Semantic Memory and Academic Achievement of Middle School Students in Monywa Township

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Abstract

The main aim of this study is to investigate semantic memory and academic achievement of middle school students from Monywa Township. This study was also investigated the significant differences in students' semantic memory by their gender, grade, age group and parents' education. Descriptive research design and survey method were employed. A total sample of 1000 students of Grade 8 and Grade 9 students (male=496, female=504) from selected schools in Monywa Township, Sagaing Region during the academic year 2014-2015 were selected as participants. Based on Clinical Evaluation of Language Fundamentals – Fifth Edition (CELF-5), (Eleanor Semel et al, 2013), semantic memory test (60 items) was developed as an instrument for this study. It consisted of seven subtests; word definition test, concept and direction test, recall and retrieval of spoken language test, word class test, semantic relationship test, sentence assembly test and formulated sentence test. Results of statistical analysis confirmed that middle school students had high skills in semantic memory. The *t*-test result showed that there was no significant difference between males and females, and also that Grade 9 students had better semantic memory than Grade 8 students. Age groups differences in semantic memory were not found significantly according to the *t*-test result. ANOVA results indicated that parents' education affect on semantic memory of middle school students in this study. Correlation matrix showed that students' semantic memory was positively correlated with their academic achievement. This research found that semantic memory impacts on students' academic area and it can predict students' academic achievement. To sum up, it is certain that the higher the semantic memory of the middle school students, the higher the academic achievement they will obtain. Semantic memory is a core component of general intelligence and learning, not only in the field of education but in educational psychology. By studying semantic memory of middle school students, it is valuable for educators to foster effective and quality education in one side or another.

Key words: semantic, semantic memory, academic achievement, preadolescence, adolescence

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Introduction

Education is the process of imparting or acquiring knowledge and habits through instruction. The most important objective of educational process is to transfer knowledge to the next generation (Gedler, 2005). In every society, the teaching – learning process and its effectiveness determine the success of the respective education system. And also, the majorities of nations aim is education to develop children who are efficient problem solvers equipped with higher mental faculties and are efficient enough to face the challenges of ever changing scenario in this globalization age. In order to equip with higher mental faculty, it is essential to enhance and accelerate the special mental abilities. Among the mental faculties, memory is a special faculty of the mind to store the past experiences or learning and to reproduce them for use when required at a later time.

Memory is defined as the ability to use the past in the service of the present. Furthermore, memory is the power or process of reproducing or recalling what has been learned and retained especially through associate mechanisms (Sternberg, 2010). Generally, memory is divided into three groups: sensory memory, short-term memory and long-term memory. Abbot (2002) stated that long-term memory "is that more permanent store in which information can reside in a dormant state – out of mind and unused – until a person fetches it back into consciousness". Researchers in the field categorized human long-term memory system into distinct categories, namely as implicit (or non-declarative) and explicit (or declarative) memory systems (Bauer, Larkina, & Deocampo, 2010, cited in Michael N. Jones, 2014).

Explicit memory also has subcategories, including episodic memory and semantic memory. Episodic memory is defined as remembering a past event, in which the person is aware of the time, place and other specific features of that particular experience (Tulving, 1993). Semantic memory consists of general knowledge without sense of self (Wojcik, Moulin, & Souchay, 2012, cited in Michael N. Jones, 2014).

To function in daily life, people must be able to retrieve facts about the world (semantic knowledge) and to remember the specific spatial and temporal details of prior experiences in their lives (episodic memory). In addition, people must be able to learn new facts and to record new experiences. To interact with the world in daily life, people acquire a large amount of information from their environment. Semantic memory is

generically thought of as the storage system for all of the information they have about objects in the world, both informational and perceptual.

In addition to language, semantic memory is also important in the education area because students do not always remember the specific moments that they learned a new piece of information by recalling from semantic memory (Conway et al., 1997; Herbert & Burt, 2004; Leichtman et al., 2011). This makes educators focus on students' performance in the exams in order to find out the efficiency of using semantic memory.

Purpose of the Study

The purpose of this study is to investigate semantic memory and academic achievement of middle school students from the selected schools in Monywa Township according to gender, grade, age group, school types and parents' education.

Scope of the Study

Only seven subtests of semantic memory tests are applied to assess middle school students' semantic memory in this study. 1000 participants of this study are randomly limited to investigate semantic memory of Grade 8 and Grade 9 students from the selected schools in Monywa Township, Sagaing Region.

