
4) Discussing what they need to do to improve their individual student' abilities with their colleagues	2.60	.79
5) Taking feedback from their colleagues, students and their parents on what they need to do to improve their teaching abilities	2.59	1.01
<b>Overall (Teaching Performances on Lesson Evaluation)</b>	<b>2.57</b>	<b>.82</b>

1.00-1.75=never 1.76-2.50=sometimes 2.51-3.25=often 3.26-4.00=always

According to the Table 3, primary teachers were found with the overall mean score of teaching performances on lesson evaluation between 2.51 and 3.25 as often practiced.

Table 4. Means and Standard Deviations, and Levels of Primary Teachers' Teaching Performances (N=480)

Variables	Mean	SD	Level
Lesson Preparation	2.57	.80	Moderately high
Lesson Implementation	2.56	.70	Moderately high
Lesson Evaluation	2.57	.82	Moderately high
<b>Overall Teaching Performances</b>	<b>2.57</b>	<b>.72</b>	<b>Moderately high</b>

1.00-1.75=low 1.76-2.50=satisfactory 2.51-3.25=moderately high  
3.26-4.00= high

According to Table 4, the mean value of overall teaching performances was 2.57, teachers conducted it moderately high. Based on the results each dimension, teachers conducted the dimension of lesson preparation moderately high as its mean value was 2.57, teachers conducted the dimension of lesson implementation moderately high as its mean value was 2.56, and teachers conducted the dimension of lesson evaluation moderately high as its mean value was 2.57. The analysis appeared the level of primary teachers' teaching performances on the overall teaching performances was moderately high, and which was found as the same for the level of teaching performances of lesson preparation, lesson implementation and lesson evaluation.

### **Conclusion**

As the observations of teachers' teaching performances were not determined to the specific subject, the researcher observed these three portions for all subjects such as English teaching, mathematics teaching and Science teaching. As regards lesson preparation, 18.75% (N=3) of teachers from Group I were found to have discussed setting learning objectives for each lesson with their colleagues. For their teaching English, they collected things to be used in their teaching such as textbooks, recorders, English video lessons that were really helpful to be effective language teaching. They discussed specific things of how to elicit background knowledge of the lessons, how to make students interested in their teaching with suitable activities, how to teach students to be able to reach the lesson objectives. They discussed how to use both of hands-on activities and minds-on activities concerning science in their teaching by the participation of their colleagues. They created teaching-aids with their colleagues and tried to have new teaching learning tools on their own way.

The results of observing teachers from Group II are that two (12.5%) of teachers of this group were found to have little focused on the lesson preparation. They did not have specific time for their lesson preparation and other necessary things for their teaching. Generally, they would not spend time on preparation the lessons even if they had enough time to do. They prepared their instructions and lessons not in groups but individually. They were not found to have discussed with their colleagues in creating teaching learning tools. The other two (12.5%) of teachers of this group were found to have not focused on the lesson preparations at all.

As regards lesson implementation, four (25%) of teachers from Group I could be able to implement their teaching very systematically. As they planned the lessons well, they could move the implementation steps with not many difficulties. As the lessons were taught based on student-centered approaches, those teachers could make students caught in classroom activities. However, the other four (25%) of teachers from Group I were found as highly performed when it comes to lesson implementation. More specifically, the other two (12.5%) of teachers from Group II were not found as highly performed when it comes to lesson implementation. Besides, they did not keep the records of the accomplishments in their teaching and how they felt on it. Then they did not discuss them with their colleagues in order to find out the solutions to improve their performances.

As regards lesson evaluation, two teachers (12.5%) from Group I evaluate whether their teaching was effective or not based on the learning objectives. Noting the abilities of an individual student, they discussed with their colleagues. When it comes to observing the other six (37.5%) of teachers from Group II, they could not able to evaluate whether their teaching was effective or not based on the learning objectives. They had not noted what were still necessary to add on their teaching from the evaluation the lessons. They did not ask anything when they teach the lessons. They grouped students according to the results of their evaluation. They evaluated the students by asking questions at the beginning of the lesson, during the lesson and at the end of the lesson. Sometimes they asked students questions that could challenge students' thinking.

### **Recommendations and Suggestions**

Based on the quantitative and qualitative studies, the followings were recommended.

- 1) Teachers need to be provided with the opportunities of attending the professional development workshops. Creating professional development programs are helpful for the teachers to participate in a culture of collaboration
- 2) Teachers need to have enough time to be engaged in the reflective practice activity both by themselves and with their colleagues.

- 3) Teachers are necessarily to be provided with resources (teaching and learning resources) to be able to have knowledge of creating an effective classroom. This is critical to be done under the government-led efforts.
- 4) Every primary school is importantly to have the supporting places where principals and teachers can collaboratively learn and work together for the school goal, try new things of teaching-learning, work in groups, and discuss methods of teaching, and reflect their teaching lessons.

### **Need for Further Research**

The study analyzed primary teachers' teaching performances based on the overall subjects, not on a specific subject matter, thus the further investigations should be led to teachers' teaching performances in different teaching areas.

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## **Relationship between Principals' Instructional Leadership Practices and Teachers' Instructional Practices**

San San Nyunt<sup>1</sup>, Daw Htay Khin<sup>2</sup> & Su Su Hlaing<sup>3</sup>

### **Abstract**

The main aim of this study is to study the relationship between principals' instructional leadership practices and teachers' instructional practices of the Basic Education High School in Waw Township, Bago Region. Eight principals and two hundred and thirty six teachers in Waw Township, Bago Region were selected as the participants. The quantitative finding of this study revealed that the principals often practiced in all areas of instructional leadership practices. The mean value of principals' instructional leadership practices in school C is higher than that of any other schools. The teachers often practiced in all areas of instructional practices. The mean value of teachers' instructional practices in school C is higher than that of any other schools. There were significant differences in principals' instructional leadership practices and teachers' instructional practices depending on their personal factors and school related factors. The research finding showed that teachers' instructional practices depend upon the instructional leadership practices of principals. According to the Pearson correlation, teachers' instructional practices are highly correlated with principals' instructional leadership practices.

**Keyword: instructional leadership practices**

### **Introduction**

Basic education is one area for all children. It can access, progress through and successfully complete quality basic education. As a consequence, there is a greater need for the principals to expertise in teaching and learning process and to prepare actions in order to improve the quality of education. A principal's major role is to help provide the focus and support system to enable teachers to develop their classrooms for greater instructional effectiveness (Pullan, Hill, &Crevola, 2006).

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Therefore, instructional leadership practices of principals and instructional practices of teachers play an important part of basic education in Myanmar.

### **Significance of the Study**

As an instructional leader, a principal should develop a productive in satisfying work environment for teachers and desirable learning conditions and outcomes for children. If both the principal and teachers work together with a team spirit to meet school vision and mission, the student engagement and their learning outcomes will increase. This study helps principals to recognize the best practices that could help teachers in their classroom instruction. For these reasons, it is essential to study relationship between principals' instructional leadership practices and teachers' instructional practices.

### **Aims of the Study**

The main aim of the study is to study the relationship between principals' instructional leadership practices and teachers' instructional practices.

The specific aims are

1. To investigate the extent of principals' instructional leadership practices
2. To study variations on principals' instructional leadership practices in terms of their personal factors and school related factors
3. To investigate the extent of teachers' instructional practices
4. To study variations on teachers' instructional practices according to their personal factors and school related factors
5. To study the relationship between principals' instructional leadership practices and teachers' instructional practices

### **Research Questions**

1. To what extent do the principals perform instructional leadership practices?

2. Are there any significant differences in principals' instructional leadership practices in terms of their personal factors and school related factors?
3. To what extent do the teachers perform their instructional practices?
4. Are there any significant differences in teachers' instructional practices depending on their personal factors and school related factors?
5. Is there any relationship between the principals' instructional leadership practices and teachers' instructional practices?

### **Theoretical Framework**

In this study, the investigation of principals' instructional leadership practices will be based on the instructional leadership model developed by Murphy's model (1990). There are four components in this model. They are:

- Developing Mission and Goals
- Managing the Educational Production
- Promoting an Academic Learning Climate
- Developing a Supportive Work Environment

On the other hand, manageable analysis on teachers' instructional practices will be concluded in terms of Green's teaching process. Green (2003) proposed:

- Planning
- Implementation
- Assessment
- Feedback

### **Definition of Key Terms**

Instructional leadership is defined as the ability of a principal to initiate school improvement, to create learning oriented educational climate and to simulate and supervise teachers in such a way that the latter may

exercise their tasks as effectively as possible (Van de Grift and Houtveen, 1999, cited in Alig-Mikelcarek, J.M.,2003).

## **Methodology**

### **Research Method**

Quantitative and qualitative methods were used in this study.

### **Sample**

Out of 10 schools in Waw Township Area, 8 Basic Education High Schools were chosen by using purposive sampling method. Therefore, 8 principals and 236 teachers (all teachers from selected school) were participated in this study.

### **Instrumentation**

In this study, the instrument for the instructional leadership practices of the principals including 46 items was developed based on the instructional leadership model of Murphy (1990), and the instrument for the teachers' instructional practices including 29 items was constructed based on Green's teaching practices.

### **Analysis of Data**

The data obtained from questionnaires were analyzed by using Statistical Package for the Social Science (SPSS) software version 24. The descriptive analysis techniques were used to tabulate mean values and standard deviations for the group of items. The independent sample *t* test and one way ANOVA were used to find the differences of principals' instructional leadership practices and teachers' instructional practices in terms of personal factors and school related factors. After that, Post Hoc Tukey HSD test was also used. And then, Pearson correlation was used to determine the relationship between principals' instructional leadership practices and teachers' instructional practices. Besides quantitative analysis, data collected from qualitative study were categorized and analyzed to complete the quantitative findings on differences in the performance of instructional leadership practices of the principals.

## Findings

### Quantitative Findings of the Instructional Leadership Practices of Basic Education High School Principals

Based on the principals' self-rating scale and teachers' rating scale, the principals' instructional leadership practices were measured.

Table 1. Comparisons of Mean Values and Standard Deviations of Principals' Instructional Leadership Practices Grouped by School (N=244)

School	Principals' Instructional Leadership Practices									
	DMG		MEPF		PALC		DSWE		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
School A	4.55	.36	4.16	.49	4.63	.44	4.39	.46	4.38	.40
School B	4.45	.36	4.27	.55	4.49	.38	4.17	.38	4.33	.41
School C	4.80	.26	4.63	.29	4.84	.19	4.73	.32	4.72	.21
School D	4.38	.39	3.94	.53	4.09	.58	4.37	.57	4.05	.46
School E	4.02	.76	3.79	.81	3.79	.76	3.89	.84	3.85	.72
School F	4.77	.23	4.53	.32	4.88	.16	4.41	.26	4.62	.19
School G	4.47	.25	4.53	.16	4.67	.23	4.23	.21	4.53	.10
School H	3.79	.62	3.33	.71	3.79	.71	3.75	.66	3.58	.62

Note: DMG – Developing Mission and Goals  
 MEPF \_ Managing the Educational Production Function  
 PALC \_ Promoting an Academic Learning Climate  
 DSWE \_ Developing a Supportive Work Environment

Table 2. Mean Values and Standard Deviations of Principals' Instructional Leadership Practices (N=244)

Variable	Mean	SD	Performance
Developing Mission and Goals	4.45	.53	Often
Managing the Educational Production Function	4.27	.64	Often
Promoting an Academic Learning Climate	4.44	.61	Often
Developing a Supportive Work Environment	4.25	.57	Often
<b>Principals' Instructional Leadership Practices</b>	4.28	.56	Often

Scoring Direction: 1.00-1.49=never, 1.50-2.49=seldom,  
2.50-3.49=sometimes, 3.50-4.49=often, 4.50-5.00=always

Table 3. Independent Sample *t* Test Results of Principals' Instructional Leadership Practices Grouped by Gender (N=244)

Variable	Gender	No. of Principals	Mean (SD)	<i>t</i>	<i>df</i>	<i>P</i>
Developing Mission and Goals	Male	3	4.60(.37)	3.98	242	.000***
	Female	5	4.34(.58)			
Managing the Educational Production Function	Male	3	4.29(.51)	2.78	242	.006**
	Female	5	4.06(.72)			
Promoting an Academic Learning Climate	Male	3	4.58(.49)	3.55	242	.000***
	Female	5	4.31(.65)			
Developing a Supportive Work Environment	Male	3	4.42(.51)	4.63	242	.000***
	Female	5	4.11(.55)			
Principals' Instructional Leadership Practices	Male	3	4.42(.44)	3.75	242	.000***
	Female	5	4.17(.60)			

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$  at significant level

Table 4. Independent Sample *t* Test Results of Principals' Instructional Leadership Practices Grouped by Administrative Services (N=244)

Variable	Administrative services	No. of principals	Mean (SD)	<i>t</i>	<i>df</i>	<i>P</i>
Developing Mission and Goals	< 5 years	4	4.21(.58)	7.638	242	.000***
	≥5 years	4	4.67(.32)			
Managing the Educational Production Function	< 5 years	4	3.87(.72)	7.374	242	.000**
	≥5 years	4	4.41(.42)			
Promoting an Academic Learning Climate	< 5 years	4	4.09(.65)	10.03	242	.000***
	≥5 years	4	4.73(.33)			
Developing a Supportive Work Environment	< 5 years	4	3.99(.60)	-7.58	242	.000***
	≥5 years	4	4.48(.40)			
<b>Principals' Instructional Leadership Practices</b>	< 5 years	4	3.99(.60)	8.920	242	.000***
	≥5 years	4	4.54(.33)			

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$  at significant level

Table 5. One-Way ANOVA Results of Variance Summary Table Comparing of Principals' Instructional Leadership Practices Grouped by Location (N = 244)

Variable	School	N	Mean	SD	<i>F</i>	<i>P</i>
Developing Mission and Goals	Group A	88	4.49	.36	43.84	.000***
	Group B	77	4.11	.63		
	Group C	79	4.76	.24		

Variable	School	N	Mean	SD	F	P
Managing the Educational Production Function	Group A	88	4.21	.50	51.91	.000***
	Group B	77	3.70	.73		
	Group C	79	4.57	.28		
Promoting an Academic Learning Climate	Group A	88	4.55	.40	79.44	.000***
	Group B	77	3.90	.66		
	Group C	79	4.81	.20		
Developing a Supportive Work Environment	Group A	88	4.30	.43	31.88	.000***
	Group B	77	3.91	.65		
	Group C	79	4.53	.34		
<b>Principals' Instructional Leadership Practices</b>	Group A	88	4.34	.39	65.47	.000***
	Group B	77	3.84	.62		
	Group C	79	4.64	.19		

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$  at significant level

Note: Group A = within 5 miles,

Group B = within 10 miles

Group C = between 10miles and 20 miles

### Quantitative Findings of the Instructional Practices of Basic Education High School Teachers

Table 6. Comparisons of Mean Values and Standard Deviations of Teachers' Instructional Practices Grouped by School (N=236)

School	Teachers' Instructional Practices Areas									
	Planning		Implementation		Assessment		Feedback		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
School A	4.64	.43	4.42	.39	4.57	.33	4.45	.34	4.50	.32
School B	4.53	.43	4.37	.37	4.59	.43	4.57	.38	4.46	.34
School C	4.81	.26	4.65	.32	4.80	.25	4.78	.28	4.71	.26

School	Teachers' Instructional Practices Areas									
	Planning		Implementation		Assessment		Feedback		Overall	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
School D	4.37	.57	4.07	.45	4.24	.59	4.09	.71	4.16	.23
School E	4.17	.84	4.38	.41	4.49	.47	4.47	.48	4.46	.28
School F	4.77	.35	4.63	.92	4.76	.34	4.64	.29	4.70	.22
School G	4.38	.60	4.32	.29	4.58	.34	4.61	.10	4.42	.16
School H	3.91	.66	4.18	.33	4.39	.29	4.09	.65	4.12	.23

Table 7. Mean Values and Standard Deviations of Teachers' Instructional Practices (N=236)

Variable	Mean	SD	Extent of Performance
Planning	4.49	.59	Often
Implementation	4.40	.41	Often
Assessment	4.57	.42	Always
Feedback	4.48	.49	Often
<b>Teachers' Instructional Practices</b>	4.46	.37	Often

Scoring Direction: 1.00-1.49=never, 1.50-2.49=seldom,  
2.50-3.49=sometimes, 3.50-4.49=often, 4.50-5.00=always

Table 8. One-Way ANOVA Results of Variance Summary Table Comparing Teachers' Instructional Practices Grouped by Teaching Service (N=236)

Variable	Services	N	Mean	SD	F	P
Planning	1-3 years	25	4.11	.77	2.65	.034*
	4-6 years	17	4.40	.71		
	7-18 years	53	4.55	.54		
	19-30	82	4.60	.52		

<b>Variable</b>	<b>Services</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>P</b>
	years					
	31 years and above	59	4.46	.55		
<b>Implementation</b>	1-3 years	25	4.18	.39	2.68	.032*
	4-6 years	17	4.36	.41		
	7-18 years	53	4.49	.36		
	19-30 years	82	4.50	.48		
	31 years and above	59	4.39	.39		
	4-6 years	17	4.50	.36		
	7-18 years	53	4.53	.46		
	19-30 years	82	4.56	.39		
	31 years and above	59	4.51	.36		
<b>Teachers' Instructional Practices</b>	1-3 years	25	4.19	.38	3.35	.011*
	4-6 years	17	4.43	.39		
	7-18 years	53	4.42	.32		
	19-30 years	82	4.54	.37		
	31 years and above	59	4.49	.34		

Table 11. One-Way ANOVA Results of Variance Summary Table  
 Comparing Teachers' Instructional Practices Grouped by  
 Location (N=236)

<b>Variable</b>	<b>Location</b>	<b>N</b>	<b>Mean</b>	<b>SD</b>	<b>F</b>	<b>P</b>
Planning	Group A	86	4.59	.43	21.36	.000***
	Group B	74	4.16	.74		
	Group C	76	4.71	.41		
implementation	Group A	86	4.39	.38	11.18	.000***
	Group B	74	4.27	.43		
	Group C	76	4.57	.35		
assessment	Group A	86	4.58	.36	13.17	.000***
	Group B	74	4.40	.47		
	Group C	76	4.73	.32		
Feedback	Group A	86	4.49	.35	19.48	.000***
	Group B	74	4.24	.65		
	Group C	76	4.70	.30		
<b>Teacher' Instructional Practices</b>	Group A	86	4.48	.32	23.90	.000***
	Group B	74	4.27	.40		
	Group C	76	4.60	.28		

Note: Group A = within 5 miles, Group B = within 10 miles,  
 Group C = between 10miles and 20 miles

## Relationship between Principals' Instructional Leadership Practices and Teachers' Instructional Practices

Table13. Correlation between Principals' Instructional Leadership Practice and Teachers' Instructional Practices

Variables	Mean	SD	Pearson's Correlation (r)	Remark
Principal's Instructional Leadership Practices	4.28	.56	.687**	Highly correlated
Teachers' Instructional Practices	4.46	.37		

### Findings from Open-ended Questions

For the open-ended Question (1), "How does your principal come up with term/annual goals to enhance teaching and learning in the school?", 43% (N=102) of teachers stated that their principals cooperated with subject leaders, class leaders and teachers to set the annual goals to enhance teaching and learning in their school. The 30% (N=70) of teachers answered that their principals have to be in the discussion with parents and school community to set the annual goals.