Definitions of Key Terms

Semantic - Semantic is the study of the relationship between words or phrases and the things or concepts to which they refer.

Semantic Memory - Semantic memory is defined as encoding and recalling general knowledge about the world (Tulving, 1993) and it consists of general knowledge without sense of self (Wojcik, Moulin, & Souchay, 2012, cited in Michael N. Jones, 2014).

Academic Achievement - Academic achievement is identified that the measure of knowledge gained in formal education usually indicated by test scores, grade, grade points, average and degrees of school subjects (Arul Lawrence, A.S. 2012, cited in Lieury et al. 2013).

Preadolescence - Preadolescence is the period of human development just preceding adolescence (Merriam Webster Dictionary).

Adolescence - A general term signifying the period from the onset of puberty to adulthood, typically including the teen years 13 to 19 (Lefrancois, Guy R., 1995).

Literature Review

Semantic Memory

Semantics is the analysis of meaning of language, but especially of individual words, the relationships among words, and the significance of words within particular contexts (Allyn & Bacon, 1997). Semantic memory is regarded as the long-term repertoire of world knowledge (Tulving, 1972). Without world knowledge, people would be incapable of understanding the world around us and hence unable to communicate or to act in the service of goals (Hodges & Patterson, 1997).

Semantic memory encompasses a rich fund of general knowledge about the world, including people's understanding of words, pictures, objects, sounds, faces and events (Rogers et al., 2004; Jefferies and Lambon Ralph, 2006; Patterson et al., 2007). It plays a critical role in many everyday verbal and non-verbal activities. Semantic memory includes:

- The meaning of letters, words
- Word definitions
- Recognizing color names and dates
- Knowing the names of shapes
- Knowing that the capital of the country
- Remembering the names of the famous people
- Knowing that a thing is a plant or an animal
- Geographical knowledge
- Concepts that learned in school
- Semantic relationships
- The concept of what an animal is
- Knowledge of historical events, i.e. World War II (Tulving, E. ,1972)

There are several different tests today that are used to study semantic memory, both in the clinical neuropsychological examination of patients,

and in scientific research. Among them, seven semantic memory tests in this study were used as follows;

***Word Definition Test*:** Word definition is the ability to analyze words for their meaning features, define words by referring to class relationships and shared meanings, and describe meanings that are unique to the reference or instance.

***Concept and Direction Test*:** Concept and direction is the ability to evaluate concepts and information of geographical knowledge, concepts that learned in school and recalling the dates or facts.

***Recall and Retrieval of the Spoken Language Test*:** Recall and retrieval of the spoken language is the ability to examine the semantic representations of the spoken words and write down these words that recall immediately.

Word Class Test: Word class is the ability to understand relationships between words based on semantic class features, function, or place or time of occurrence.

***Semantic Relationship Test*:** Semantic relationship is the ability to interpret sentences that (a) make comparisons, (b) identify location or direction, (c) specify time relationships, (d) include serial order, or (e) are expressed in passive voice.

***Sentence Assembly Test*:** Sentence assembly is the ability to formulate grammatically – acceptable and semantically - meaningful sentences or phases by manipulating and transforming given words and word groups.

***Formulated Sentence Test*:** Formulated sentence is the ability to formulate complete, semantically and grammatically correct sentences of increasing length and complexity (i.e. simple, compound, and complex sentences), using given word and contextual constraints imposed by illustrations.

Academic Achievement

Academic achievement or (academic) performance is the outcome of education — the extent to which a student, teacher or institution has achieved their educational goals. Academic achievement is commonly measured by examinations or continuous assessment but there is no general agreement on how it is best tested or which aspects are most important procedural knowledge such as skills or declarative (semantic) knowledge such as facts (Mildred Murray-Ward, et al., 1996).

Academic achievement may also refer to a person's strong performance in a given academic area. Education associations and schools monitor the overall level of student academic achievement to decide what, if any, changes need to be made in the educational system.

Semantic memory is an essential component of learning and education. According to Crow and Crow (1969), academic achievement is defined as the extent to which a learner is profiting from instructions in a given area of learning i.e., achievement is reflected by the extent to which skill and knowledge has been imparted to him. So, semantic memory and academic achievement are related in education process.

Implications of Semantic Memory in Academic Areas

Language is used as an instrument and it needs to remember a word's meaning, which would be retrieved from semantic memory (Wheeler et al., 1997). Therefore, semantic memory is important and required for language development. Words, their meanings and the relations between them are stored in the semantic memory system and this information helps individuals to use language as a communication tool (Tulving, 1972).