For the open-ended Question (2) "In what ways does your principal promote professional development of teaching staff?", 75% (N=177) of the teachers answered that their principals gave the opportunities to the teachers to promote professional development such as encouraging them to attend the refresher course and workshop in township according to their seniority or their respective subject. The 27% (N=64) of the teachers answered that their principals supported for teaching aids. The 4% (N=10) of the teachers told that their principals created learning opportunities for beginning teachers from the experienced teachers.

The open-ended Question (3), "How does your principal perform for improving students' academic achievement?", 47% (N=112) of the teachers responded that their principals encouraged teachers to teach the extra-teaching in the evening or at the weekend. The 20% (N=48) of the teachers replied that their principals discussed the parents for improvement of their children. The 4% (N=9) of the teachers responded that their principals observed the classroom teaching and gave the necessary suggestion.

## **Conclusion and Discussion**

In this study, it was found that male principals perform their instructional leadership practices more than female principals. Moreover, it was found that the principals who had 5 years and more than of administrative service performed all areas of instructional leadership practices more than the principals who had less than 5 years of administrative service did. There were significant differences in all areas of principals' instructional leadership practices according to their location. The principals from group C performed all areas of instructional leadership practices more than the principals from group A and group B.

Finding of this study indicated that the teachers' who had 19-30 years and more than of teaching service performed in planning and implementation areas of instructional practice more than the teachers who had 1-3 years of teaching service did. There were significant differences in all areas of teachers' instructional practices. According to their location. The group of teachers from group C performed all areas of instructional practices more than the group of teachers from group A and group B. The research finding showed that teachers' instructional practices do not depend upon the location. According to the Pearson-product moment correlation coefficient, teachers' instructional practices are highly correlated with principals' instructional leadership practices. It can be said that the more principals' instructional leadership practices, the more the teachers' instructional practices.

## **Recommendations**

- The principals should give the necessary suggestions after observing teachers' instruction.
- The principals should organize and encourage school communities to participate in school activities for all round development of students.
- The principals within township should cooperate each other and then solve the difficulties together.
- The group of more experienced teachers should help the group of less experienced teachers to enable to use various teaching techniques.

- The teachers should always reflect their teaching and give feedback themselves to improve their teaching ability.
- The schools should cooperate with families and local bodies in order to overcome the challenges and difficulties faced by principals and teachers.

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## **An Investigation into Level of Students' Satisfaction in Yangon University of Education**

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### **Abstract**

The objectives of this study are to investigate the level of students' satisfaction in Yangon University of Education, to study the differences in students' satisfaction according to gender, to study the differences in students' satisfaction according to the year of study and to find out the reasons of students for dissatisfaction. Both quantitative and qualitative methods were used in this study. Three hundred fifty undergraduate students from Yangon University of Education were selected as participants by using equal-size stratified random sampling method. Instrument was reviewed by a panel of experts. The reliability coefficient Cronbach's alpha of students' satisfaction was 0.89. Descriptive statistics, one-way ANOVA and independent samples *t* test were used to analyze the data obtained in this study. The level of students' satisfaction was at satisfied level ( $\bar{X}=2.96$ ). There was no significant difference in students' satisfaction between male and female students. However, there was the significant difference in students' satisfaction grouped by year of study. Some reasons given by students for their dissatisfaction were mainly concerning with internet access provided in the library, places to take a rest, provision of water, toilets, places for sport, seating capacity of canteen, foods from canteen, temperature in classrooms, cleanliness of the campus, using computer in teaching, computer classes, services of staff from student service centre and services of library staff.

**Keyword:** Students' Satisfaction

### **Introduction**

The development of a country depends on the degree of higher education (Kazemi 2005). According to Seymour (1972), the most important goal of higher education is to develop satisfied customers: students, parents and alumni, etc. Yeo (2008) also said that higher education is widely considered as a part of service industry since the orientation of its institutions is to provide quality service to students in an increasing

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competitive environment. Crawford (1991) also said that there are various groups that can be categorized as customers of a university, namely students, employees, families and the society. In spite of this diversity, higher education has considered students to be the primary customers of a university. According to Kulik (2001), universities set up satisfaction surveys to serve two purposes: to help administrators monitor teaching quality and to help teaching staff improve on their teaching. Wiers-Jenssen, Stensaker and Groggaard (2002) also said that assessing student satisfaction provides a way that universities can focus directly on issues of quality development in order to ensure that educational standards are high.

## **Objectives of the Research**

### **General Objective**

- To study the level of students' satisfaction in Yangon University of Education

### **Specific Objectives**

- To investigate the level of students' satisfaction in Yangon University of Education
- To study the differences in the students' satisfaction according to gender in Yangon University of Education
- To study the differences in the students' satisfaction according to year of study in Yangon University of Education
- To find out the reasons of students for dissatisfaction in Yangon University of Education

### **Research Questions**

- What is the level of students' satisfaction in Yangon University of Education?
- Are there any significant differences in the students' satisfaction according to gender in Yangon University of Education?
- Are there any significant differences in the students' satisfaction according to the year of study in Yangon University of Education?
- What are the reasons of students for dissatisfaction in Yangon University of Education?

## **Limitations of the Research**

In this study, the participants are first year to fifth year undergraduate students from Yangon University of Education.

## **Theoretical Framework**

The following theoretical framework leads to the research work.

The mentioned three dimensions of student satisfaction will be used in this research. They are university Facilities, academic experiences, social Integration

**University Facilities:** University facilities involve physical (tangible) facilities and non-physical (intangible) facilities. Physical facilities include electricity, toilets, safe buildings, libraries, computer rooms, sports halls and fields, laboratories for science experiments, running water, hostels, etc. The non-physical (intangible) facilities involve the indoor environmental element. Indoor Environmental Quality (IEQ) should be a priority in planning and management. Many factors such as air pollution, thermal condition, sound, lighting, etc. contribute to the IEQ.

**Academic Experiences:** Academic experience includes the experiences concerning the teachers and the curriculum. Academic experiences for students include teachers' knowledge level, teaching ability, teaching methods, using technology in teaching and other aspects. Curriculum satisfaction is an important indicator to measure the quality of education in a university. Curriculum satisfaction reflects the needs and expectations of university students. It includes curriculum aims, curriculum contents, curriculum implementation, curriculum resources, adequacy of curriculum, composition of curriculum, the difficulty level of the subject contents etc.

**Social Integration:** Social integration includes the treatment to students by staff and the opportunities to meet socially relevant goal. The treatment to students by staff includes friendliness, concern shown if the student has a problem, respect for feeling and opinion, willingness to assist by providing fast and efficient service performance, etc. The opportunities to meet socially relevant goals includes social activities, chance to meet people with same interest, participating in campus events, making friends, etc.

## **Definition of Key Term**

**Student Satisfaction:** Student satisfaction is the favorability of a student's subjective evaluation of the various outcomes and experiences associated with education (Elliott & Shin, 2002).

## **Methodology**

### **Research Design**

In this study, mixed method (quantitative and qualitative methods) was used to study the level of students' satisfaction in Yangon University of Education.

### **Population and Sample**

In Yangon University of Education, there are 2700 undergraduate students. There are five years of education for undergraduate students. The sample consisted of 350 undergraduate students from Yangon University of Education. Students were chosen by using equal-size stratified random sampling method.

### **Instrumentation**

The student satisfaction questionnaire was developed by the researcher through review of related literature to explore the level of students' satisfaction. This questionnaire included demographic data, university facilities, academic experiences and social integration. Demographic data included gender and year of study. There were 41 items and each item was rated on a four-point Likert scale ranging from (1) "very dissatisfied" to (4) "very satisfied". In this instrument, item 1 to item 17 were related to university facilities, item 18 to item 30 were related to academic experiences and item 30 to item 41 were related to social integration. Open-ended questions were also used for each quantitative item in measuring students' satisfaction to know the reasons for dissatisfaction.

### **Procedure**

The instrument was reviewed by 12 experts in the field of study to get validity and modified under the guidance of supervisor by using the expert suggestions. Pilot study was conducted. The internal consistency (Cronbach's  $\alpha$ ) of the whole scales of students' satisfaction was .89. Questionnaires were distributed to the students on 7, December, 2018. After the questionnaires were returned, the data were entered into a computer data

file and were analyzed using the Statistical Package for the Social Science (SPSS) software version 25. The reasons given by students were thoroughly studied to categorize the similar perception and identify the reasons of students for dissatisfaction. Data analysis was based on categorizing and interpreting.

## Findings

### Findings of Quantitative Study

Mean values and standard deviations of the level of students' satisfaction are described in Table 1.

Table 1. Mean Values and Standard Deviations Showing the Level of Student Satisfaction (N=350)

Variables	Mean(SD)	Remark
University Facilities	2.85 (.27)	Satisfied
Academic Experiences	2.99(.30)	Satisfied
Social Integration	3.12(.31)	Satisfied
<b>Students' Satisfaction</b>	<b>2.96(.24)</b>	<b>Satisfied</b>

#### Scoring Direction

1.00 – 1.49=Very Dissatisfied      1.50 – 2.49=Dissatisfied  
 2.50 – 3.49=Satisfied                      3.50 – 4.00=Very Satisfied

According to Table 1, students were at the satisfied level ( $\bar{X} = 2.96$ ).

According to Table 2, both male and female students were at the satisfied level in all areas: university facilities, academic experiences and social integration. Overall, both male and female students were at the satisfied level because mean values were fallen between 2.50 and 3.49.

Table 2. Mean Values and Standard Deviations Showing the Level of Students' Satisfaction Grouped by Gender (N=350)

Variables	Gender	N	Mean (SD)	Level of Satisfaction
University Facilities	Male	175	2.85(.26)	Satisfied
	Female	175	2.84(.28)	Satisfied

Variables	Gender	N	Mean (SD)	Level of Satisfaction
Academic Experience	Male	175	2.99(.29)	Satisfied
	Female	175	3.00(.32)	Satisfied
Social Integration	Male	175	3.16(.29)	Satisfied
	Female	175	3.08(.32)	Satisfied
Students' Satisfaction	Male	175	2.98(.23)	Satisfied
	Female	175	2.95(.25)	Satisfied

#### Scoring Direction

1.00 – 1.49=Very Dissatisfied

1.50 – 2.49=Dissatisfied

2.50 – 3.49=Satisfied

3.50 – 4.00=Very Satisfied

Table 3 describes the results of independent samples *t* test for the students' satisfaction. According to Table 3, there were no significant differences in two dimensions: university facilities and academic experiences. There was significant difference in social integration. Overall, there was no significant difference in students' satisfaction between male and female students.

Table 3. Result of Independent Samples *t* Test for the Level of Students' Satisfaction Grouped by Gender (N=350)

Variables	Gender	N	Mean (SD)	<i>t</i>	<i>df</i>	<i>p</i>
University Facilities	Male	175	2.85(.26)	.187	348	n.s
	Female	175	2.84(.28)			
Academic Experience	Male	175	2.99(.29)	-.337	348	n.s
	Female	175	3.00(.32)			
Social Integration	Male	175	3.16(.29)	2.490	348	.013*
	Female	175	3.08(.32)			
Students' Satisfaction	Male	175	2.98(.23)	.805	348	n.s
	Female	175	2.95(.25)			

\* $p < .05$ , \*\* $p < 0.01$ , \*\*\* $p < .001$ , n.s = no significance

Table 4 describes the mean values and standard deviations of students' satisfaction grouped by year of study. According to Table 4, students from all years of study were at the satisfied level in all areas: university facilities, academic experiences and social integration. Overall, students from all years of study were at the satisfied level because the mean values of their satisfaction were fallen between 2.50 and 3.49.

Table 4. Mean Values and Standard Deviations Showing the Level of Students' Satisfaction Grouped by Year of Study(N=350)

<b>Variables</b>	<b>Year of Study</b>	<b>N</b>	<b>Mean (SD)</b>	<b>Level of Satisfaction</b>
University Facilities	1 <sup>st</sup> Year	70	3.05(.20)	Satisfied
	2 <sup>nd</sup> Year	70	2.87(.24)	Satisfied
	3 <sup>rd</sup> Year	70	2.78(.30)	Satisfied
	4 <sup>th</sup> Year	70	2.80(.22)	Satisfied
	5 <sup>th</sup> Year	70	2.74(.25)	Satisfied
Academic Experiences	1 <sup>st</sup> Year	70	3.20(.22)	Satisfied
	2 <sup>nd</sup> Year	70	3.04(.28)	Satisfied
	3 <sup>rd</sup> Year	70	3.03(.38)	Satisfied
	4 <sup>th</sup> Year	70	2.91(.20)	Satisfied
	5 <sup>th</sup> Year	70	2.77(.24)	Satisfied
Social Integration	1 <sup>st</sup> Year	70	3.35(.29)	Satisfied
	2 <sup>nd</sup> Year	70	3.15(.34)	Satisfied
	3 <sup>rd</sup> Year	70	3.05(.25)	Satisfied
	4 <sup>th</sup> Year	70	3.06(.24)	Satisfied
	5 <sup>th</sup> Year	70	2.97(.27)	Satisfied
Students' Satisfaction	1 <sup>st</sup> Year	70	3.18(.17)	Satisfied
	2 <sup>nd</sup> Year	70	3.00(.23)	Satisfied

Variables	Year of Study	N	Mean (SD)	Level of Satisfaction
	3 <sup>rd</sup> Year	70	2.93(.26)	Satisfied
	4 <sup>th</sup> Year	70	2.90(.16)	Satisfied
	5 <sup>th</sup> Year	70	2.81(.19)	Satisfied

#### Scoring Direction

1.00 – 1.49=Very Dissatisfied

1.50 – 2.49=Dissatisfied

2.50 – 3.49=Satisfied

3.50 – 4.00=Very Satisfied

According to Table 5, first year was significantly different with second year, third year, fourth year and fifth year. There were also significant differences between second year and fourth year, second year and fifth year, and third year and fifth year.

Table 5. Tukey HSD Results of Students' Satisfaction Grouped by Year of Study (N=350)

Dependent Variable	(I) Grade	(J) Grade	Mean Difference (I-J)	<i>p</i>
Overall Students' Satisfaction	1 <sup>st</sup> year	2 <sup>nd</sup> year	.177 <sup>*</sup>	.000***
		3 <sup>rd</sup> year	.246 <sup>*</sup>	.000***
		4 <sup>th</sup> year	.274 <sup>*</sup>	.000***
		5 <sup>th</sup> year	.367 <sup>*</sup>	.000***
	2 <sup>nd</sup> year	3 <sup>rd</sup> year	.068	n.s
		4 <sup>th</sup> year	.097 <sup>*</sup>	.043*
		5 <sup>th</sup> year	.190 <sup>*</sup>	.000***
	3 <sup>rd</sup> year	4 <sup>th</sup> year	.029	n.s
		5 <sup>th</sup> year	.122 <sup>*</sup>	.005**
	4 <sup>th</sup> year	5 <sup>th</sup> year	.093	n.s

\* $p < .05$ , \*\* $p < 0.01$ , \*\*\* $p < .001$ , n.s = no significance

## Findings of Qualitative Study

The reasons given by students for their dissatisfaction were mainly concerning with the following items.

### 1. Internet connection in library (n=128, 36.57%)

The internet connection is not good enough. (n=128, 36.57%)

### 2. Toilets (n=94, 26.86%)

There is no sufficient water in toilets. (n=39, 11.14%)

The toilets are not clean. (n=32, 9.14%)

Some toilets are not good to use as the doors can't be closed. (n=23, 6.57%)

### 3. Places to take a rest (n=84, 24.00%)

There are no sufficient places and seats to take a rest. (n=56, 16%)

The seats need cleaning more than this situation. (n=19, 5.43%)

There is no good arrangement for definite places to take a rest. (n=9, 2.57%)

### 4. Provision of water (n=86, 24.57%)

There is no sufficient water for drink and other utilization. (n=37, 10.57%)

There are no enough places to get water. (n=25, 7.14%)

The provided drinking water needs more purification and then the cups and the places need cleaning. (n=24, 6.86%)

### 5. Places for sports (n=78, 22.29%)

There are no enough spaces and devices for the sports. (n=45, 12.86%)

There is no opportunity to take part in the different kinds of sports. (n=10, 2.86%)

The sports hall is narrow. (n=14, 4.00%)

The sports hall is necessary to modify. (n=5, 1.43%)

The football field is not good to play. (n=4, 1.14%)

### 6. Canteen buildings (n=63, 18.00%)

The spaces of shops in canteen are narrow. (n=43, 12.29%)

There is just a little number of shops. (n=11, 3.14%)

The shops from canteen need cleaning more than this situation.  
(n=9, 2.57%)

**7. Foods from the canteen (n=46, 13.14%)**

The foods need cleaning and freshness. (n=46, 13.14%)

**8. Temperature in the classrooms (n=64, 18.29%)**

Some fans in the classrooms are not good to use. (n=41, 11.71%)

There are no sufficient fans in the classrooms. (n=13, 3.71%)

**9. Cleanliness of the campus (n=39, 11.14%)**

There are some unwanted grasses and wastes in the campus. (n=31, 8.86%)

The garbage is collected near the classrooms. (n=6, 1.71%)

There are some dogs within the campus. (n=2, 0.57%)

**10. Using computer in teaching (n=107, 30.57%)**

There is just little using computer in teaching. (n=77, 22%)

Teachers don't use computer in teaching at all. (n=30, 8.57%)

**11. Computer class (n=111, 31.71%)**

Students don't have opportunities to learn computer effectively.  
(n=82, 23.43%)

There are just little computer periods. (n=15, 4.29%)

There are no sufficient computers for practice. (n=14, 4.00%)

**12. Services of staff from student service center (n=143, 40.86%)**

Staff from student service center scold to the students. (n=47, 13.43%)

They have no tolerance. (n=38, 10.86%)

They have no good relationship with students. (n=21, 6.00%)

They have no willingness to give service. (n=14, 4.00%)

They take time without necessary and don't work on time. (n=11, 3.14%)

They have no good management. (n=6, 1.71%)

There is gender discrimination. (n=6, 1.71%)

### **13. Services of staff from library (n=48, 13.71%)**

Most of the staff from library have no good relationship. (n=18, 5.14%)

They scold to students. (n=13, 3.71%)

They have no tolerance. (n=11, 3.14%)

They have no willingness to give service. (n=6, 1.71%)

### **Conclusion and Discussion**

According to the results, the level of students' satisfaction was at satisfied level (Mean=2.96). There was no significant difference in students' satisfaction between male and female students. However, there was the significant difference in students' satisfaction grouped by year of study. Parasuraman, et al. (1985) defined service quality as to what extent service performance matches consumers' expectation. Parasuraman, et al. (1988) also argued that if service quality matches or exceeds consumers' expectations, they will have favourable assessment towards service. Students from Yangon University of Education gave favourable assessment. Therefore, service quality of Yangon University of Education matches or exceeds students' expectation. Equity theory also stated that satisfaction exist when consumers perceive their output/input ratio as being fair (Swan & Oliver, 1989). According to this theory, satisfaction is seen as a relative judgement that takes into consideration both the qualities and benefits obtained. Therefore, students from Yangon University of Education accept that the ratio of their input and output is fair. Numerous studies have been conducted to examine the influence of gender on students' satisfaction. Some researchers (Corts, et al., 2000; Carey., et al., 2002; Hong, 2002; Dirkin., Mishra., & Altermatt, 2005; Mupinga, Nora, & Yaw, 2006; Witowski, 2008; Ilias, et., 2008; Strayhorn & Saddler, 2009) found no significant difference between male and female students regarding satisfaction in the academic domain (Tessema, et al., 2012). This study also indicated that there is no significant difference between male and female students. The result of this study followed Oldfield and Baron (2000) who evaluated students' perception of service quality in a UK university that indicated the mean score for final year students was lower than those of the first year students. They suggested that, as students become more experienced in the higher educational settings, they tend to be more critical in their perceptive of the service quality.

## Recommendations

The recommendations proposed below were based on the findings of the study.

- University provides free internet access for students at the library. However, it is likely to be an intermittent internet access. Therefore, the free and reliable internet access should be provided.
- It is needed a plan to get sufficient water in toilets. Some damaged toilet doors should also be repaired and the regular toilet cleaning activities should be carried out so that the students can use the clean toilets.
- The places to take a rest for students should be provided more than the present situation.
- Adequate water should be provided for the students to drink and for other utilization. It is also needed to provide more places to get water.
- More sport areas for students should be arranged. More places and devices should be provided. Sport hall should be modified and it is also necessary to plan for different kinds of sports for the students.
- Seating capacity should be increased in the canteen.
- More clean and fresh food should be provided in canteen.
- The damaged fans in the classrooms should be repaired and enough number of fans should be provided.
- Some unwanted grasses in the campus are needed to cut and the waste materials should be kept systematically.
- Adequate devices (e.g. projectors) should be provided in the classrooms for applying the technology in teaching and learning process.
- Lessons of computer class should be taught systematically and effectively. Adequate number of computers should also be provided in the computer classes.
- Services of staff from the student service centre and the library should be provided well. They should also have willingness to give service and there should have good relationship with students.

### **Need for Further Research**

This study had got only the voice of students. The further study could select the administrators and different staff of the university as the participants in order to get more reasonable results. The further study could find the relationship between the satisfaction level and other dimensions such as commitment of students, grade points, etc.

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## Relationship between Instructional Leadership Practices and Teacher Efficacy

Ei Ei Lin<sup>1</sup> & Cho Cho Sett<sup>2</sup>

### Abstract

The main aim of this research is to study principals' instructional leadership practices and teacher efficacy and the specific aims of this research are to study principals' instructional leadership practices in Basic Education High Schools, to study the differences of teachers' perceptions on their principals' instructional leadership practices among schools, to study the level of teacher efficacy in teaching in Basic Education High Schools, to study the variations on teacher efficacy in terms of personal factors such as position, teaching service and qualification and to examine the relationship between principals' instructional leadership practices and teacher efficacy.

Quantitative and qualitative methods were used in this study. A total of two hundred and fifty nine teachers were selected as subjects from four Basic Education High Schools in Mudon Township, using the stratified random sampling method. This questionnaire included demographic data, principals' instructional leadership practices items and teacher efficacy items. Instrument was reviewed by a panel of experts. The Cronbach's alpha ( $\alpha$ ) of overall principals' instructional leadership practices was .89 and teacher efficacy was .83. Descriptive, one-way ANOVA, Pearson product moment correlation were used to analysis the data in this study. Open-ended and interview questions were conducted.

Principals were often performed in this study (mean=3.13, SD=.42). There were significant differences on principals' instructional leadership practices among schools. The level of teacher efficacy was high (mean=3.64, SD=.36). There was no significant differences on teacher efficacy scores among teachers grouped by teaching service. There were significant variations in the level of perceived teacher efficacy among teachers grouped by position and qualification. There were an association between principals' instructional leadership practices and teacher efficacy. ( $r=0.514$ ,  $p<0.01$ ). Information from open-ended questions and interview from teachers were complementary to each other.

**Keywords:** Instructional Leadership, Teacher Efficacy

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## **Introduction**

A society without effective teachers does not bear thinking about. Teachers educate and mold the minds of the younger generation and prepare them to be contributing citizens to their specific communities. Teachers are expected to face challenges relating to the student differences in each classroom, the range of ability levels, behaviors and the values surrounding the educational environment. These challenges and obstacles can overwhelm and defeat most teachers who have high efficacy.

Teacher efficacy is defined as teachers' beliefs in their abilities to organize and execute courses of action necessary to bring about desired results (Tschannen-Moran, Woolfolk-Hoy, & Hoy 1998). Teacher efficacy has been found to be one of the important variables consistently related to positive teaching behavior and student outcomes (Henson, 2001).

The principal as an instructional leader appears throughout literature as one of the most common characteristics of effective schools. Effective instructional leaders impact on student achievement, teacher attitudes, student behavior, and community support. The term instructional leadership is defined as actions leaders take to improve teaching and learning (King, 2002).

Ebmeier (2003) used path modeling derived from Tschannen-Moran et al. (1998) and showed that school principals play an important role in the development of teacher efficacy.

## **Importance of the Study**

Student success depends on effective teachers (Ashton & Webb, 1986). Teacher efficacy has been linked to teacher retention (Brown & Wynn, 2009) and student performance (Ashton & Webb, 1986). The high and low efficacy effect predicts the individual's performance level, whether he or she will be persistent or surrender all efforts (Barkley, 2006). High efficacy teachers confront educational challenges and willingly experiment with newly developed teaching strategies while low efficacy teachers view strategies, such as differentiation, as an unmanageable challenge.

McEwan (2002) theorized that the capacity to ascertain and cultivate effective teachers is a prerequisite for the instructional leader. Principals face many daily challenges and responsibilities as they strive to effectively manage their schools and enhance student achievement. Their time is taxed

by important leadership responsibilities and excessive management demands. They must make wise choices as to how to spend their valuable time more efficiently. It is important for principals to understand the relationships between what they do and its impact on teachers' work and teacher efficacy (Hipp, 1995). Principals, as leaders of the school and the gatekeepers for performance standards, need to understand teacher efficacy and the influence administrators have on teacher efficacy.

For above reasons, I chose to focus on principals' instructional leadership practices and teacher efficacy in this study.

## **Aims of the Study**

### **Main Aim**

The main aim of this study is to study relationship between principals' instructional leadership practices and teacher efficacy.

### **Specific Aims**

1. To study principals' instructional leadership practices in Basic Education High Schools
2. To study the differences of teachers' perceptions on their principals' instructional leadership practices
3. To study the level of teacher efficacy in teaching in Basic Education High Schools
4. To study the variations on teacher efficacy in terms of personal factors such as position, teaching services and qualification
5. To examine the relationship between principals' instructional leadership practices and teacher efficacy

### **Research Questions**

1. To what extent do teachers perceive principals' instructional leadership practices in Basic Education High Schools?
2. Are there any significant differences of teachers' perceptions on their principals' instructional leadership practices among schools?
3. To what extent do teachers perceive levels of their efficacy in teaching in Basic Education High Schools?
4. Are there any significant differences in teacher efficacy in terms of personal factors such as position, teaching service and qualification?

5. Is there any relationship between principals' instructional leadership practices and teacher efficacy?

### **Theoretical Framework**

In this study, principals' instructional leadership practices were based on Frame the school goals, Communicate the school goals, Supervise and evaluate instruction, Coordinate the curriculum, Monitor student progress, Protect instructional time, Provide incentives for learning, Provide incentives for teachers, Promote professional development and Maintain high visibility. Teachers' Efficacy was based on student engagement, instructional strategies and classroom management.

### **Instructional Leadership**

A model (Hallinger and Murphy, 1985) focused on "three dimensions for the instructional leadership role of the principal: defining the school mission, managing the instructional program and creating a positive school climate. Defining the school mission included: frame school goals and communicate these goals to the staff and community. Managing instructional program included: supervise and evaluate instruction, coordinate the curriculum, monitor student progress. Creating a positive school climate contained: protect instructional time, promote professional development, maintain high visibility, provide incentives for teachers and provide incentives for learning. (Hallinger, 2009).

### **Teacher Efficacy**

Using the wealth of information about the construct of teacher efficacy, Tschannen-Moran et al. (1998) recognized the need to make sense of the work already published. The Tschannen-Moran model of teacher efficacy has three components: efficacy in student engagement, efficacy in instructional strategies, and efficacy in classroom management.

### **Methodology**

Both quantitative and qualitative research methods were used to collect the required data in this study.

## Sample

As focused on the stratified random sampling method, among seven Basic Education High Schools in Mudon Township, Mon State, four Basic Education High Schools under the criteria for inclusion in this study. Data were collected from 159 teachers from these four high schools.

## Instrumentation

There were four parts in the questionnaire. The first one was to collect the demographic information regarding gender, age, position, teaching service and qualification and the questionnaire of Principals' Instructional Leadership Practices (PILPQ). The PILPQ consists of 5 items for Frame the school goals, 5 items for Communicate the school goals, 5 items for Supervise and evaluate instruction, 5 items for Coordinate the curriculum, 5 items for Monitor student progress, 5 items for Protect instructional time, 5 items for Provide incentives for learning, 5 items for Provide incentives for teachers, 5 items for Promote professional development and 5 items for Maintain high visibility. The teachers were asked to respond to the questionnaire items through the use of four-point Likert-type scale (1. never, 3. sometimes, 4. often, 5. always).

The second was the questionnaire of teacher efficacy. There are 16 items in Teacher Efficacy Questionnaire (TEQ): 6 items for student engagement, 5 items for instructional strategies and 5 items for classroom management. The teachers were asked to respond to the questionnaire items through the use of four-point Likert-type scale (1=not truly believe, 2=little believe, 3=somewhat believe, and 4=truly believe).

The third was three open-ended questionnaire about principals' instructional leadership practices and teacher efficacy.

The last one was six interview questions for principals' instructional leadership practices and teacher efficacy.

***Instrument Validity:*** In order to obtain the content validity for Principals' Instructional Leadership Practices Questionnaire and Teacher Efficacy, expert review was conducted to nine experienced educators, who have sound knowledge and close relationship with this area, from Department of Educational Theory, Yangon University of Education.

***Instrument Reliability:*** The modified instrument was used to find out the reliability in the pilot study. To test the reliability of these questionnaires,

the Cronbach's alpha was used. The internal consistency ( $\alpha$ ) of the whole scales of Principals' Instructional Leadership Practices was 0.89. The internal consistency ( $\alpha$ ) of the whole scales of Teacher Efficacy was 0.83.

### **Procedure**

After obtaining the permission from Department of Educational Theory to do research in Basic Education High Schools of Mudon Township, Mon State, the questionnaires were distributed to the respondents in the selected schools on 16<sup>th</sup> October, 2018. The respondent rate was 100 %.

### **Data Analysis**

In quantitative analysis, the Statistical Package for Social Science (SPSS) software version 25 was used to analyze the collected data. The descriptive statistics were used to calculate mean and standard deviation of individual items and group of items in the questionnaire. One-Way ANOVA was used to describe principals' instructional leadership practices among schools and the level of teacher efficacy by position, teaching service and qualification. Pearson correlation was used to find the relationship between principals' instructional leadership practices and teacher efficacy.

## **Findings**

### **Quantitative Findings**

#### **Instructional Leadership Practices of Principals Perceived by Teachers in Basic Education High Schools**

Data on instructional leadership practices of principals in Basic Education High Schools, Mudon Township, Mon State were collected from the teachers' responses of each school to the principals' instructional leadership practices questionnaire.

Table 1. Mean Values and Standard Deviations for Teachers' Perceptions on Principals' Instructional Leadership Practices in the Selected Basic Education High Schools (N=159)

No.	Dimensions of Principals' Instructional Leadership Practices	Mean	SD	Remark
1	Frame the school goals	3.42	.65	Often
2	Communicate the school goals	3.42	.52	Often
3	Supervise and evaluate instruction	3.10	.56	Often
4	Coordinate the curriculum	3.20	.56	Often
5	Monitor student progress	3.12	.51	Often
6	Protect instructional time	2.76	.45	Often
7	Provide incentives for teachers	2.80	.78	Often
8	Provide incentives for learning	3.52	.55	Always
9	Promote professional development	3.11	.57	Often
10	Maintain high visibility	2.89	.53	Often
	Overall Principals' Instructional Leadership Practices	3.13	.42	Often

Scoring Direction: 1.00-1.49=Never      1.50-2.49=Sometimes,  
2.50-3.49=Often,      3.50-4.00=Always

According to Table 1, overall mean value of principals' instructional leadership practices was 3.13. This mean value indicated that the principals of the selected schools **often** performed principals' instructional leadership practices.

### Comparison of Principals' Instructional Leadership Practices Grouped by Schools

Table 2. Mean Values and Standard Deviations for Teachers' Perceptions on Principals' Instructional Leadership Practices Grouped by Schools (N=159)

No.	School	Mean	SD	Remark
1	School A	3.11	.35	Often
2	School B	3.27	.34	Often
3	School C	2.88	.50	Often
4	School D	3.34	.32	Often

Scoring Direction: 1.00-1.49=Never, 1.50-2.49=Sometimes,  
2.50-3.49=Often, 3.50-4.00=Always

According to Table 2, the mean values of School A was 3.11, School B was 3.27, School C was 2.88 and School D was 3.34 respectively.

Table 3. The ANOVA Results of Teachers' Perceptions on Principals' Instructional Leadership Practices Grouped by Schools

No.	Dimensions of Principals' Instructional leadership Practices		Sum of Square	df	Mean Square	F	p
1	Frame the school goals	Between Groups	8.404	3	2.801	7.357	.000***
		Within Groups	59.020	155	.381		
		Total	67.423	158			
2	Communicate the school goals	Between Groups	11.648	3	3.883	19.309	.000***
		Within Groups	31.167	155	.201		

No.	Dimensions of Principals' Instructional leadership Practices		Sum of Square	df	Mean Square	F	p
		Total	42.816	158			
3	Supervise and evaluate instruction	Between Groups	8.922	3	2.974	11.180	.000***
		Within Groups	41.228	155	.266		
		Total	50.150	158			
4	Coordinate the curriculum	Between Groups	6.480	3	2.160	7.637	.000***
		Within Groups	43.839	155	.283		
		Total	50.319	158			
5	Monitor student progress	Between Groups	5.303	3	1.768	7.614	.000***
		Within Groups	35.986	155	.232		
		Total	41.290	158			
6	Protect instructional time	Between Groups	.638	3	.213	1.042	.376(ns)
		Within Groups	31.616	155	.204		
		Total	32.254	158			
7	Provide incentives for teachers	Between Groups	6.097	3	2.032	3.543	.016*
		Within Groups	88.903	155	.574		
		Total	95.000	158			

No.	Dimensions of Principals' Instructional leadership Practices		Sum of Square	df	Mean Square	F	p
8	Provide incentives for learning	Between Groups	6.215	3	2.072	7.867	.000***
		Within Groups	40.818	155	.263		
		Total	47.033	158			
9	Promote professional development	Between Groups	4.489	3	1.496	4.892	.003**
		Within Groups	47.410	155	.306		
		Total	51.899	158			
10	Maintain high visibility	Between Groups	3.547	3	1.182	4.560	.004**
		Within Groups	40.192	155	.259		
		Total	43.739	158			
	Overall Principals' Instructional Leadership Practices	Between Groups	4.451	3	1.484	9.970	0.000***
		Within Groups	23.068	155	.149		
		Total	27.520	158			

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < 0.001$  at significant level and *ns* = no significance

According to the Table 3, there were significant differences in Frame the school goals ( $df=3$ ,  $F=7.357$ ,  $p < 0.001$ ), Communicate the school goals ( $df=3$ ,  $F=19.309$ ,  $p < 0.001$ ), Supervise and evaluate instruction ( $df=3$ ,  $F=11.180$ ,  $p < 0.001$ ), Coordinate the curriculum ( $df=3$ ,  $F=7.367$ ,  $p < 0.001$ ), Monitor student progress ( $df=3$ ,  $F=7.614$ ,  $p < 0.001$ ), Provide incentives for teachers ( $df=3$ ,  $F=3.543$ ,  $p < 0.05$ ), Provide incentives for learning ( $df=3$ ,

$F=7.867$ ,  $p<0.001$ ), Promote professional development ( $df=3$ ,  $F=4.892$ ,  $p<0.01$ ) and Maintain high visibility ( $df=3$ ,  $F=11.180$ ,  $p<0.01$ ) respectively.