In addition to language, semantic memory is also important in the education area because students do not always remember the specific moments that they learned a new piece of information by recalling from semantic memory (Conway et al., 1997; Herbert & Burt, 2004; Leichtman et al., 2011). Remembering specific learning information, storing acquired knowledge in semantic memory is a useful source in educational settings.

Besides, the specific teaching knowledge in middle school; History, Geography, Mathematics, Physics, Literature, Foreign Languages probably mainly depends on the lexical and semantic memory (Lieury, A. & Lorant, S. 2013). Moreover, developing knowledge of terms for orientation may increase the student's ability to follow instructions across subject areas (eg, English, Language, Arts, Mathematics and Sciences). Semantic memory influence on the stored vocabulary and metalinguistic knowledge (Marinellie & Johnson, 2002), reading comprehension (Zipke, 2007), written language expression (Thompson & Shapiro, 2007), the early and later acquisition of literacy (Larsen & Nippold, 2007), reading comprehension, written language expression and editing and revising text

(Thompson & Shapiro, 2007) and literacy acquisition (Justice & Vukelich, 2008) (cited in Eleanor Semel, et. al , 2013).

Semantic memory plays an important role in academic subject areas. Obviously, semantic memory is an important part of the learning process. Understanding what people know about the functions of semantic memory can help expert educators to create memorable lessons that will be the foundation of complete learning. Although semantic memory of people is developing continuously, they can be deficient in their semantic development in one way or another. Therefore, it needs to be considered possible causes for those who have deficient semantic memory development.

Methodology

The aim of this study was to investigate semantic memory and academic achievement of middle school students. Quantitative approach was used in this study. Survey method and descriptive research design were employed. Semantic memory test was used to investigate semantic memory of middle school students from selected schools in Monywa Township.

Participants of the Study

The total number of participants in this study were 1000 students (496 males and 504 females) from Monywa Township in Sagaing Region. There were (485) Grade 8 and (515) Grade 9 students in the whole sample (see in Table 1). They were selected by using random sampling technique according to the selected school types in the 2014-2015 Academic Year. And also, average age of participants was 13.43.

Table 1 The Number of Participated Students by Gender, Grade and School Types

Grade School Types	Grade 8		Grade 9		Total
	Male	Female	Male	Female	
BEHS	70	66	76	73	**285**
BEHS (branch)	62	66	61	65	**254**
BEMS (branch)	47	54	51	59	**211**
Private School	64	56	65	65	**250**
Total	**243**	**242**	**253**	**262**	**1000**

Instrumentation

Semantic memory test for middle school students was used to measure students' semantic memory. In this study, semantic memory test adapted from Test Objectives and Descriptions for the Clinical Evaluation of Language Fundamentals – Fifth Edition (CELF-5) by Elisabeth H. Wiig, Eleanor Semel and Wayne A., (2013) was used. After adaptation, expert reviews were conducted for face validity and content validity by the experts in the field of educational psychology form Yangon University of Education and from Sagaing University of Education.

The semantic memory test which included 78 items was administered to 100 students (Grade 8=50 and Grade 9=50) students from No. (19), B.E.H.S (Basic Education High School), Chanayetharzan Township, Mandalay Region for pilot testing. The internal consistency (Cronbach α) of the whole items was 0.8.

Moreover, difficulty index and discrimination index for each item were calculated by using the proportion of high and low scores. According to these results, the items that were between 0.25 and 0.8 difficulty index and equal to (or) greater than 0.2 discrimination index were chosen with content validity (see Appendix C). Based on item analysis, 60 items were selected and utilized for the final test administration after leaving 18 items out.

In conducting the item analysis, it was found that most items were easy for students and so items selecting were done for revised test of 60 items to conduct the final test administration. For a measure of internal consistency, Cronbach's alpha of the whole test in the final test administration is 0.885. Thus, Cronbach's alpha value indicated that semantic memory test is satisfactorily reliable as an instrument to measure semantic memory of middle school students.

A questionnaire was used to collect demographic information of the participants such as gender, grade, name of the school, parent's job and parent's education. In this study, semantic memory test consists of 60 items and was categorized into seven subtests: word definition test (8 items), concept and direction test (9 items), recall and retrieval of spoken language test (8 items), word class test (9 items), semantic relationship test (6 items), sentence assembly test (12 items) and formulated sentence test (8 items). The scoring method of semantic memory test in this study was 1 (one) for correct answer and 0 (zero) for incorrect answer.