Table 4. The Results of Tukey HSD Multiple Comparisons of Teachers' Perceptions on Principals' Instructional Leadership Practices Grouped by Schools

No.	Dimensions of Principals' Instructional Leadership Practices	(I) Principals' Instructional Leadership Practices	(J) Principals' Instructional Leadership Practices	Mean Difference (I-J)	P
1	Frame the school goals	A	C	.36491*	.025*
		C	D	-.66671*	.000***
2	Communicate the school goals	A	C	.48825*	.000***
		B	C	.75658*	.000***
		C	D	-.65861*	.000***
3	Supervise and evaluate instruction	A	C	.44474*	.000***
		B	C	.48640*	.002**
		C	D	-.66230*	.000***
4	Coordinate the curriculum	A	D	-.42396*	.001**
		B	C	.37807*	.036*
		C	D	-.49203*	.001**
5	Monitor student progress	A	C	.30842*	.013*
		B	C	.56842*	.000***
		C	D	-.36842*	.006**
6	Provide incentives for teachers	A	D	-.50387*	.009**
7	Provide	A	C	.34526*	.008**

No.	Dimensions of Principals' Instructional Leadership Practices	(I) Principals' Instructional Leadership Practices	(J) Principals' Instructional Leadership Practices	Mean Difference (I-J)	P
	incentives for learning	B	C	.49693*	.002**
		C	D	-.52418*	.000***
8	Promote professional development	B	C	.48991*	.005**
		C	D	-.38023*	.018*
9	Maintain high visibility	A	D	-.28387*	.042*
		C	D	-.42475*	.002**
10	Overall Principals' Instructional Leadership Practices	A	C	.23104*	.023*
		B	C	.38404*	.001**
		C	D	-.45953*	.000***

\*p<.05, \*\*p<.01, \*\*\*p<0.001 at significant level

According to Table 4, School A was significantly different from School C in Frame the school goals, Communicate the school goals, Supervise and evaluate instruction, Monitor student progress and Provide incentives for Learning. Moreover, School A was significantly different from School D in Coordinate the curriculum, Provide incentives for teachers and Maintain High Visibility. School B was significant different from School C in Coordinate the curriculum, Supervise and evaluate instruction, Coordinate the curriculum, Monitor student progress, Provide incentives for learning and Promote professional development. School C was significantly different from School D in Frame the school goals, Communicate the school goals, Supervise and evaluate instruction, Coordinate the curriculum, Monitor student progress, Provide incentives for learning, Promote professional development and Maintain high visibility. In overall instructional leadership practices, School A was significantly different from School C, School B was significantly different from School C and School C was significantly different from School D.

### The Level of Teacher Efficacy in Basic Education High Schools

Table 5. Mean Values and Standard Deviations for the Level of Teacher Efficacy in the Selected Basic Education High Schools (N=159)

No.	Dimensions of Teacher Efficacy	Mean	SD	Level of Teacher Efficacy
1	Student engagement	3.50	.44	High
2	Instructional strategies	3.71	.40	High
3	Classroom management	3.73	.39	High
	Overall Teacher Efficacy	3.64	.36	High

Scoring Direction: 1.00-1.49 = Low, 2.50-3.49 = Moderately high,  
1.50-2.49 = Moderately low, 3.50-4.00 = High

According to Table 5, the mean value of student engagement was 3.50, instructional strategies was 3.71 and classroom management was 3.73. The overall mean value of teacher efficacy was 3.64 that showed that the level of teacher efficacy in the selected Basic Education High Schools in this study was high.

Table 6. Overall Mean Values and Standard Deviations of the Level of Teacher Efficacy Grouped by Position (N=240)

No.	Position	Mean	SD	Level of Teacher Efficacy
1	PT	3.43	.40	Moderately high
2	JT	3.67	.36	High
3	ST	3.68	.41	High

Scoring Direction: 1.00-1.49 = Low, 2.50-3.49 = Moderately high,  
1.50-2.49 = Moderately low, 3.50-4.00 = High

According to Table 6, Teacher efficacy mean value of the group of senior teachers ( $M=3.68$ ) was the highest and teacher efficacy mean value of the group of primary teachers ( $M=3.43$ ) was the lowest.

Table 7. The ANOVA Results for the Level of Teachers Efficacy Grouped by Position

No.	Dimensions of Teacher Efficacy		Sum of Square	df	Mean Square	F	p
1	Student engagement	Between Groups	1.274	2	.637	3.369	.037*
		Within Groups	29.503	156	.189		
		Total	30.777	158			
2	Instructional strategies	Between Groups	.857	2	.429	2.697	.071(ns)
		Within Groups	24.794	156	.159		
		Total	25.652	158			
3	Classroom management	Between Groups	1.424	2	.712	4.833	.009**
		Within Groups	22.987	156	.147		
		Total	24.411	158			
	Overall Teacher Efficacy	Between Groups	.980	2	.490	3.923	.022*
		Within Groups	19.489	156	.125		
		Total	20.470	158			

\* $p < .05$ , \*\* $p < .01$  at significant level and *ns* = no significance

According to Table 7, there were statistically significant differences in the perceived level of overall teacher efficacy ( $df=2$ ,  $F=3.923$ ,  $p < .05$ ) and teacher efficacy regarding as student engagement ( $df=2$ ,  $F=3.369$ ,  $p < .05$ ), classroom management ( $df=2$ ,  $F=4.833$ ,  $p < .01$ ) among teachers grouped by position.

Table 8. The Tukey HSD Multiple Comparison Results for the Level of Teacher Efficacy Grouped by Position

No.	Dimensions of Teacher Efficacy	(I) Position	(J) Position	Mean Difference(I-J)	<i>p</i>
1	Student engagement	PT	JT	-.28246*	.029*
2	Classroom management	PT	JT	-.29684*	.007**
			ST	-.27743*	.025*
	Overall Teacher Efficacy	PT	JT	-.23942*	.021*
			ST	-.24698*	.031*

\* $p < .05$ , \*\* $p < .01$  at significant level

According to Table 8, PT was significantly different from JT in the perceived level of teacher efficacy regarding as student engagement and classroom management overall teacher efficacy. Moreover, PT was significantly different from ST in the perceived level of teacher efficacy regarding as classroom management and overall teacher efficacy.

### Mean Values and Standard Deviations of the Level of Teacher Efficacy Grouped by Teaching Service

Table 9. Overall Mean Values and Standard Deviations of the Level of Teacher Efficacy Grouped by Teaching Service (N=240)

No.	Teaching Service	Mean	SD	Level of Teacher Efficacy
1	1-10 years	3.66	.28	High
2	11-20 years	3.67	.39	High
3	21-30 years	3.63	.36	High
4	31 and above years	3.37	.71	Moderately High

Scoring Direction: 1.00-1.49 = Low, 2.50-3.49 = Moderately high,  
1.50-2.49 = Moderately low, 3.50-4.00 = High

According to Table 9, Teacher efficacy mean value of the teachers who had (11-20) years of service ( $M=3.67$ ) was the highest and teacher

efficacy mean value of the group of teachers who had (31 and above) years of service ( $M=3.37$ ) was the lowest.

Table 10. The ANOVA Results for the Level of Teachers Efficacy Grouped by Teaching Service

No.	Dimensions of Teacher Efficacy		Sum of Square	df	Mean Square	F	p
1	Student engagement	Between Groups	.505	3	.168	.861	.463(ns)
		Within Groups	30.273	155	.195		
		Total	30.777	158			
2	Instructional strategies	Between Groups	.705	3	.235	1.459	.228(ns)
		Within Groups	24.947	155	.161		
		Total	25.652	158			
3	Classroom management	Between Groups	.475	3	.158	1.026	.383(ns)
		Within Groups	23.936	155	.154		
		Total	24.411	158			
	Overall Teacher Efficacy	Between Groups	.500	3	.167	1.295	.278(ns)
		Within Groups	19.969	155	.129		
		Total	20.470	158			

ns= no significance

According to the data presented in Table 10, it was found that there were no significant differences in all dimensions of teachers' perceptions on teacher efficacy grouped by teaching service.

Table 11. Mean Values and Standard Deviations of the Level of Teacher Efficacy Grouped by Qualification

No.	Qualification	Mean	SD	Level of Teacher Efficacy
1	BA	3.73	.26	High
2	BSc	3.51	.45	High
3	BEEd	3.69	.32	High

Scoring Direction: 1.00-1.49 = Low, 2.50-3.49 = Moderately high, 1.50-2.49 = Moderately low, 3.50-4.00 = High

According to Table 11, Teacher efficacy mean values of the groups of teachers who had BA, BSc and BEEd were 3.73, 3.51 and 3.69 respectively.

Table 12. The ANOVA Results for the Level of Teachers Efficacy Grouped by Qualification

No.	Dimensions of Teacher Efficacy		Sum of Square	df	Mean Square	F	p
1	Student engagement	Between Groups	1.248	2	.624	3.298	.040*
		Within Groups	29.529	156	.189		
		Total	30.777	158			
2	Instructional strategies	Between Groups	1.966	2	.983	6.475	.002*
		Within Groups	23.686	156	.152		
		Total	25.652	158			
3	Classroom management	Between Groups	.892	2	.446	2.957	.055 (ns)
		Within Groups	23.519	156	.151		
		Total	24.411	158			

No.	Dimensions of Teacher Efficacy		Sum of Square	df	Mean Square	F	p
	Overall Teacher Efficacy	Between Groups	1.298	2	.649	5.281	.006**
		Within Groups	19.171	156	.123		
		Total	20.470	158			

\* $p < .05$ , \*\* $p < .01$  at significant level and *ns* = no significance

According to Table 12, there were statistically significant differences in the perceived level of overall teacher efficacy ( $df=2$ ,  $F=5.281$ ,  $p < .05$ ) and teacher efficacy regarding as student engagement ( $df=2$ ,  $F=3.298$ ,  $p < .05$ ), instructional strategies was ( $df=2$ ,  $F=6.475$ ,  $p < .01$ ) among teachers grouped by qualification.

Table 13. The Tukey HSD Multiple Comparison Results for the Level of Teacher Efficacy Grouped by Qualification

No.	Dimensions of Teacher Efficacy	(I) Qualification	(J) Qualification	Mean Difference(I-J)	p
1	Student engagement	BA	BSc	.23556*	.036*
2	Instructional strategies	BA	BSc	.24781*	.011*
		BSc	BA	-.24781*	.011*
			BEd	-.23916*	.003**
	Overall Teacher Efficacy	BA	BSc	.22048*	.012*
		BSc	BA	-.22048*	.012*
			BEd	-.17966*	.018*

\* $p < .05$ , \*\* $p < .01$  at significant level

According to Table 13, teachers who had qualification of BA was significantly different from teachers who had qualification of BSc in the perceived level of teacher efficacy regarding as student engagement, instructional strategies and overall teacher efficacy. Teachers who had

qualification of BSc was significantly different from teachers who had qualification of BEd in the perceived level of teacher efficacy regarding as instructional strategies and overall teacher efficacy.

Table 14. Pearson Correlation Matrix between Principals' Instructional Leadership Practices and Teachers Efficacy

<b>Two Groups</b>	<b>Principals' Instructional Leadership Practices</b>	<b>Teacher Efficacy</b>
Principals' Instructional Leadership Practices	1	.514**
Teacher Efficacy	.514**	1

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

As shown in Table 14, overall principals' instructional leadership practices was positively and moderately correlated with teacher efficacy. Overall principals' instructional leadership practices was correlated teacher efficacy at  $r=.514$ .

### **Qualitative Findings**

In the qualitative study, three open-ended questions and six interview questions were used.

In open-ended question (1), teachers' perceptions on principals' implementing the school mission, 89% of teachers (n=143) answered their principals implemented the school mission and 59% of teachers (n=94) mostly reported that their principals set the school missions and implemented the setting goals with extra teaching time for daily/ every weekend/ night study. In open-ended question (2) teachers' perceptions on their principals' performing to develop a positive school learning climate, 91% of teachers (n=145) answered their principals performed positive school climate and 42% of teachers (n=66) mostly reported that their principals supported teaching aids and necessary documents. In open-ended question (3) teachers' beliefs to do to interest their students in learning, 94% of teachers (n=150) answered they believed and 43% of teachers (n=68) mostly stated that they could teach students to interest in learning by using with teaching aids.

In the interview, principals' defining the school mission, the teachers responded that the principals set the school mission by meeting and discussion and then implemented by extra teaching time in Grade 8, 9 and 10. In the interview, principals' managing instructional program, the teachers responded that the principals regularly discussed with the teachers, sometimes visited the classroom and observed teaching and learning, organized the discussion of the subject committee and discussed teaching strategies and gave completely the books related with academic subjects. In the interview, principals' creating positive school climate, the teachers responded that the principals attended and participated in school co-curricular activities, discussed with the teachers for instructional matters, supported teaching aids, journals, old question books and necessary documents, presented the outstanding students and teachers with rewards and sometimes visited the classroom to discuss instructional matters. In the interview, teacher efficacy regarding student engagement, the teachers responded that 25% of teachers little believed and 75% of teachers truly believed the students to engage in their teaching. In the interview, teacher efficacy regarding instructional strategies, the teachers could use question and answer method, discussion method, observation method, child centered method and teach the students who are weak in learning by repeating until they understood the lesson clearly. In the interview, teacher efficacy regarding classroom management, the teachers responded that they thought they were good at classroom management by controlling classroom disciplines/ with eyes.

### **Conclusion**

This study is aimed to study principals' instructional leadership practices and teacher efficacy in Basic Education High Schools.

### **Discussion**

This study is focused on principals' instructional leadership practices regarding Frame the school goal, Communicate the school goal, Supervise and evaluate instruction, Coordinate the curriculum, Monitor student progress, Protect instructional time, Provide incentives for learning, Provide incentives for teachers, Promote professional development and Maintain high visibility and teacher efficacy regarding student engagement, instructional strategies and classroom management.

According to the quantitative findings for teachers' perceptions on principals' instructional leadership practices of four schools (School A, B, C and D), overall mean values was 3.13. That is, the responses of teachers indicated that principals often performed instructional leadership practices as a school leader. Through open-ended questions and the interview with teachers, the teachers responded that the principals often performed in defining the school mission, managing instructional program and creating positive school climate.

According to the quantitative findings for teachers' perceptions on principals' instructional leadership practices among schools, the mean values of School A, B, C and D were 3.11, 3.27, 2.88 and 3.34 respectively. It seems that the principal from School C performed slightly lower than the principals from School A, School B and School D. It can be that the principal from School C was weak in having knowledge and skills of instructional leadership when comparing with other schools. According to interview, teachers from school C responded that their principal was weak in supervising and evaluating instruction and providing incentives for teachers and the teachers from school B responded that their principal performed those practices. So, in qualitative finding, teachers' opinions were consistent to quantitative findings.

According to the quantitative findings for the level of teacher efficacy, overall mean value of teacher efficacy was 3.64. That is, the level of teacher efficacy was high.

According to quantitative findings of the level of teacher efficacy by personal factors, the group of primary teachers had moderately high level of teacher efficacy and other groups had high level of teacher efficacy. The findings revealed that the group of primary teachers seemed to have less efficacy in their daily practices than other groups of teachers. Goddard and Goddard (2001) stated that the teachers' beliefs about individual efficacy was enhanced by the teachers' beliefs about the collective efficacy of school organization. Through interview, it was found that junior and senior teachers were had collective efficacy by discussing and sharing beliefs for improving student achievement in Grade 8, Grade 9 and Grade 10. It was not found in primary teachers to be got collective efficacy of school organization. Moreover, it seems that the higher position the teacher got, the more efficacy the teachers had.

The group of teachers who had (31 and above) years of service had moderately high level of teacher efficacy and the other groups had high level of teacher efficacy. It was found that teachers who had (31 and above) years of service seemed to have less efficacy than other groups of teachers. It can be like that older teachers were weak in interesting into the school because of their ages. But Rew (2013) stated that teachers with more than five years of teaching experience had significantly higher self-efficacy than their colleagues who had teaching experience of five years or less.

The group of teachers who got BA degree, BSc degree and BEd degree had high level of teacher efficacy. Teacher efficacy mean values of the groups of teachers who got BA, BSc and BEd were 3.73, 3.51 and 3.69 respectively. It was found that teachers who got BA degree had more slightly teacher efficacy than other groups of teachers. It can be that teachers who got BA degree discussed in the subject committee and shared their beliefs regularly.

According to the findings, principals' instructional leadership practices was correlated with teacher efficacy. It was found that overall principals' instructional leadership practices was positively and moderately correlated with teacher efficacy. The finding supported Rew (2013) found that instructional leadership practices had statistically significant relations with teacher efficacy belief.

## **Recommendations**

After teachers' perceptions on principals' instructional leadership practices and teacher efficacy are analyzed, some practices and the level of teacher efficacy were lower mean values when comparing to the other practices and efficacy. Principals' instructional leadership practices regarding Protect instructional time, Provide incentives for teachers and Maintain high visibility were lower mean values than other practices and teacher efficacy regarding student engagement and instructional strategies were lower mean values than efficacy regarding classroom management. The following are recommendations based on those practices and efficacy.

- For protecting instructional time, the principals should greater protect instructional time by encouraging teachers to use instructional time for teaching and practicing new skills and concepts and by the time allocated for teaching and reducing

speeches and meeting that could waste the time. The principal should tell truant students about the consequences for missing instructional time.

- For providing incentives for teachers, the principals should greater provide incentives for teachers by reward program. The principals should motivate the outstanding teachers.
- For maintaining high visibility, the principals should have greater visibility by visiting the classrooms and discussing with the teachers and students the school issues in the break by establishing involvement with them. The principals should attend or participate co-curricular activities.
- For student engagement, the teachers should have the beliefs that they are willing to do to engage students and motivate students to interest in learning.
- For instructional strategies, the teachers should have the beliefs that they master in teaching by their teaching subjects and teaching methods and craft good questions for their students.
- The teachers should be provided by professional development to have high efficacy.

### **Need for Further Study**

Further studies should be made not only for primary and middle schools in the same townships but also for the schools in other townships, states or regions. In the future, if the research methods can include field observation, the data obtained will be more diversified.

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## **A Study of Teachers' Knowledge and Practices on Primary Mathematics Teaching**

Pyae Phyoo Khin<sup>1</sup>, Cho Cho Sett<sup>2</sup> & Zin Nwe Than<sup>3</sup>

### **Abstract**

The objectives of this study are to investigate the levels of teachers' knowledge on primary mathematics teaching and to study the teachers' practices on primary mathematics teaching concerning mathematical process skills. Quantitative and qualitative methods were adopted in this study. Five hundred teachers were selected as subjects from ninety-two schools in YCDA by using the proportional stratified sampling. Instrument was reviewed by a panel of expert. The internal consistency (Cronbach's alpha) of teachers' practices, and knowledge concerning primary mathematics teaching were 0.85, and 0.72 respectively. Descriptive statistics, Item Percent Correct (IPC) were employed to analyze the data in quantitative study. Observation was used for qualitative study. Most of the teachers had satisfactory level of knowledge about how children learn and mathematical process skills. Teachers often practiced primary mathematics teaching concerning mathematical process skills.