Procedure

Firstly, the related literatures were gathered form several available books, journals, reports, theses and internet sources. In order to explore middle school students' semantic memory, semantic memory test was prepared. After preparing the test, expert reviews in the field of educational psychology form Yangon University of Education and from Sagaing University of Education were conducted. To validate the instrument, pilot testing was done with the sample of 100 Grade 8 and Grade 9 students from No. (19), B.E.H.S (Chanayetharzan Township), Mandalay Region during the first week of November in 2014.

After modifying the instrument based on pilot testing results, the necessary data were collected from six selected schools: one Basic Education High School, one Basic Education High School (Branch), two Basic Education Middle Schools (Branch) and two Private Schools in Monywa Township, Sagaing Region during the third week of November in 2014. And then, the collected data was analyzed. Finally, the interpretation of the findings was made and conclusion and suggestions were drawn.

Data Analysis, Findings and Interpretations

Descriptive analysis was conducted to reveal the mean and standard deviation of middle school students' semantic memory. The mean and standard deviation of the whole sample were 41.6 and 9.174 (see Table 2).

Table 2 Descriptive Analysis of Students' Semantic Memory

Scores	*N*	Minimum	Maximum	Median	Mean	SD
Semantic Memory	1000	7	59	43	41.46	9.174

Based on the descriptive analysis, middle school students' semantic memory scores were identified into three groups: 16.7% of high semantic memory group with scores one standard deviation above the sample mean, 69% of moderate semantic memory group with scores equal to the sample mean and 14.1% of low semantic memory group with scores one standard deviation lower than sample mean (see Figure 1). Therefore, it can be interpreted that majority of middle school students in Monywa township were good and satisfactory in semantic memory.

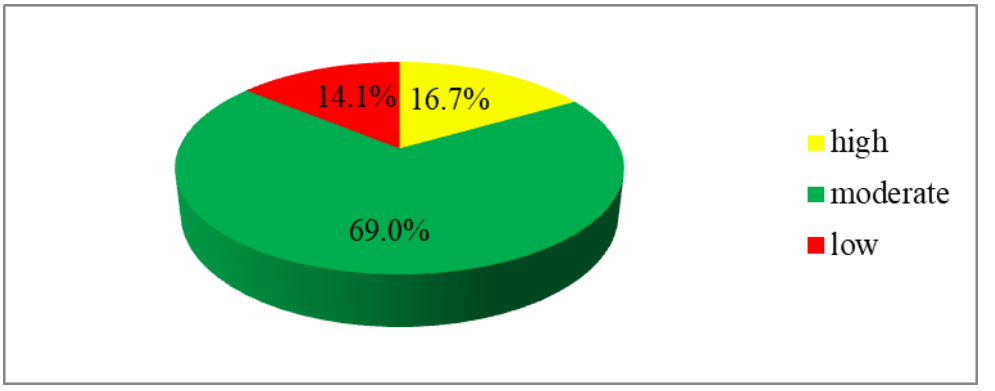

Figure 1 Three Groups of Middle School Students' Semantic Memory Scores

Semantic memory of students was measured by seven subtests of semantic memory. Students' semantic memory scores were shown by means of descriptive analysis (see Table 3).

Table 3 Descriptive Analysis of Students' Semantic Memory for Seven Subtests

Semantic Memory	*N*	Minimum	Maximum	Mean	Mean %	SD
Word Definition	1000	0	8	5.92	74%	1.595
Concept and Direction	1000	0	9	4.60	51.11%	2.314
Recall and Retrieval of Spoken Language	1000	0	8	5.17	64.63%	1.854
Word Class	1000	0	9	6.88	76.44%	1.665
Semantic Relationship	1000	0	6	4.06	67.67%	1.500
Sentence Assembly	1000	0	12	10.11	84.25%	2.243
Formulated Sentence	1000	0	8	4.73	59.13%	1.806
Total	1000	7	59	41.46	70.27%	9.174

Table 3 presented mean and standard deviation of each subtest and total semantic memory scores for the whole sample. In Table 3, the highest mean percentage for sentence assembly ability was 84.25%. This result showed that students were good at such abilities as formulating grammatically-acceptable and semantically-meaningful sentences by manipulating and transforming given words and word groups. The lowest mean percentage for concept and direction ability was 51.11%. The result revealed that students were weak in evaluating concepts and information of geographical knowledge, concepts that learned in school and recalling the dates or facts.