**Keyword:** Primary mathematics teaching

### **Introduction**

Mathematics is a core skill for all adult in life and makes an essential contribution to a good rounded education. A mathematically well population will contribute to country's economic prosperity (ACME, 2011a; Vorderman et al., 2011, cited in Joubert, 2013). Therefore, mathematics teaching is vital role in education. Some students in Myanmar have low concept concerning mathematics and are weak in connecting mathematics with daily life. So, it is urgently important to become effective mathematics teaching practices of teachers.

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## **Objectives**

- To investigate the levels of teachers' knowledge on primary mathematics teaching
- To study the teachers' practices on primary mathematics teaching concerning mathematical process skills

## **Research Questions**

- What are the levels of teachers' knowledge on primary mathematics teaching?
- To what extent do teachers practice on primary mathematics teaching concerning mathematical process skills?

## **Definition of Key Term**

Primary mathematics teaching is the process to acquire mathematical concepts and skills such as problem solving, reasoning, communication, representation, and connection through mathematical approaches.

## **Theoretical Framework of the Study**

The following theoretical framework leads to the research work.

### **Problem Solving**

Problem solving is the process of applying previously acquired knowledge in new and unfamiliar situations (Scusa, 2008). There are four steps to become successful problem solving. They are understanding the problem, devising the plan, carrying out the plan, and looking back.

Students are given opportunities to conjecture, test these conjectures and prove or reason to think mathematically. This is the process of reasoning and proof. Mathematical reasoning refers to the ability to analyse mathematical situations and construct logical arguments. Classifying, comparing, sequencing, analysing parts and wholes, identifying patterns and relationships, induction, deduction and spatial visualization are used to improve reasoning skill.

Communication is the process of expressing mathematical ideas and understanding orally, visually, and in writing, using numbers, symbols, pictures, graphs, diagrams, and words (Wichelt, 2009).

Students are given opportunities to represent mathematical ideas and relationships and model situations using concrete materials, pictures, diagrams, graphs, tables, numbers, words, and symbols. Students need practice in presenting and defending their answers and repeated chances to show what they are thinking and how the problem was solved to improve representation.

Experiences that allow students to make connections how concepts and skills from one strand of mathematics are related to those from another to grasp general mathematical principles. Seeing the relationships among procedures and concepts also helps develop mathematical understanding. Teachers explain connections between the mathematics students learn at school and its applications in their everyday lives not only helps them understand mathematics but also allows them to see how useful and relevant it is in the world beyond the classroom.

## **Methodology**

### **Research Method**

Both quantitative and qualitative methods were used in this study.

### **Sample**

The sample was consisted of 92 schools from YCDA. In addition, 500 teachers from selected schools in YCDA were chosen by using proportional stratified sampling method. So, teacher sample included 82 (16.3%) teachers from high school level, 100 (20%) teachers from middle school level, and 318 (63.7%) teachers from primary school level. Purposive sampling method is used in qualitative study.

### **Instruments**

This knowledge questionnaire included 10 true / false items relating to knowledge on how children learn, 15 multiple choice items, and 9 matching items related to mathematical process skills. The other is mathematics teaching practices of teachers. There are 20 items (five point Likert-type) relating to teaching practices on mathematical process skills. The internal consistency (Cronbach's alpha) were 0.85 for the questionnaire

to explore teachers' knowledge and 0.72 for the questionnaire of teachers' teaching practices. Observation checklist was used for qualitative study.

## Procedures

In order to construct appropriate questionnaires concerning this study, the related literature was reviewed and analyzed. In addition, the researcher got some advice and guidance from 17 expert teachers who were experienced and well versed in this field. Pilot study was conducted on 12th July 2017 in 11 Basic Education Schools. After reviewing and modifying the items of questionnaires based on the responses of pilot test, questionnaires were distributed to the selected Basic Education Schools on 21st September, 2017.

## Data Analysis

Descriptive and Item Percent Correct (IPC) were used for quantitative data analysis.

## Findings

### Investigating Teachers' Knowledge for Primary Mathematics Teaching

The knowledge level of teachers on how children learn was identified as shown in Table 1.

Table 1. Knowledge Level of Teachers about How Children Learn  
(N=500)

Scoring Range	Frequency	Percentage	Remark
<50%	4	.8	Below Satisfactory Level
50%-74%	237	47.4	Satisfactory Level
≥75%	259	51.8	Above Satisfactory Level

<50%= Below satisfactory  
≥75%=Above satisfactory

50%-74%=Satisfactory

In Table 1, according to the scoring range, 4 (0.8%) of the teachers had below satisfactory level, 237 (47.4%) of the teachers were satisfactory level, and 295 (51.8%) possessed above satisfactory level.

Table 2. Knowledge Level of Teachers about Mathematical Process Skills  
(N=500)

Scoring Range	Frequency	Percent	Remark
<50%	184	36.8	Below Satisfactory Level
50%-74%	285	57.0	Satisfactory Level
≥75%	31	6.2	Above Satisfactory Level

<50%=low satisfactory

50%-74%= average satisfactory

≥75%=high satisfactory

In Table 2, according to the scoring range, 184 (36.8%) of the teachers had below satisfactory level, 285 (57%) of the teachers were satisfactory level, and 31 (6.2%) possessed above satisfactory level.

### Investigating Primary Mathematics Teaching Practices of Teachers

The descriptive statistics for mathematics teaching practices were presented in Table 3. Generally, as a mean score of mathematics teaching practices, teachers often practiced on primary mathematics teaching practice.

Table 3. Mean Values and Standard Deviations of Primary Mathematics Teaching Practices of Teachers  
(N=500)

No.	Items	Mean	D
1	Explaining students to understand the meaning of problem thoroughly	4.43	.88
2	Letting students to think the ways to solve mathematics problems	3.99	.88
3	Carrying out the problem based on relevant information	4.32	.94
4	Review the answer reasonably	3.96	1.01

No.	Items	Mean	D
5	Asking students about the questions that are related to predictions and conjecture	3.59	.88
6	Accepting students' predictions and conjecture	4.00	.94
7	Encouraging students to explain how to solve the problem and justify their solutions	3.55	.96
8	Teaching students by using inductive and deductive methods	3.46	.97
9	Teaching students mathematics connecting with other subjects	3.23	.99
10	Teaching lessons connecting to their everyday life	3.87	.92
11	Providing students to experience the interrelation of mathematical topics	4.06	.99
12	Asking students how can mathematics lessons be applied in their everyday life	3.26	.85
13	Using real objects and models in teaching mathematics	3.47	.99
14	Using teaching aids such as charts and geoboard in teaching mathematics	3.77	.94
15	Helping students to express their ideas by drawing or bar graph	3.11	.98
16	Explaining students by using bar graphs and pictures	3.43	1.02
17	Letting the students discuss as a group	3.46	.85
18	Allowing students to present their ideas openly	3.80	.95
19	Let the students read the problem and present it in their own words	4.00	.97
20	Providing opportunities to students for discussing logically in support of an idea	3.54	.86
	<b>Teaching Practices</b>	<b>3.72</b>	<b>.61</b>

1.00-1.49=never    1.50-2.49= seldom    2.50-3.49=sometime

3.50-4.49= often    4.50-5.00= always

## **Classroom Observations**

During the observation periods, teachers' approaches of mathematical process skills were observed thoroughly.

Most teachers used lecture method, questioning method, and discussion method. One teacher from Group A (high performance) and Group B (Low performance) used inductive method. It was found that teachers applied at least two teaching methods in their mathematics teaching.

Regarding problem solving, most of the teachers explained students to understand the meaning of the problem thoroughly. Among teachers, 50% (n=2) of teachers from Group A gave opportunity to students "Which method do they apply in solving the mathematics problems?" Regarding reasoning skill, only 50% (n=2) of teachers from Group A asked students to answer the questions using why and how. Regarding communication, most of the teachers read the problem clearly but 50% (n=2) of teachers from Group A let students read the problem. Among teachers, 25% (n=1) of teachers from Group A divided the class into small groups and let students discuss the lesson. However, almost all of the teachers from Group A and Group B asked questions to students and let students answer the questions. Regarding representation, 50% (n=2) of teachers from Group A and 50% (n=2) of teachers from Group B taught the lesson by drawing pictures and bar graph. Only 25% (n=1) of teachers used calendar as teaching aids. Regarding connection, all teachers connected the new lesson with previous lesson.

## **Conclusion**

### **Conclusion and Discussion**

One hundred and eighty-four (36.8%) of the teachers possessed below satisfactory level, two hundred and eighty-five (57.0%) of teachers possessed satisfactory level, and thirty-one (6.2%) had above satisfactory level of knowledge about mathematical process skills. Therefore, it can be concluded that most of the principals in this study had satisfactory level of knowledge about mathematical process skills. The mean value of primary mathematics teaching practices of teachers was 3.72. Therefore, their primary mathematics teaching practices were moderately high.

According to the investigation into the knowledge of teachers on how children learn, most of the teachers were above satisfactory level. It can be concluded that they have sufficient knowledge about how children learn. Moreover, this study also investigated knowledge level of teachers on mathematical process skills. Only 31 teachers had above satisfactory level and 184 out of 500 teachers had below satisfactory level. Interview and documentation revealed that board of study meeting was found of discussing exam result of students and official instructions by Township Education Office, and putting less emphasis on professional development activities. Therefore, creating opportunities for participating in workshops, seminar, lesson study, mentoring and coaching programs, and providing the requirements such as financial support and books and teaching learning materials concerning mathematics should be implemented so that teachers can improve pedagogical content knowledge for mathematical process skills. It would be better when these opportunities are arranged in school setting in order that teachers can grasp these chances without giving much time.

By focusing on mathematical process skills, teachers empower students mathematically (TIPS4RM, 2005). Similarly, findings from the questionnaire survey indicated that they often provided learning opportunities to promote mathematical process skills. In the observation, almost all teachers explain the problem thoroughly and connect the lesson with previous lessons. Group A teachers used a question and answer method and teaching aids. They model various ways to demonstrate understanding (talking, writing, graphing, explaining, questioning, and drawing). Virginia Department of Education (n.d) stated that checking answers to problems is an important practice for problem solving. Observation indicated that almost all teachers are weak in checking answers of the problems. Group B teachers were less emphasis on assigning student roles. Students were led by teachers in identifying strategies in solving the problems.

Hypothesizing/making conjectures, and making inferences, conclusions, and justifications are important student role in reasoning (TIPS4RM, 2005). In the light of classroom observation, a few teachers gave opportunities for making conjecture and justifications.

Make explicit links between mathematical concepts and skills and those in other disciplines is an important strategy for connecting

(TIPS4RM, 2005). It was found that all teachers were not very good at connecting mathematics with other subjects.

TIPS4RM (2005) stated that teachers give opportunities to select an appropriate representation and defend their choice and use kinesthetic movement. In the light of classroom observation, giving opportunities to select an appropriate representation and defend their choice and using kinesthetic movement was hardly found in their teaching practices.

Ministry of Education Science and Technology (2001) stated children will be at the stage of development where they will need to express their ideas verbally. The ability to listen and talk about mathematics is very vital in their learning and understanding of the subject. Group A teachers encourage students to present their ideas and solutions during group or class discussions.

The teachers responded that although they were interested in professional development activities, they had many workloads and put more emphasis on completion of the lesson in time. As a result, they do not have much time for professional development. Therefore, the principal as an instructional leader should arrange time for teachers' professional development, support books concerning mathematics, nature collaborative learning culture, and involve themselves in professional development activities.

### **Recommendations**

- Principals should actively lead school-based professional development for promoting primary mathematics teaching.
- Principals should recognize and praise teachers to their eagerness of participating in their teaching process.
- Extra work loads which can be waste of energy and time for teachers should be reduced.
- It is necessarily important to organize professional development activities such as lesson study, workshops, seminars, institutes, demonstration lesson, action research, coaching, mentoring, online professional development, and professional network.
- It is necessary appoint the sufficient number of trained teachers to be able to implement effective primary mathematics teaching.

- Necessary resources (books, teaching aids, etc.) should be supported for promoting primary mathematics teaching.

### **Need for Further Research**

This study revealed teachers' primary mathematics teaching practices. It is also necessary to conduct an in-depth study on secondary school level for promoting mathematics teaching. Moreover, teachers were chosen as sample from only Yangon City Development Area in this study. It is necessary to investigate primary mathematics teaching in other townships, states and divisions to represent the whole country. This study was carried out by giving more emphasis on primary mathematics teaching. Therefore, it is also necessary to be conducted for other subjects in order to promote teaching learning process of the respective subjects

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## **Investigating Primary School Teachers' Perception and Practices of Environmental Education**

Su Chan Myae<sup>1</sup>, Aung Lin<sup>2</sup> & Thet Naing Oo<sup>3</sup>

### **Abstract**

The main aim of this study is to study the perception and practices of primary school teachers on environmental education. The specific aims are (1) to investigate primary school teachers perception of environmental education, (2) to investigate the practices of primary school teachers on environmental education, (3) to investigate the interest and concern of primary school teachers towards environmental issues, and (4) to investigate the method used by primary school teachers in giving environmental education. Quantitative and qualitative methods were used in this study. In order to collect the required data, descriptive research method and interviews were also employed. The reliability coefficient (Cronbach's Alpha) of the questionnaire was 0.78. A total of 227 primary school teachers participated in this study. Descriptive statistics was used for the analysis of quantitative data. According to the findings, it was found that primary school teachers agreed the importance of teachers' role in giving environmental education (Mean= 3.44). Primary school teachers sometimes practised education in the environment (Mean = 3.39), often practised education about the environment (Mean = 3.50) and sometimes practised education for the environment (Mean = 3.12) . They were very interested towards environmental issues (Mean= 4.07) and very concerned to these issues (Mean = 4.16). Concerning teaching methods, the primary school teachers often gave environmental education with oral explanation and never invited external experts for giving environmental education to children.

**Keyword:** Environmental Education

### **Introduction**

Environmental education is one of the important areas, which is gaining prominence in the modern world. Many worldwide discussions are going on regarding the solutions for environmental problems that aims at

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attaining sustainable development. Educating people is one of the measures to bring the needed awareness and sensitivity towards protecting the environment. According to Shobeiri (2005), solving existing environmental crisis requires environmental awareness and its proper understanding which should be deeply rooted in the education system at all levels of school education. Jackson (2005) stated that one of the best ways of preservation is creating environmental awareness among society especially students as they are future leaders, future custodians, planners, policy maker, and educators of the environment and its issues.

Teachers in Basic Education Schools are the key person to achieve Sustainable Development Goals (SDGs). Educators are powerful change agents who can deliver the educational response needed to achieve the SDGs. Their perception and practices on environmental education are of vital importance towards the sustainable future.

### **Significance of the Study**

All over the world, people are facing a wealth of new and challenging environmental problems every day. These problems are caused by increase population, uncontrolled urbanization, global warming, breakdown of the natural life, thinning and depletion of the ozone layer, greenhouse effect, increase in solid wastes, nuclear pollution, decrease of green areas and extinction of plant and animal species. Myanmar is also one of the countries which are most vulnerable to climate change with its environmental degradation and unsustainable livelihoods practices.

In order to handle environmental problems, it is very important to emerge environmentally literate children who know about environment and are aware of the environmental problems. Moreover, children should notice the things that they are able to do themselves for their environment; they should take precautions to conserve their environment and provide solutions for environmental problems. Providing environmental education for young children can enhance their knowledge and attitudes towards environmental issues and have contribution their further lives.

Therefore, the perception and practices of teachers are very important in promoting students' awareness related to environmental issues.

## **Aims of the Study**

### **Main Aim**

The main aim of the study is to study primary school teachers' perception and practices of environmental education.

### **Specific Aims**

The specific aims of the study are

- (1) to investigate primary school teachers' perception of environmental education
- (2) to investigate the practices of primary school teachers on environmental education
- (3) to investigate the interest and concern of primary school teachers towards environmental issues
- (4) to investigate the methods used by primary school teachers in giving environmental education

### **Research Questions**

The research questions of the study are

- (1) What are primary school teachers' perception of environmental education?
- (2) To what extent do primary school teachers practise on environmental education?
- (3) To what extent are primary school teachers interested and concerned towards environmental issues?
- (4) What are the methods used by primary school teachers in giving environmental education?

### **Theoretical Framework**

In this study, the following theoretical framework was used. According to Palmer & Neal (1994), environmental education needs to fall on threefold structures: education in the environment, education about the environment and education for the environment.

*Education in the environment* is primarily concerned with facilitating environmental education experiences in nature and inspiring children to develop relationships with the nature world. The students need

to be involved in learning process through the environment by: using relevant first-hand resources and real life experiences, working outside the classroom, developing skills of enquiry and exploration within the local area and contrasting environment elsewhere, developing problem-solving skills and critical and creative thinking skills.

*Education about the environment* focuses on building environmental knowledge, understandings, and awareness of ecological processes. Students should develop knowledge and understanding of the natural process which takes place in the environment, how life is dependent on the environment, the impact of human activities on the environment, environmental issues, the importance of effective action to protect the environment, the role of science and technology in the development of societies and their impact on the environment.

*Education for the environment* is mainly directed towards promoting positive conservation behaviours and environmental action. For being educated for the environment, the children should; be interest in and learn to appreciate their environment through the care of living things and their habitats in and around the school, respect and liking for their environment through relevant and interesting studies of it, seek solutions to environmental problems within the school and the local area, appreciate the resilience, fragility, and beauty of nature.

### **Definition of Key Term**

**Environmental Education** is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biological surroundings. Environmental education also entails practice in decision making and self-formulation of a code of behaviour about issues concerning environmental quality (Palmer & Neal, 1994).

### **Operational definition**

#### **Environmental Education**

In this study, environmental education is studied in terms of education in the environment, education about the environment and education for the environment that the teachers are giving to students.

## **Methodology**

### **Research Method**

Quantitative and qualitative methods were used in this study. For quantitative study, descriptive research design was used and data were collected through questionnaire. For qualitative study, interviewed questions were used.

### **Sample**

The participants of this study were teachers who thought at primary level in Chaungzone Township. A total number of participants were 227. They were randomly selected from Basic Education Primary Schools, Basic Education Middle Schools and Basic Education High Schools in Chaungzone Township.