Gender Differences in Students' Semantic Memory

To investigate the significance differences between male and female students in semantic memory, independent sample *t*-test was made.

Table 4 Gender Differences in Students' Semantic Memory

Gender	*N*	Mean	Std. Deviation	*t*	*df*	*p*	Mean Difference
Male	496	40.97	9.087	-1.664	998	.096	-.965
Female	504	41.94	9.244				

According to Table 4, the result of *t*-test indicated that there was no significant difference between males and females in semantic memory scores. This finding is similar to the study of Herlitz et al., (1997; 1999) and the study of Hatta et al. (2013).

Comparison of Students' Semantic Memory by Grade

To investigate the significant differences between Grade 8 and Grade 9 students in semantic memory, independent sample *t*-test was made.

Table 5 Students' Semantic Memory by Grade

Grade	*N*	Mean	SD	*t*	*df*	*p*	Mean Difference
Grade 8	485	39.95	9.779	-5.119	998	.000	-2.935
Grade 9	515	42.88	8.328				

Table 5 showed that Grade 8 students were significantly lower than Grade 9 students in semantic memory scores ($p<0.01$). Thus, Grade 9 students had significantly better semantic memory than Grade 8 students. This finding is consistent with the previous research of Lieury et al., (1995) and Lieury, A. & Lorant, S. (2012) (cited in Lieury et al. 2013).

Comparison of Students' Semantic Memory by Age Group

In this study, middle school students were categorized into two age groups. Students of age 11 to 13 years and 6 months were grouped as preadolescence age group and students of above 13 years and 6 months were grouped as adolescence age group. To investigate the significant differences between preadolescence and adolescence age groups in semantic

memory, independent sample *t*-test was made. It showed the comparison of students' semantic memory by age group.

Table 6 Students' Semantic Memory by Age Group

Age Group	*N*	Mean	SD	*t*	*df*	*p*	Mean Difference
Preadolescence	578	41.56	9.307	.385	998	.701	.226
Adolescence	422	41.33	8.998				

According to Table 6, the result of *t*-test indicated that there was no significant difference between preadolescence and adolescence in semantic memory scores (p=.096). This finding is similar to the study of Ronnlund, Nyberg, Backman & Nilsson (2005) but it contrasted with the study of Henk J. Haarmann (2002).

Comparison of Students' Semantic Memory by School

Because of socioeconomic status was distinct, different school types were selected to compare mean differences. To know the mean and standard deviation of students' semantic memory by school, descriptive analysis was computed.

Table 7 Descriptive Analysis of Students' Semantic Memory by School Types

School Types	*N*	Minimum	Maximum	Mean	Std. Deviation
BEHS	285	10	59	40.89	8.989
BEHS (branch)	254	10	57	40.25	8.929
BEMS (branch)	211	7	57	37.92	9.770
Private School	250	24	59	46.32	6.913
Total	1000	7	59	41.46	9.174

To explore more exact, One-way Analysis of Variance (ANOVA) was conducted. The result indicated that there was significant difference in students' semantic memory scores in terms of different school types (F (3,996) = 39.884), p<0.01 (see in Table 8).

Table 8 ANOVA Table of Mean Comparison for Students' Semantic Memory in Terms of School Types

School	Sum of Squares	*df*	Mean Square	*F*	*P*
Between Groups	9017.855	3	3005.952	39.884	**.000**
Within Groups	75066.545	996	75.368		
Total	84084.400	999			

Then to obtain more detail information of how different in students' semantic memory by school, Post Hoc test was computed by Games-Howell method.

Table 9 Result of Games-Howell for Students' Semantic Memory by School

School (I)	School (J)	Mean Difference (I-J)	*p*
BEHS	BEHS (branch)	.643	.839
	BEMS (branch)	**2.967***	**.003**
	Private School	**-5.433***	**.000**
BEHS (branch)	BEHS	-.643	.839
	BEMS (branch)	**2.324***	**.041**
	Private School	**-6.076***	**.000**
BEMS (branch)	BEHS	**-2.967***	**.003**
	BEHS (branch)	**-2.324***	**.041**
	Private School	**-8.400***	**.000**
Private School	BEHS	**5.433***	**.000**
	BEHS (branch)	**6.076***	**.000**
	BEMS (branch)	**8.400***	**.000**

* The mean difference is significant at the 0.05 level.