### **Instrumentation**

The questionnaire for this study was structured with five main parts. There were altogether 82 items. The first part involves gender, age, qualification and specialized subjects, total services, position, subject taught and Grade, teacher training courses attended and environmental education training and courses attended. The second part consisted of activities the teacher used to give environmental education and it was developed as five point Likert-type items: (1=never, 2=rarely, 3=sometimes, 4=often, 5=always). The third part included the items concerning environmental issues and they were developed as five point Likert-type items: (1=not interested, 2=slightly interested, 3=moderately interested, 4=very interested, 5=extremely interested). To investigate teacher concern level towards environmental issues, these items were also developed as five-point Likert-type items: (1=not concerned, 2=slightly concerned, 3=moderately concerned, 4=very concerned, 5=extremely concerned). The fourth part was made up of three components; 7 items for education in the environment, 6 items for education about the environment, and 5 items for education for the environment. These items were developed as five point Likert-type items: (1=never, 2=rarely, 3= sometimes, 4=often, 5=always). The fifth parts comprise 22 items for teacher's perception on environmental education. These items were developed as five point Likert-type items: (1=not agree, 2=slightly agree, 3=moderately agree, 4=agree, 5=strongly agree). For qualitative study, three interviewed questions were developed.

## **Procedure**

The set of questionnaire was developed after reviewing the related literature. For the expert review, the advice and guidance were taken from the 11 expert educators who have special knowledge and experience in the field of this study. For item clarity, the wording and content of items were revised in accordance with the result of expert review.

Pilot study was conducted with 40 primary school children, their 40 parents and 40 teachers who taught at primary level from three Basic Education Primary Schools in Mayangone Township, Yangon Region. After conducting pilot study, the questionnaire was modified.

To collect the required data at the selected Basic Education, permission was granted by the Department of Basic Education. The modified questionnaire were distributed to 227 teachers from 38 Basic Education Schools including Basic Education High Schools, Basic Education Branch High School, Middle Schools, Basic Education Branch Middle School, Basic Education Primary Schools and Basic Education Post Primary School in Chaungzone township. A valid response rate was 100%. After analyzing the collected data.

## **Analysis of Data**

In this study, the descriptive method of research was used. The collected data of this study were systematically analyzed by using the Statistical Package for the Social Science software version 22 as it is widely used in quantitative research. Twenty primary school teachers were selected to interview in this study. Data were collected by using such methods: note taking and recording informally.

## Findings

### Quantitative Findings

#### Findings on Primary School Teachers' Perception on Environmental Education

Table 1. Mean Values and Standard Deviations of Teachers' Perception on Environmental Education (N=227)

No.	Items	Mean	SD
1	Protecting the environment is every individual's first priority.	4.42	0.58
2	Protecting the environment by individuals is desirable and possible only at adulthood	3.62	1.15
3	Teaching of a particular school subject should not be tightly compartmentalized without relating it to environment and its components.	1.88	0.89
4	Infusion of environmental dimension in the teaching of different school subjects helps get a holistic view of environment and its problem	4.07	0.59
5	Environment related concepts cannot be successfully infused only in subject like science.	2.70	1.16
6	Irrespective of the subjects taught, the teacher can provide the activities that can be performed in the nature.	3.88	0.70
7	Organizing environmental field trips should be an integral part of the school activities	4.04	0.58
8	Teaching in a natural setting motivates students' learning.	4.19	0.51
9	'Well-organized' visit to a park enables student to learn	4.19	0.67
10	Even when there is provision to relate environment and its problems in the classroom teaching, it is not a waste of time to do so.	3.76	0.97
11	A teacher should know to use different techniques of teaching, which promote positive attitude towards protection of environment among students	3.86	0.62

No.	Items	Mean	SD
12	Teachers play a dominant role in modifying environmental behaviour of students	4.33	0.63
13	Eco-friendly behaviour can be hardly taught/ practiced through the school subjects in the classroom	3.76	0.85
14	It is not the responsibility of 'parents only' to teach eco-friendly actions among children.	3.73	0.90
15	Environmental education training should be given to teachers.	3.72	0.73
16	Without any special training in Environmental Education during their teacher education period, it is possible to teach environmental dimension through any school subject	3.96	0.56
17	Students learn to protect environment through reading environment related books.	3.83	0.65
18	It is an inevitable responsibility of teachers to develop environmental awareness among students.	3.70	0.99
19	Development of knowledge about environment among students can trigger off environmental friendly actions by them	4.00	0.61
20	Infusing environmental concepts in different school subjects cannot leads to the deviation of students' concentration from the subject on hand.	2.30	0.76
21	It is appropriate to focus on environmental dimensions while teaching history and civics.	2.62	0.92
22	Teacher should deliberately create opportunity to make students understand the cause-effect relationship in the nature.	4.17	0.44
	<b>Average</b>	<b>3.44</b>	<b>0.25</b>

Scoring Range: 1.00-1.80=not agree                      1.81-2.60=slightly agree  
2.61-3.40=moderately agree                      3.41-4.20=agree  
4.21- 5.00=strongly agree

Table 2. Mean Values and Standard Deviations of Teachers' Practices of Education About the Environment, In the Environment and For the Environment (N=227)

No.	Variables	Mean	SD
1	Education in the environment	3.39	0.70
2	Education about the environment	3.50	0.77
3	Education for the environment	3.12	0.81
	<b>Average</b>	<b>3.35</b>	<b>0.68</b>

Scoring range: 1.00-1.80 =never      1.81-2.60 =seldom,  
2.61-3.40=sometimes    3.41-4.20 =often    4.21-5.00=always

### Findings on Primary School Teachers' Interest and Concern towards Environmental Issues.

Table 3. Mean Values and Standard Deviations of Teachers' Interest and Concern towards Environmental Issues (N=227)

No.	Items	Degree of Interest		Degree of Concern	
		Mean	SD	Mean	SD
1	Deforestation	3.86	0.72	4.00	0.72
2	Energy Scarcity	3.51	1.03	3.70	0.96
3	Water Scarcity	4.35	0.89	4.42	0.87
4	Air pollution	4.09	0.88	4.20	0.75
5	Water pollution	4.31	2.01	4.25	0.75
6	Soil pollution	3.97	0.79	4.26	3.43
7	Garbage	4.11	0.72	4.19	0.76
8	Endangered species	3.75	0.90	3.86	0.91
9	Global Warming	4.21	0.84	4.33	0.82

No.	Items	Degree of Interest		Degree of Concern	
		Mean	SD	Mean	SD
10	Unusual heavy rain and flooding	4.61	0.55	4.69	0.48
	<b>Average</b>	<b>4.07</b>	<b>0.54</b>	<b>4.16</b>	<b>0.52</b>

Scoring range:

Interest:

1.00-1.80 = not interested

1.81-2.60 = slightly interested

2.61-3.40 = moderately interested

3.41-4.20 =very interested

4.21-5.00 = Extremely interested

Concern

1.00-1.80 = not concerned

1.81-2.60=slightly concerned

2.61-3.40= moderately concerned

3.41-4.20 =very concerned

4.21-5.00 =Extremely concerned

Table 4. Mean Values and Standard Deviations of Teachers' Using Various Methods for Giving Environmental Education (N=227)

No.	Items	Mean	SD
1	Asking Students to observe by themselves	3.44	1.21
2	Giving oral explanation	3.95	1.07
3	Asking them to solve the problem	3.39	1.10
4	Using arts and music	3.59	1.04
5	Writing essay	2.55	1.22
6	Role-playing	2.48	1.10
7	Telling stories	3.19	1.08
8	Going a field-trip	2.05	1.01
9	Giving lecture by inviting external experts	1.61	0.84

No.	Items	Mean	SD
10	Holding impromptu talk and debate	1.79	0.95
11	Asking students to write essays	2.09	1.03
12	Showing videos and movies	2.50	3.32
	<b>Average</b>	<b>2.72</b>	<b>0.68</b>

Scoring range: 1.00-1.80 =never 1.81-2.60 =rarely  
2.61-3.40=sometimes 4.21-5.00=always 3.41-4.20 =often

### Qualitative Findings

Teachers with high mean values (Group A) and teachers with low mean values (Group B) were divided.

#### How do you suggest your students to protect the environment?

The result shows that 50% of teachers from Group A (n=5) and 40% of teachers from Group B (n=4) answered that plantation of tree was the best solution for environmental conservation. The rest of the teachers said that children should be taught to have environmental attitudes. The rest of the teacher replied throwing garbage should be the focus issue.

#### What environmental education activities do you give your students.

Fifty percent of teachers from Group A (n=5) said, "*In practical, we don't perform any events concerning to environmental education.*" The rest of the teachers gave the awareness on not to destroy the plants and trees. The rest of the teachers from Group B explained about ecology to their students.

#### How can we educate the children to save the environment?

Forty teachers from Group A (n=4) and 40% of teachers from Group B (n=4) responded, "*deforestation and carbon emission are the opposite of environmental sustaining.*" Some argued to give a public awareness".

### **Conclusion**

Teachers need to give more environmental education activities to students. It is the most appropriate way to make people conscious of their responsibilities and enables them to participate in the solution of the environmental problems they create (Dogan, 2007, cited in Giiven, 2011).

### **Suggestion**

1. Teachers should be familiar with the goals and objectives of environmental education.
2. Teachers should invite external experts who are focusing on environmental conservation and awareness to school.
3. Teachers should use the approaches that are suitable and interesting for pupils.
4. Teachers should be the role models for environmentally-friendly behaviour.
5. Teachers should integrate environmental education concept in every subject.

### **Need for Further Study**

Further studies need to investigate parents' perception and practices of environmental education for enhancing children environmental knowledge.

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# Teachers' Knowledge and Practices on Primary Science Teaching

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## Abstract

The purposes of this study are to study the levels of knowledge of teachers' primary science teaching, to study the extent of practices of teachers' primary science teaching, and to study the variation on the extent of teachers' science teaching practices perceived according to their knowledge. Descriptive method is used in this study. Two sets of questionnaires: knowledge and practices of primary science teaching were used in quantitative study. In qualitative study, open-ended questions and observation checklists were used. A proportional stratified sampling method was used to select 450 teachers from 10 selected townships in Yangon City Development Area. Item Percent Correct (IPC), one-way ANOVA, and cyclical process were used for the analysis of quantitative and qualitative data. It was found that most of the teachers' knowledge in primary science teaching was satisfactory level. All of the teachers often perform primary science teaching practices. Qualitative study suggests that extra work loads, and number of teachers may be the main reasons affecting primary science teaching.

**Keyword:** science process skills

## Introduction

One of the aims of Basic Education in Myanmar is to give precedence to the teaching of science capable of strengthening and developing productive forces. So, fostering the development of science education is one of the most challenging and rewarding tasks instructional leaders will have to do in the twenty-first century (Victor, 1989). According to Fitzgerald (2011), teachers are key players in the reinvigoration of science education. Teaching science in primary schools is important as it arouses the curiosity among the children with regards to their surroundings.

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Upgrading the quality of basic education teachers is one of the main tasks of the education promotion program in Myanmar. Today's science teachers play central roles in educating, inspiring, and guiding students to become responsible scientifically literate citizens. Therefore, it is essential that teachers of science uphold the highest ethical standards of the profession to earn the respect, trust, and confidence of students, parents, school leadership, colleagues, and other members of the community and their professional competency is significant for school improvement.

One of the prime objectives of elementary science is to help children learn science concepts and conceptual schemas that will help them understand and interpret their environment (Victor, 1989). In order to be effective science teaching, science teachers not only need to know science content knowledge but also to master basic science process skills and have to apply these skills in science teaching. And then, science teachers are also necessary to assess that their students acquire these basic science process skills. According to Loucks-Horsley, Kaptian, Carlson, Kuerbis, Clark, Nelle, Sasche, and Walton (1990, cited in Hernandaz, Arrington, and Whithworth, 2002), elementary teachers encounter a number of obstacles to teaching science effectively through inquiry. They are as follows:

- (1) There is lack of preparation in science for elementary teachers.
- (2) The emphasis in the preparation of elementary teachers is on language and math and not science.
- (3) Insufficient time is often given to the teaching of science in elementary schools.
- (4) There are an inadequate number of well-defined elementary science programs.
- (5) There is a shortage of adequate support materials for instruction.
- (6) There is lack of professional development for elementary teachers.

This study will be carried out or these reasons.

### **Purposes**

- (1) To study the levels of knowledge of teachers' primary science teaching
- (2) To study the extent of practices of teachers' primary science teaching

- (3) To study the variation on the extent of teachers' science teaching practices perceived according to their knowledge

### **Research Questions**

- (1) What are the levels of knowledge of teachers' primary science teaching?
- (2) To what extent do teachers practice primary science teaching?
- (3) Are there any significant differences in teachers' primary science teaching practices according to their knowledge level?

### **Definition of Key Term**

*Science process skills* are the skills that ensure active student participation, have students develop the sense of undertaking responsibility in their own learning, increase the permanence of learning, and also have students acquire research ways and methods, that is, they ensure thinking and behaving like a scientist (Ostlund, 1992).

### **Theoretical Framework of the Study**

Among the twelve science process skills which should be engendered in the teaching and studying of science at the elementary (primary) level are six basic science process skills: observing, classifying, measuring, communicating, inferring, and predicting (Ango, 2002).

Observing is using the senses to gather information about an object or event. All scientific enquiries begin with the skill of observation. Observation is recognized as an important initial skill in early years and primary science (Harlen, 2000; Johnston, 2005; deBóo, 2006 cited in Johnston, 2009). Observation is the most basic process skill in which students use the five senses to obtain information about themselves or the world around them (Muskingum Valley, 2007).

Inferring is using what the children observe to explain what has happened, and making an educated guess about an object or event based on previously gathered data or information. Inferring is an inventive process in which an assumption of cause is generated to explain an observed event (Jinks, 1997). The usual meaning of inference is to interpret or explain what we observe. Inference is an explanation of an observation based on the

available information (O'Brien, et al., n.d). An inference is a conclusion or judgment based upon observations. It is arrived at indirectly rather than directly (Cain and Evans, 1990).

Measuring is using both standard and non-standard measures and estimates to describe the dimensions of an object or event. Measuring is to use a standard or nonstandard measurement system to describe or estimate the dimensions of an object or event (Muskingum Valley, 2007). Measuring is a science process skill which gives students an opportunity to appraise themselves realistically. Measuring is the process of making observations that can be stated in numerical terms (Ango, 2002). Measurement is the specific determination of the length, mass, volume, speed, time, or other property of an object or event (O'Brien, et al., n.d). Linear measurements, liquid measurements and mass/ weight measurements will be made. (Cain and Evans, 1999).

Communicating is using words or graphic symbols to describe an action, object or event. Communicating is to use words or symbols to describe an action, object or event (Muskingum Valley, 2007). Communication is the sharing of information through written or spoken means such as an oral report, charts, graphs, reports, and publications (O'Brien, et al., n.d). Communicating refers to the skill of describing simple phenomena. Constructing graphs and diagrams for observed results of experiments is another form of communicating (Cain and Evans, 1999).

Classifying is a systematic procedure used by a person to impose order on collections of objects or events (Muskingum Valley, 2007). Classification is the "process of sorting, grouping and arranging on the basis of similarities and differences. It contributes to the extent to which students understand, conceptualize and attach meaning to scientific ideas (Ango, 2002). Classifying is making up categories and grouping things by breaking them down (Vitti & Torres, 2006). Classification is seen as constructing an order based on similarities and differences between objects or events. (O'Brien, et al., n.d).

A prediction is a forecast of a future observation based on inferences from the available data (O'Brien, et al., n.d). Predicting is to state the outcomes of a future event based on available information (Muskingum Valley, 2007). Predictions are central to the process of testing whether or not a hypothesis is on the right track. Predictions invite the orderly

gathering of evidence for a specific purpose (Ash, 1991). Predictions should be based upon selected data (Cain and Evans, 1999).

Elementary school students are in the preoperational and concrete operational stage. In preoperational stage, the child can observe and describe variables (properties of an object or aspects of a phenomenon). In concrete operational stage, he thinks about, and learns mainly through, concrete experiences. Among the operations developed during this stage are addition, subtraction, multiplication, division, classification, correspondence and placement in order.

Understanding of space and time are greatly expanded. The child develops conservation abilities. Conservation is the realization that changing an object physically (shape, length, direction or position) does not alter the amount present. Hands-on science activities provide experiences that contribute to their development of an understanding of numbers. Science is basic to the three Rs since it helps students to develop the operations necessary to read and do mathematics (Carin & Sund, 1989). The child:

- (1) performs operations: combining, separating, ordering, seriating, multiplying, or repeating, dividing, and substituting.
- (2) can do correspondence (by end of stage).
- (3) analyze, is aware of variables, classifies.
- (4) measures and converses volume, weight, and areas (Carin & Sund, 1989).

Lev Vygotsky's social development theory is one of the foundations of constructivism. Vygotsky, a social constructivist, also studied the child's cognitive development. ZPD (zone of proximal development) is the concept of scaffolding, which can help students attain the upper limits of their ZPD. Vygotsky's theory promotes learning contexts in which students play an active role in learning. Roles of teacher and students are shifted, as a teacher should collaborate with his or her students in order to help facilitate meaning construction in students.

The most common methods of teaching science in the elementary school involve the use of experiments, reading, reporting, discussion, field trips, resource persons, and audio-visual materials. The availability of supplies and equipment, textbooks and references, or films will help

determine the method to be used. Science that should be taught as a process of inquiry is accepted (Victor, 1989).

The most effective and successful learning experiences can be resulted from systematic, creative planning. According to Cain and Evans in 1984, there are three stages of lesson planning: (1) developing and writing objectives, (2) selecting and developing appropriate instructional strategy, and (3) using evaluation techniques. The effective science classroom reflects considerable teacher planning. In assessing science process skills, Carin and Sund (1989) pointed out that evaluation is a continuous process. There are three main types of evaluation approaches: diagnostic, formative and summative.

## **Quantitative Method**

### **Samples**

School level was divided into three levels in this study. 58 Basic Education Primary Schools and 5 Basic Education Post Primary Schools were in Level 1, twenty Basic Education Middle Schools were in Level 2, and 11 Basic Education High Schools and one Basic Education Branch High School were in Level 3. 450 teachers were included in this study by a proportional stratified sampling. 95 Basic Education Schools from 10 townships in Yangon City Development Area were selected to collect the data. There were 73 teachers from the Level 1 schools, 90 teachers from the Level 2 schools, and 287 teachers the Level 3 schools.

### **Instruments**

In this study, two main instruments were used to collect the required data. The first instrument was to investigate teachers' primary science knowledge. The second one was to investigate teachers' primary science teaching practices.

### **Data Analysis**

Descriptive statistics, Item Percent Correct (IPC), and one-way ANOVA were used for the analysis of quantitative data.

## **Qualitative Method**

### **Samples**

In order to keep the sample size manageable in this study, purposive sampling method was used to choose the participants. Twenty-one teachers from seven schools involved in this in-depth qualitative study.