Accordingly, there was significant difference between students from BEHS (branch) and those from BEMS (branch) (p<.05). Also, there were significant differences between students from private school and those from the remaining other school types (p<.01).

Comparison of Students' Semantic Memory by Parents' Education Level

To explore the mean and standard deviation of students' semantic memory by fathers' education level, descriptive analysis was computed.

Table 10 Descriptive Analysis of Students' Semantic Memory by Fathers' Education Level

Fathers' Education Level	*N*	Minimum	Maximum	Mean	SD
Primary School Level	259	13	56	38.73	8.532
Middle School Level	358	7	57	39.45	9.335
High School Level	180	15	57	42.38	8.868
Graduate	198	20	59	47.59	6.624
Post Graduate	5	47	55	51.00	3.391
Total	1000	7	59	41.46	9.174

Table 10 revealed that there were significant differences in students' semantic memory by fathers' education level by computing One-way analysis of variance (ANOVA).The result indicated that there was significant difference in students' semantic memory scores by fathers' education level (F (4,995) = 39.125), p<.001.

Table 11 ANOVA Table of Mean Comparison for Students' Semantic Memory by Fathers' Education Level

Fathers' Education Level	Sum of Squares	*Df*	Mean Square	*F*	*P*
Between Groups	11427.996	4	2856.999	39.125	**.000**
Within Groups	72656.404	995	73.022		
Total	84084.400	999			

Again, Post Hoc test was computed by Games-Howell method to obtain more detail information of students' semantic memory by fathers' education level.

Table 12 Result of Games-Howell for Students' Semantic Memory by Fathers' Education Level

Father Education(I)	Father Education(J)	Mean Difference(I-J)	*p*
Primary	Middle	-.727	.854
	High	**-3.652***	**.000**
	Graduate	**-8.865***	**.000**
	Post Graduate	**-12.274***	**.003**
Middle	Primary	.727	.854
	High	**-2.925***	**.004**
	Graduate	**-8.138***	**.000**
	Post Graduate	**-11.547***	**.005**
High	Primary	**3.652***	**.000**
	Middle	**2.925***	**.004**
	Graduate	**-5.213***	**.000**
	Post Graduate	**-8.622***	**.013**
Graduate	Primary	**8.865***	**.000**
	Middle	**8.138***	**.000**
	High	**5.213***	**.000**
	Post Graduate	-3.409	**.332**
Post Graduate	Primary	**12.274***	**.003**
	Middle	**11.547***	**.005**
	High	**8.622***	**.013**
	Graduate	3.409	.332

According to Table 12, the result showed that the students whose fathers with high school level were significantly different with those of primary school level ($p< .01$) and those of middle school level ($p<.05$). And also, students whose fathers' graduated level were significantly different with those of primary level ($p<.01$), middle school level ($p<.01$) and those of high school level ($p<.01$), respectively. Moreover, students whose fathers' post graduated level were also significantly different from those of primary level ($p<.05$), those of middle school level ($p<.05$) and high school level ($p<.05$). Therefore, it can be concluded that highly educated fathers can suppose or practice their children's high semantic memory.

After finding students' semantic memory by fathers' education level, descriptive analysis was computed to explore the mean and standard deviation of students' semantic memory by mothers' education level.

Table 13 Descriptive Analysis of Students' Semantic Memory by Mothers' Education Level

Mothers' Education Level	*N*	Minimum	Maximum	Mean	Std. Deviation
Primary School Level	346	7	56	38.94	9.007
Middle School Level	313	10	57	40.11	9.030
High School Level	176	15	59	42.66	8.956
Graduate	162	25	59	47.91	6.273
Post Graduate	3	54	55	54.67	.577
Total	1000	7	59	41.46	9.174

Next, Table 13 revealed that there were differences in students' semantic memory by mothers' education level. One-way (ANOVA) was conducted to explore to be sure these differences. The result indicated that students were significantly different in semantic memory scores by mothers' education level (F (4,995) = 34.641), p<.001 (see Table 14).

Table 14 ANOVA Table of Mean Comparison for Students' Semantic Memory by Mothers' Education Level

Mothers' Education Level	Sum of Squares	*df*	Mean Square	*F*	*p*
Between Groups	10278.212	4	2569.553	34.641	**.000**
Within Groups	73806.188	995	74.177		
Total	84084.400	999			

Furthermore, Post Hoc test was computed by Games-Howell method to obtain more detail information of how different in students' semantic memory by mothers' education level (see in Table 15).

Table 15 Result of Games-Howell for Students' Semantic Memory by Mothers' Education Level

Mother Education(I)	Mother Education(J)	Mean Difference (I-J)	*p*
Primary	Middle	-1.163	.464
	High	**-3.717***	**.000**
	Graduate	**-8.965***	**.000**
	Post Graduate	**-15.724***	**.000**
Middle	Primary	1.163	.464
	High	**-2.554***	**.023**
	Graduate	**-7.802***	**.000**
	Post Graduate	**-14.561***	**.000**
High	Primary	**3.717***	**.000**
	Middle	**2.554***	**.023**
	Graduate	**-5.248***	**.000**
	Post Graduate	**-12.008***	**.000**
Graduate	Primary	**8.965***	**.000**
	Middle	**7.802***	**.000**
	High	**5.248***	**.000**
	Post Graduate	**-6.759***	**.000**
Post Graduate	Primary	**15.724***	**.000**
	Middle	**14.561***	**.000**
	High	**12.008***	**.000**
	Graduate	**6.759***	**.000**

* The mean difference is significant at the 0.05 level.

The results of Table 15 revealed that the students whose mothers with high school level were significantly different from those of primary school level mothers ($p<.01$) and those of middle school level ($p<.05$). And also, mothers with graduated level were significantly different with those of primary level ($p<.01$), those of middle school level ($p<.01$) and those of high school level ($p<.01$), respectively. Moreover, mothers with post graduated level were also different significantly with those of primary level ($p<.01$), those of middle school level ($p<.01$), high school level ($p<.01$) and graduated level ($p<.01$). Therefore, it can be said that highly educated mothers is found to be positively related to semantic memory of their children.

Thus, it can be said that highly educated parents can encourage semantic memory of children to be high. These results are consistent with the research of Schaefer (1972) in which they concluded that parents have great influence upon the behavior of their children, particularly their semantic memory and academic achievement (cited in Breger, 1987).

The Relationship between Middle School Student's Semantic Memory and Academic Achievement

To investigate the relationship between semantic memory and academic achievement, the Pearson product moment correlation coefficient was calculated. The correlation matrix was reported in Table 16.

Table 16 Correlation Matrix between Student's Semantic Memory and Academic Achievement

		Semantic Memory	**Academic Achievement**
Semantic Memory	Pearson Correlation Sig. (2-tailed) *N*	1 1000	.513** .000 1000
Academic Achievement	Pearson Correlation Sig. (2-tailed) *N*	.513** .000 1000	1 1000

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

According to the Table 16, there was significant correlation between semantic memory and academic achievement scores (r= 0.513, p<0.01). Therefore, semantic memory was positively correlated with students' academic achievement. In other words, it can be said that students who have high semantic memory will obtain high academic achievement. This result was congruent with the result of Conway et al., 1997, Nuthall & Alton-Lee, 1995, (cited in Nur Elibol, 2014).

Moreover, the correlation coefficient between semantic memory (seven subtests) and academic achievement of middle school students was shown in Table 17.

Table 17 Intercorrelations for Semantic Memory Subtests and Academic Achievement of Middle School Students

Subtests	1	2	3	4	5	6	7	8	9
1. Word Definition									
2. Concept and Direction	.541**								
3. Recall and Retrieval of Spoken Language	.403**	.505**							
4. Word Class	.406**	.390**	.307**						
5. Semantic Relationship	.467**	.502**	.314**	.382**					
6. Sentence Assembly	.489**	.494**	.454**	.411**	.439**				
7. Formulated Sentence	.342**	.381**	.312**	.265**	.336**	.405**			
8. Total	.729**	.797**	.679**	.628**	.678**	.772**	.617**		
9. Achievement	.383**	.409**	.334**	.250**	.363**	.442**	.321**	.513**	

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

Table 17 showed that there were significant relationship between all subtests of semantic memory and students' academic achievement at 0.01 level. The result showed that the intercorrelation of word definition and concept and direction test (r= .54, p<.01) were significantly correlated than other subtests as there were more associated in semantic memory. Further, it was found that the intercorrelation of word class and formulated sentence test (r= .27, p<.01) were slightly correlated than others. Thus, the intercorrelation coefficients were in the range of 0.27 to 0.54. Therefore, it can be concluded that all subtests of middle school students' semantic memory were intercorrelated and students with high semantic memory will achieve high success in their academic area.