### **Instrumentation**

Instruments for qualitative methodology including open-ended questions and observations were developed based on quantitative instruments.

### **Data Analysis**

Data analysis was conducted based on categorizing and interpreting the observation, and open-ended questions. The cyclical process was used to analyze the qualitative data.

## **Research Findings**

### **Quantitative Findings**

As shown in Table 1, 89 (19.77%) teachers were in below satisfactory level. 273 (60.67%) teachers were in satisfactory level and 88 (19.55%) of teachers were in above satisfactory level.

Table 1. Number and Percentage of Teachers Showing their Level of Knowledge on Primary Science Teaching (N= 450)

<b>Number of Teachers</b>	<b>Remark</b>
88 (19.77%)	Below Satisfactory Level
273 (60.67%)	Satisfactory Level
89 (19.55%)	Above Satisfactory Level

Table 2. Summary of ANOVA Result for Teachers' Primary Science Teaching Practices by School Level

No.	Items for teachers' primary science teaching practices	Mean Value per Item
1	Teachers lay down the learning objectives of students' competency of science concepts.	2.60
2	Teachers prepare notes of lessons and teaching aids before classroom teaching.	3.24
3	Teachers explain the students the objectives of the lesson to understand before teaching.	3.21
4	Teachers use teaching aids to get students' attention in learning science.	3.13
5	Teachers encourage students to observe the real objects and manipulate the teaching aids in science classroom.	2.88
6	Teachers teach the science lessons by using question and answer method.	3.27
7	Teachers teach the science lessons by communicating with daily life.	3.27
8	Teachers teach students by using teaching aids with five senses.	2.94
9	Teachers teach students by observing and grouping.	3.17
10	Teachers create environment for students to express their finding daringly in classroom.	3.20
11	Teachers teach students to observe the things in their environment.	3.09
12	Teachers teach students to infer the results themselves based on their findings.	3.00
13	Teachers teach students to measure themselves.	3.03
14	Teachers teach students to communicate themselves	2.56

No.	Items for teachers' primary science teaching practices	Mean Value per Item
	with respect to their findings.	
15	Teachers teach students to classify themselves.	3.13
16	Teachers teach students to predict the conditions based on their findings.	2.86
17	Teachers use diagnostic test.	3.40
18	Teachers use formative test.	3.52
19	Teachers use summative test.	3.57
20	Teachers apply to remedial teaching for students who are weak in learning.	3.34
	<b>Primary science teaching practices</b>	3.13

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , ns = not significant

Table 2 showed that the summary analysis of variance for teachers' primary science teaching practices. It was found that teachers in this study often practiced the other items.

Table 3. One-way ANOVA Result for Showing Teachers' Primary Science Teaching Practices according to their Knowledge Level

Groups of teachers according to their knowledge level	N	Mean (SD)	F	p
Group of teachers who are in below satisfactory level	89	3.13(.82)	.413	ns
Group of teachers who are in satisfactory level	273	3.10 (.79)		
Group of teachers who are in above satisfactory level	88	3.19 (.82)		

ns = not significant

It was found that there was no significant difference in teachers' primary science teaching practices according to their knowledge level.

### **Qualitative Findings**

In qualitative studies, the selected teachers advise that principals should provide the following things for improving primary science teaching.

1. Supporting necessary teaching aids for science teaching more than the present time
2. Planning the time to prepare the science lesson before teaching
3. Encouraging teachers to discuss the lessons taught with their subject leaders before teaching
4. Providing necessary books for science teaching in the library
5. arranging time to study those books for professional development
6. Giving rewards, praising and recognition to outstanding teachers
7. Creating an enjoyable atmosphere for teachers

In order to examine the teachers' primary science teaching practices, teachers were observed in their classroom about how to teach students science process skills.

### **Conclusion and Discussion**

According to the findings, there were most of the teachers who were in satisfactory level of knowledge about primary science teaching. In classroom observations, it was found that a few teachers apply appropriate teaching aids, and gave students opportunities to learn science by using their science process skills. Thus, it can be concluded that systematically designed professional development activities are vitally important for the development of teachers' knowledge about primary science teaching.

### **Recommendations**

- (1) Teachers should attend the educational programs for improving their science teaching.
- (2) Teachers should be provided the necessary teaching aids and the teachers should be urged to create new teaching aids on their own.
- (3) Teachers should reflect about their science teaching.

- (4) Teachers should attend workshops, seminars, and in-service trainings concerning science teaching skills.
- (5) Teachers should be provided recognitions for participating in the exhibition of creating teaching aids, and outstanding performance in science teaching.
- (6) Teachers should be given praise and rewards to individually, in the meetings, and in the parent-teacher gatherings.
- (7) Too much extra workloads that can waste energy and time for teachers should be reduced.

### **Need for Further Research**

This study tried to explore teachers' knowledge and practices on primary science teaching. The samples of this study were teachers who were only from Yangon City Development Area. It is necessary to investigate teachers' primary science teaching practices in other states and regions to represent the whole country.

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## **In-Service Teacher Training Needs and Preferences of Lower Secondary Teachers**

Thet Thet Khine<sup>1</sup> & Thet Naing Oo<sup>2</sup>

### **Abstract**

The aim of this study is to determine the content and form of in-service teacher training that is needed and preferred by lower secondary teachers. Content refers what the teachers learn in the in-service training programs; form denotes the context, kinds of trainers, schedule, and evaluation in which learning takes place. Quantitative research method was used in this study. Data were collected from 88 lower secondary school teachers from Kamayut Township in Yangon Region. The questionnaire included three parts: Demographic information, Teachers' Preferences on In-service Teacher Training and Teachers' Needs for In-service Teacher Training. The reliability coefficient of the whole scale was 0.79. Descriptive Statistics and One-Way ANOVA were employed for the analysis of quantitative data. According to the findings, teachers have higher needs for Guidance and Special Education, Self-development, and Use of ICT. They also reported their preferences for in-service training program format. Determining what teachers need and prefer made it possible to provide suggestions for in-service teacher training programs to maximize the match between teacher needs and the content and process by which those needs are met.

**Keywords:** Need, Preference, In-service Training

### **Introduction**

At a time when Myanmar is being welcomed back into the global economy and playing a key role in ASEAN, and is introducing reforms to expand trade and investment, it is recognized that there is an urgent need to rebuild capacity for political, administrative and legal reform, and for the delivery of key public services, especially education and health. Therefore the improvement of education standards has been made as a top priority and teacher education has been identified as a critical area of concern and a key strategy for improving the quality of education. In calling for such reforms, it is recognized that a motivated and well-trained teaching force is a

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prerequisite for quality education and that this can only be brought about by improving the status, quality, management, policies and training of teachers.

In National Education Strategic Plan 2016-21, the three major challenges teacher education in Myanmar are identified as follow;

- There is an immediate need for comprehensive and integrated teacher management reforms that will strengthen teacher recruitment, deployment and retention; establish an effective and transparent performance evaluation and promotion system; and provide clear and equitable career pathways for teachers across the national education system.
- Major changes are needed to improve the quality of teaching, learning, infrastructure and management in teacher education institutions (TEIs) – Education Colleges (ECs), Universities of Education (UOEs) and the University for the Development of National Races (UDNR).
- A high-quality, national continuous professional development (CPD) program needs to be put in place to upgrade teacher pedagogic knowledge and skills over a sustained period that will lead to measureable improvements in student learning achievement in all basic education schools in Myanmar.

To cope with the problems arisen from pre-service education, in-service teacher training programs are designed by faculties of education, ministries of education, and NGOs. However, how these designs are effective for teachers who face with the challenges of 21<sup>st</sup> century, and what type of in-service training designs teachers of 21<sup>st</sup> century need are somehow obscure. Assuming the major aim of the efforts as to improve the quality of teaching and learning, the main purpose of this study is to determine the kinds and qualities of in-service training that teachers report and expressed that they need.

### **Significance of the study**

Generally, the Ministry of Education in Myanmar is the main provider of education. It employs innovative means to get the required number of qualified teachers. Hence, teacher training in basic education sub-sector is provided using two approaches; pre-service teacher training programs and in-service teacher training programs (Ministry of Education, 2004).

Education reform has so far concentrated on teacher training as the Ministry of Education, which is responsible for hiring, placing, and promoting qualified teachers in the country, has been providing pre-service and in-service teacher training since 2004 (Ministry of Education, 2004). Over the last three years approximately 72,000 new teachers have been hired to ensure that there are more teachers in every school. Furthermore, work is ongoing to improve the professional capacities of these new teachers. (Ministration of Education, 2016) Most of recently recruited daily wage teachers have received less formal teacher education and training.

Education colleges (ECs) in Myanmar generally offer four programs: a one-year Pre-service Primary Teacher Training Course (PPTT) for candidates with a first degree, a two-year Diploma in Teacher Education (DTEd), and a one-year correspondence course for primary teachers and a one-year correspondence course for junior teachers.

Accordingly, there are other forms of teacher training courses that are being conducted in the country. Among these courses are the Education College-based Teacher Training Course (conducted for the uncertified teachers) and the Township-based Primary School Teacher Training program, which is a one-year course in collaboration with Township Education Officers conducted during weekends, and during school vacation in October and December.

According to the paper reported by UNICEF on pre-service and in-service teacher training in Myanmar 2013, in *Teachers' Continuing Professional Development (CPD)*, links between ECs and schools are minimal. School clusters (families) have been identified, and teacher support is seen as mainly the role of school cluster heads and head teachers, with support from ATEOs and TEOs. However, there is as yet very limited training in leadership skills, mentoring or teacher observation, and no established system for teacher support. This is likely to be a key reason for the low and uneven uptake of child-centred approaches in the classroom as well as inconsistencies in monitoring children's learning. Therefore, it is essential to make sure that teacher training translates into sustainable improvements in teaching and learning.

This study is important as an initial step of designing an in-service teacher education programs since the purpose of this study was to analyze in-service training needs and preferences of teachers. This study is an attempt to contribute to planning and designing in-service teacher training

programs by documenting the reports of lower secondary teachers about their needs and preferences on characteristics of effective in-service training in Myanmar.

### **Research Objectives**

- (a) General Objective: To study in-service teacher training needs and preferences of lower secondary teachers
- (b) Specific Objectives:
  - (a) To study lower secondary teachers' needs of content of in-service teacher training
  - (b) To study lower secondary teacher's preferences about form of in-service teacher training program
  - (c) To examine differences in lower secondary teachers' in-service teacher training needs and preferences

### **Research Questions**

1. What are lower secondary teachers' needs of content of in-service teacher training?
2. What are lower secondary teachers' preferences about form of in-service teacher training program?
3. Are there any significant differences in lower secondary teachers' in-service teacher training needs and preferences related to personal factors?

### **Related Literature Review**

Some of the factors characterizing education in schools such as class size, expenditure per pupil do not have demonstrable effects on student performance while teacher quality as measured by skills, knowledge and qualifications plays a decisive role in students' progress. Based on an analysis of teacher training policies in 25 countries, the OECD (2005) report cogently entitled *Teachers Matter* comes to the conclusion that teacher quality is the most important factor in an education system, and the second most important factor among the variety of influences affecting student achievement.

Dr. Khin Zaw (2001) stated that the quality of an education system cannot exceed the quality of its teachers and therefore it is important to get more talented people to become teachers, develop these teachers into better instructors, and ensure that these instructors deliver consistently for every child in the system. This appears to be the area that resources should target; knowledge-intensive training institutions and knowledge-rich teacher development centres should be provided.

Borich maintains that there are three forms of teacher competencies: (a) knowledge competencies, which specify the cognitive perspectives the teacher is expected to demonstrate; (b) performance competencies, which specify the teaching process the teacher is expected to demonstrate; and (c) consequence competencies, which specify pupil behaviors that work together to build a comprehensive set of teacher and pupil outcomes in the classroom. Although most pre-service and in-service teacher training programs involve the attainment of knowledge and process competencies, few of these programs provide training that assumes the interdependence of knowledge, performance, and consequence competencies. It seems likely that knowledge competencies are needed to achieve performance competencies, and performance competencies are in turn essential to attain consequence competencies.

In his “Theoretical Pedagogical II: Ethics”, Professor Dr. Khin Zaw explicitly states that just as there are no sudden starts or stops in the total educational process, there are no sharp beginnings in preparing for the teaching profession. The first step was before one remembers, when one was first taught something. The other steps were in a continuous process of learning stages, through the elementary grades, high school, college, and then teaching itself. But the preparation does not stop at that point. It cannot stop, especially in the current race against international disaster. It cannot stop, if the teachers are to provide the leadership that their communities have every right to expect of them.

The route of in-service courses, lectures, seminars, and conferences is one way of helping smooth out some of the rough spots. Even better is the other route of college and university courses: summer workshops and extension classes, degree or nondegree courses, lecture series adapted to specific region of district with one professor or a team of them can usually be almost as flexible can be (Dr. Khin Zaw,2001).

One possible reason for the satisfactory results of in-service teacher training might be that the objectives of programmes were congruent with the teachers' personal and classroom needs. It might be reasonable to better understand the target audience before prescribing any intervention.

In-service teacher education can be understood as the continuing education a qualified teacher receives. It is a blanket term that encompasses all the educational and social programmes, both informal and formal, as well as any professional courses, visits or travels a teacher undertakes that serve to improve and develop their teaching skills or knowledge (British Council, 2017). To ensure the quality of a program or instruction, systematic development of instructional specifications is essential. In this study, general characteristics of learners, and their needs and preferences are attempted to explore. In investigating characteristics of learners, the existing literature guided this study.

Fishman et al. (2003) argued four basic elements of a design; content, strategies, place, and media used for professional development. Based on these elements, in this study, two main elements grounded on teachers' needs and preferences were explored, which were *content and form* of in-service teacher training program. *Content* refers what professional development designer expect teachers learn; *Form* refers the context, strategies, materials, schedule, and evaluation in which professional development takes place.

The question of "What should be learnt by teachers?" can be best answered by teachers themselves. What they need to learn to develop their personal skills and knowledge, is the answer of what the target content of in-service teacher training programs is. In general there are two main categories of content of in-service teacher training programs; (a) knowledge related - general teaching contents like assessment, management, organization, teaching methods (b) knowledge and skill related - subject matter contents including laboratory and technology usage (Margerum-Leys & Marx, 2002).

In this study, two main elements grounded on teachers' needs and preferences were explored, which were *content* and *form* of in-service teacher training program. *Content* refers what teachers learn from in-service teacher training; *Form* denotes the context, trainer, strategies, schedule, and evaluation in which the training program takes place.

*Contents of In-service Teacher Training are:* 1) Pedagogical Knowledge, 2) Subject-related Knowledge, 3) Use of ICT in education, 4) Self- Development, 5) Guidance and Special Education, 6) Communication and Social Skills.

*Forms of In-service Teacher Training are:* 1) Teaching Method, 2) Trainer, 3) Schedule, 4) Trainee Selection System, 5) Assessment.

**In-Service Training:** All formal activities aiming to support workers' improvement their profession. (Harris, Bessent, & McIntyre, 1969)

**Need:** The gap between the expectations and the existing situation. (Morrison, Ross & Kemp, 2004)

**Preference:** The evaluative judgment in the sense of liking or disliking an object (Scherer, 2005)

## Methodology

In this study, descriptive research design was used. Data were collected through questionnaires. There are totally 120 lower secondary teachers in Kamayut Township, Yangon Region. In order to obtain representative sample, the subjects were selected by using simple random sampling method.

The questionnaire was developed based on "In-service Teacher Training Survey" (Tuba K. Gokmenoglu, 2012), "Survey of In-service Teachers' Needs" (UNESCO, 1991), and other research and literature review. It consisted of 3 main sections. The first section was composed of demographic information of respondents. The second section included "Teachers' preferences on in-service teacher training" which was developed as ranking questions with totally 24 items under five categories. The last section included a scale of "Teachers' Needs on In-service Teacher Training" which was a 4-point scale. The total number of items in this section is 33.

To ensure the content validity of the instrument, expert opinions were taken from six experienced teachers from the Department of Educational Theory, Yangon University of Education. The reliability coefficient of the whole scale was 0.79.

In January 2019, the revised questionnaires were distributed to 92 lower secondary teachers in the schools of Kamayut Township, Yangon

Region. The total respondent number was 88 and the respondent rate was 96%.

### Data Analysis

The data were analyzed by using descriptive statistics, and one-way ANOVA (Analysis of Variance). The descriptive statistics was used to tabulate mean and standard deviation of individual items and group of items in the questionnaire. One-way ANOVA was also used to determine whether there was any significance difference in teachers' perception on needs of in-service teacher training among age and the subjects they teach.

### Findings

The main purpose of this study is to determine the content and form of in-service training needed and preferred by lower secondary school teachers from Kamayut Township in Yangon Region.

The findings show that the mean values of lower secondary teachers' perceptions on needs of in-service teacher training were high on Using ICT in Education ( $M=3.27$ ) and low on Communication and Social skills ( $M=2.11$ ). According to this data, teachers revealed that they have somewhat needs in Pedagogical Knowledge, Subject-related Knowledge and Communication and Social Skills. And they revealed that their needs were quite a bit on Self-Development and Guidance and Special Education. They reported that their needs were in a great deal on the Use of ICT in Education. (See Figure 1)

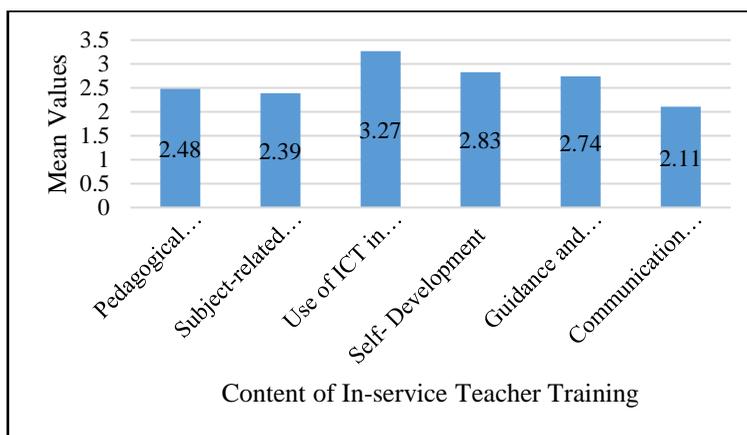


Figure 1. Teachers' Perceptions on Needs of In-Service Teacher Training

To examine the teachers' ratings on each content category in more detail, responses for each content category were analyzed separately. The mean values and standard deviation of teachers' perception on needs for each content are presented in Table 1.

Table 1. Means and Standard Deviations showing Teachers' Perception on Needs of Content of In-service Teacher Training

<b>Content of In-service Teacher Training</b>	<b>Mean</b>	<b>SD</b>
<b>Pedagogical Knowledge</b>		
Changing paradigms and educational systems	3.00	.93
Teaching methods and principles	2.57	.82
Assessment and measurement techniques	2.76	1.02
Learning and development of children	2.66	.89
Instructional planning	2.02	.85
Basic methods of classroom management	2.11	.68
Ethics in teaching	2.23	.81
<b>Subject-Related Knowledge</b>		
Curriculum changes / reforms	2.53	.97
Developing learning activities in my subject area	2.06	.65
Learning new topics in my subject area	2.42	.72
Examining /selecting educational sources and tools in my subject area	2.50	.75
Helping students to develop positive attitudes in my subject area	2.41	.73
Relating the subject area to daily life	2.43	.81
<b>Use of ICT in Education</b>		
Basic computer skills	3.24	.72
Projector Use	3.30	.69
Internet usage (Search, download, email, etc.,)	3.27	.86

<b>Content of In-service Teacher Training</b>	<b>Mean</b>	<b>SD</b>
Preparing effective teaching material with MS Office software	3.16	.74
Preparing instructional content with the help of Internet	3.20	.87
<b>Self-Development</b>		
Learning a foreign language	3.16	.85
Management	2.83	.71
Life-skills	2.59	.83
Problem solving methods	2.84	.67
Effective public speaking	2.70	.71
<b>Guidance and Special Education</b>		
Education of gifted students	2.50	1.08
Education of students with learning disabilities	3.31	.87
Education of students who need psychological help	2.99	.80
Prevention of crime and violence in educational institutions	2.65	.87
Individual differences in education	2.56	.86
<b>Communication and Skills</b>		
Communication with students	2.05	.89
Communication with parents	2.03	.89
Adapting to new workplace(city, district, etc.,)	2.27	.81
Communication with colleagues	1.91	.78
Communication with community	2.32	.94

Scoring Direction:

1.00-1.75 = not at all, 1.76-2.50 = somewhat, 2.51-3.25= quite a bit,  
3.26-4.00= a great deal

After determining the content of the in-service training programs that teacher need, second purpose of the study was to get the clues about the form of those programs.

Teachers' preferences on in-service teacher training were explored on the five sub categories namely teaching method, trainer, schedule, trainee selection system and assessment. Under each category, the respondent prioritized 3 alternative items to indicate their preferences on training program. The item which was chosen as the first priority is given a score of 3, the second choice as 2 and the third choice as 1. The total score for each item will indicate the level of teachers' preferences on this particular item. The item with the largest score is the alternative that the teacher most prefers and the second highest score indicates that the teachers second prioritize on this alternative. And the third highest one is the teachers' third choice for their preferences. The results are summarized on each category in table 2.

Table 2. Scores and Percentage Showing Teachers' Preferences on Form of In-service Teacher Training

<b>Form of In-service Teacher Training</b>	<b>Total Score</b>	<b>%</b>
<b>Teaching Method</b>		
Content is lectured by instructors	31	6
Content is discussed by instructors	142	27
Content is discussed by participants before being lectured	196	37
Content is taught by questioning	102	19
Content is delivered through activities	55	11
<b>Trainers</b>		
School principals	131	28
TEOs /ATEOs	50	11
Teacher educators from education colleges	186	40
Inspectors	41	9
Senior teachers	120	12
<b>Schedule</b>		
At the beginning of academic year (April – May)	222	30

<b>Form of In-service Teacher Training</b>	<b>Total Score</b>	<b>%</b>
At the end of academic year (March – April)	165	38
within semester time, after school hours	19	4
within semester time, on weekends	32	7
holidays during semester breaks (October/ December)	94	21
<b>Trainee Selection System</b>		
participate voluntarily	185	35
according to needs in particular subjects	167	32
selected by TEOs/ATEOs	15	3
selected by the principals	64	12
according to the order of service years	99	18
<b>Assessment System</b>		
taking examination	194	37
using multiple assessment methods	135	26
follow-up tests in the future	98	18
participation in learning activities as important part	101	19

Results in table 2 indicated that teachers strongly prefer that content is discussed by participants before being lectured and trainers should be teacher educators from education colleges. Furthermore, teachers preferred training courses should be at the beginning of academic year (April-May), participants should be involved in-service training programs voluntarily and assessment system of in-service teacher training should be taking examination. Conversely, teachers did not prefer that content lectured only by instructors, inspectors as trainers, courses given after school hours, trainee selection done by TEOs and follow up tests for assessment system of the training programs.

Teachers' preferences on the form of in-service teacher training can be presented separately. Figure 4.1 represents the teaching methods of in-service teacher training preferred by the teachers.

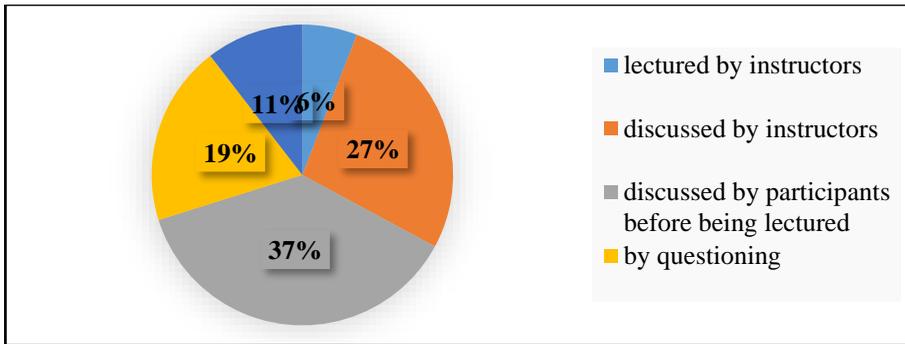


Figure 2. Teachers' Preferences on Teaching Method

The teachers' preferences on the person who gives the in-service training can be shown as in figure 3.

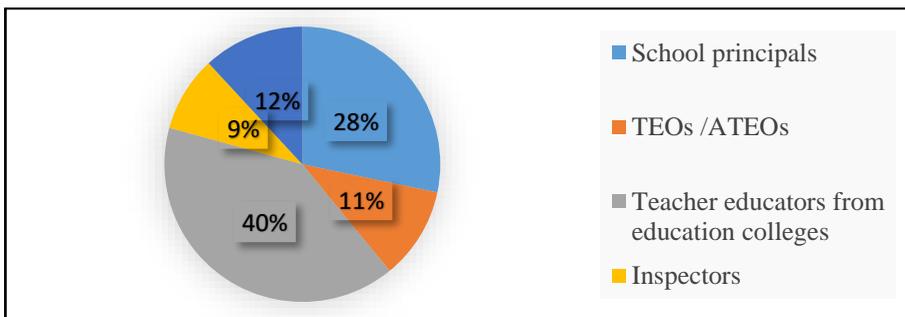


Figure 3. Teachers' Preferences on Trainers

Teachers' preferences on schedule of in-service teacher training were explored by using 5 alternatives. Figure 4 presents the schedule of in-service teacher training preferred by the teachers.

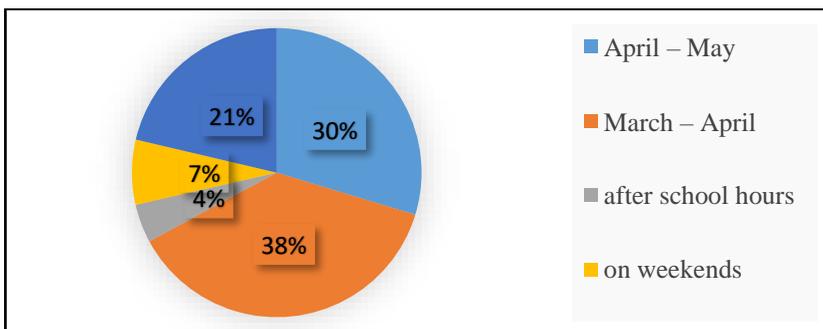


Figure 4. Teachers' Preferences on Schedule

Teachers' preferences on trainee selection system of in-service teacher training were explored by using 5 alternatives which are to be chosen 3 priorities to indicate the teachers' preferences. Figure 5 shows the teachers' preferences on trainee selection system of in-service training.

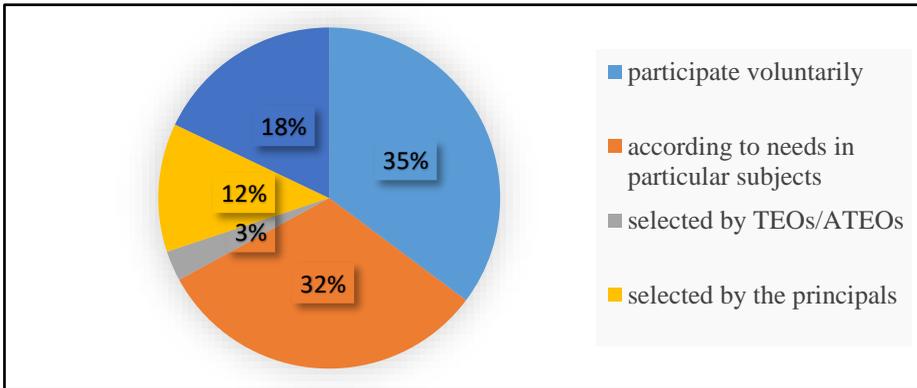


Figure 5. Teachers' Preferences on Trainee Selection System

Teachers' preferences on assessment system of in-service teacher training were explored by using 4 alternatives. Figure 4.6 shows the teachers' preferences on assessment system of in-service teacher training.

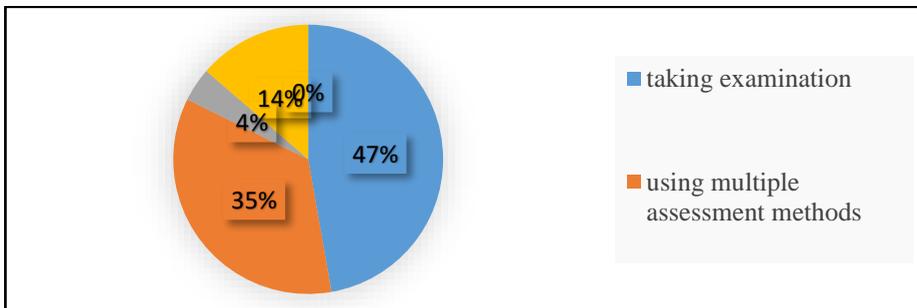


Figure 6. Teachers' Preferences on Assessment System

To find the answer the research question "Are there any significant differences in lower secondary teachers' in-service teacher training needs related to factors such as age and subject area?" one-way ANOVA analysis was conducted.

To examine the difference in teachers' perception needs with respect to their age, one-way ANOVA was conducted. (Table 3)

Table 3. Effect of Age on In-service Training Needs

		<b>SS</b>	<b>df</b>	<b>MS</b>	<b>F</b>	<b>Sig.</b>
Pedagogical Knowledge	Between Groups	1.49	2	.74	2.30	.10
	Within Groups	27.52	85	.32		
Subject-related Knowledge	Between Groups	2.38	2	1.19	5.86*	.01
	Within Groups	17.30	85	.20		
Use of ICT in Education	Between Groups	1.01	2	.50	1.33	.26
	Within Groups	32.23	85	.37		
Self-Development	Between Groups	.18	2	.09	.38	.68
	Within Groups	20.12	85	.23		
Guidance and Special Education	Between Groups	.30	2	.15	.44	.64
	Within Groups	28.59	85	.33		
Communication and Social Skills	Between Groups	4.22	2	2.11	4.13*	.01
	Within Groups	43.46	85	.51		

\* $p < .05$

According to the results, there were significant difference on needs of Subject-related Knowledge (31-40yrs:  $M=2.95$ ; 41-50yrs:  $M=2.53$ ; above50:  $M=2.83$ ), and Communication and Social Skills Knowledge (31-40yrs:  $M=2.62$ ; 41-50yrs:  $M=2.00$ ; above50:  $M=2.20$ ) categories since the mean differences between subject teachers were found statistically significant. However, there were not significant mean differences with respect to teacher's age on the needs of Pedagogical Knowledge, Use of ICT in Education, Self-Development, and Guidance and Special Education. As a post hoc comparison, Tukey HSD was conducted. According to the follow-up test results, teachers with the age range of 31 to 40 expressed higher needs on Subject-Related Knowledge, and Communication and Social Skills when compared with other age groups of 41-50 and above 50.

To examine the difference in teachers' perception on needs with respect to their subject area, one-way ANOVA was conducted. (Table 4)

Table 4. Effect of Subject Area on In-service Training Needs

		SS	df	MS	F	Sig.
Pedagogical Knowledge	Between Groups	3.48	4	.87	2.83*	.03
	Within Groups	25.53	83	.30		
Subject-related Knowledge	Between Groups	1.34	4	.33	1.52	.20
	Within Groups	18.34	83	.22		
Use of ICT in Education	Between Groups	5.29	4	1.32	3.92*	.01
	Within Groups	27.96	83	.33		
Self- Development	Between Groups	1.21	4	.30	1.31	.27
	Within Groups	19.09	83	.23		

		SS	df	MS	F	Sig.
Guidance and Special Education	Between Groups	3.74	4	.93	3.09*	.02
	Within Groups	25.14	83	.30		
Communication and Social Skills	Between Groups	4.35	4	1.08	2.08	.09
	Within Groups	43.30	83	.52		

\* $p < .05$

According to the results, there were significant differences on needs of Pedagogical Knowledge (Myanmar:  $M=2.43$ ; English:  $M=2.18$ ; Math:  $M=2.62$ ; Science:  $M=2.77$ ; Arts:  $M=2.52$ ), Use of ICT in Education (Myanmar:  $M=3.06$ ; English:  $M=2.86$ ; Math:  $M=3.42$ ; Science:  $M=3.33$ ; Arts:  $M=3.47$ ), and Guidance and Special Education (Myanmar:  $M=2.94$ ; English:  $M=2.65$ ; Math:  $M=2.86$ ; Science:  $M=2.94$ ; Arts:  $M=2.41$ ) categories since the mean differences between subject teachers were found statistically significant. However, there were not significant mean differences with respect to teacher's subject area on the needs of Subject-related Knowledge, Self-Development, and Communication and Social Skills. As a post hoc comparison, Tukey HSD was conducted. According to the follow-up test results, Science teachers expressed higher need on Pedagogical Knowledge when compared with other subject teachers. Moreover, English teachers reported that they have higher need on Use of ICT in Education comparing other subject teachers.

### Conclusion and Discussion

In this study, in-service training programs that were preferred and needed by lower secondary teachers were studied. Furthermore, differences in needs of in-service teacher training were examined related to individual factors such as age and subject area.

This study aimed to present evidence regarding the effects of teachers' demographic characteristics on in-service training needs. However, based on teachers' responses, it can be concluded that most of the variables had very small effects on needs categories. Despite their small

effects on teachers' in-service training needs, it is still important to take teachers' characteristics into account in designing an in-service training program. To illustrate, teachers with the age of 31 to 40 reported a higher need for training on subject-related knowledge, and communication and social skills than the other older age groups; Science teachers reported higher need for training of pedagogical knowledge when compared Myanmar teachers; Math, Science and Arts teachers expressed high needs for use of ICT in education comparing with other subject teachers. It is strongly suggested that Teacher Education Sector from Ministry of Education should consider the individual characteristics while designing in-service training programs so that the programs will achieve their major purposes. Moreover, reaching the target group with regarding the individual differences will be helpful in using resources effectively.

This study also aimed to find the teachers' preferences about the form of in-service training program. To illustrate the teachers' responses, teachers preferred that content to be discussed by participants before being lectured on by instructors under the Teaching Method preferences; teachers strongly preferred that trainers to be teacher educators from education colleges; they preferred that courses to be scheduled before the beginning of the academic year (April-May) under Schedule category; they strongly preferred that participants to be involved in-service training programs voluntarily, and teachers preferred that evaluation to be done by examinations and also using multiple methods for assessment. Consideration these preferences expressed by teachers may help teacher education sector in reaching their major purposes for providing in-service teacher trainings.

Most of in-service training programs offered by Ministry of Education are compulsory courses. The authorities in the field of teacher education should further examine to reveal the results that 1) whether the teachers are really good at in those specified contents so that they do not need any additional knowledge or skills; 2) the in-service training programs are not attractive to teachers' interests. Moreover, different types of professional development programs from other developed countries can be examined and taken into consideration as a model so that teachers are interested in attending in-service training courses and seminars.

Guskey (1986) supports that one of the reasons of the failure of in-service training programs is not paying attention to factors that motivate

teachers to participate in professional development. Therefore, offering incentives like in-service training programs' being imperative for promotion, recruitment, preferment, etc. may help teachers motivated to involve in in-service training programs.

Moreover, the findings of the study suggested that participants strongly preferred to attend the course voluntarily. This result should be seriously taken into consideration by teacher education sector. If teachers will be able to attend in-service training programs voluntarily then both sides may benefit from the situation; that is, teachers may get in-service training on what they need and are interested in, and the Ministry of Education may have more qualified and skilled teachers by providing opportunities to them to gain more from those programs. In addition, teachers mostly preferred teacher educators from education colleges as trainers in the trainings and as a second choice, they also want the school principals and senior teachers to be their trainers. Therefore, the school based in-service trainings where the principals and experienced teachers are trainers should also be considered for professional development programs. Knowing what teachers need and prefer will ensure a stronger and effective design of a new in-service teacher training programs.

### **Need for Further Research**

This study provides a basis for further "Professional Development" studies with a wider variety of participants. The results of the study support the following recommendations for future research.

First, the data collection instrument used in this study was based on literature and related researches, and modified with the context. To improve the current scale, therefore, preliminary interviews with teachers, school principals, township education officers, teacher educators as well as education experts to include their opinions about the quality of in-service teacher training.

Second, this research was a small-scale investigation into teachers' needs and preferences on in-service training for developing need-based training programs. In the future, researchers should try to conduct nationwide "Professional Development" studies. The results to be collected from all these participants will shed light on establishing and practicing a stronger "Professional Development" policy in Myanmar teacher education system.

Finally, in this study, the “Why” question was not addressed. To understand deeply why teachers did not rate any need among such a wide range of in-service training content, qualitative research methods should be employed in future research. From interviews and observations, teachers may give further and more specific information about this situation. The findings from the qualitative study can provide in-depth insight into teachers’ responses about their low rating of in-service training needs.

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