In order to investigate how well semantic memory (SM) predicted on students' academic achievement (AC), a linear regression was computed. The results were statistically significant (F (1,998) =357.05, p<.001). The identified equation to understand this relationship was academic achievement = 183+5.76* (semantic memory). The adjusted R squared

value was .263. The result indicated that 26% of the students' academic achievement can be predicted from semantic memory. Therefore, it can be concluded the higher semantic memory of the students, the higher academic achievement they will get.

Table 18 Results of Linear Regression Analysis of Semantic Memory as Predictor of Academic Achievement

Model	Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
	B	**Std. Error**	**Beta**		
(Constant)	182.952	12.950		14.127	.000
total	5.763	.305	.513	18.896	.000

According to Table 18, the resultant model of linear regression expressing the relationship between semantic memory and academic achievement was presented in the following equation.

AC = 183+5.76 SM

AC = academic achievement
SM = semantic memory

5. Suggestions and Conclusion

The result of the descriptive statistics revealed that most of the middle school students in Monywa Township encompassed moderate semantic memory level. Although female students were slightly higher than male students in semantic memory, there was no significant difference. It may be possible because students' semantic memory depends on the individual differences of the students but not depend on the sex differences.

Besides, Grade 9 students had higher semantic memory than Grade 8 students because of more general knowledge, more learning experiences and more semantic knowledge. Lorant S, (2012) stated that approximately 11500 words acquired on average at the end of grade 8 and approximately 17000 words acquired on average at the end of grade 9. And also, there was no significant difference between preadolescence and adolescence age groups. It may be possible that the age range between the two groups is not too great or wide.

Moreover, the students of BEMS (branch) scored lower in semantic memory than those of other school types. In this study, the difference in students' semantic memory among different school types may be the impact of different learning environment from which students can learn different phenomena to develop their semantic memory. It may also be possible that the ratio of teacher and students from different schools and learning facilities can effect to improve students' semantic memory.

Furthermore, parents' education affect on semantic memory of middle school students in this study. It may be possible that a high level of parental education is associated with their children's greater academic knowledge and also is continued seeking of new knowledge as in reading books and magazines.

In the correlation matrix, there was a significant relationship between students' semantic memory and their academic achievement. Therefore, the students who were better in semantic memory might also be better in academic achievement. Furthermore, according to regression analysis, students' semantic memory explained 26% of the variance in academic achievement. Semantic memory impacts on students' academic area and it can predict students' academic achievement. To sum up, the higher semantic memory of the middle school students, the higher academic achievement they will obtain.

According to the results of this study, it is obvious that the students' academic achievement success largely depends on their semantic memory. For this reason, the following suggestions would like to be conveyed to students, parents and teachers for the improvement of semantic memory systematically. First of all, students should be aware of their level of semantic memory ability and try to improve it. They should apply the following strategies to improve their semantic memory.

- Write a note help them remember what they need even if the students lose it in the parking lot.
- Recite material aloud in order to increase semantic memory.
- Create the type of "emotional climate" necessary for students to attend to learning.
- Read the number of times to remember the reading material.
- Keep alert by spending brief periods about ten minutes each hour during studying the lessons.
- Attend to learning while teaching in the classroom.

Besides, it is also remarkable that in this modern life, all parents need to be educated in order to generate high semantic memory children. A high level of parental education is associated with greater academic knowledge, improved semantic memory, more informed perceptions of school and increased awareness of public affairs (Schaefer, 1972, cited in Breger, 1987). So, parents can foster children's semantic memory by extending of academic achievement.

- Parents should reinforce the desirable behavior of children such as reading, writing, inquiring and sharing knowledge.
- Parents should create a comfortable and quiet place to study the lessons for their children.
- Parents should keep regular communication with the school.
- Parents should check homework carefully to see how well it is completed.

Moreover, it is deniable that teachers play crucial role in students' semantic memory development. In order to assist middle school students' semantic memory to increase maximum growth, the teachers should:

- encourage students' attention in classroom by using teaching aids, real objects, etc.
- provide students for repetition and review of information.
- actively engage students in the learning process.
- use appropriate learning method for students semantic memory level.
- attach students new learning to previous learning and repeat their studies to promote their semantic memory skill.
- help students learn things that they would struggle to learn on their own.

In order to develop the effective semantic memory that it is improved academic achievement, the cooperation of teachers, parents and students themselves will be necessarily required.

To sum up, it is well documented that semantic memory can be improved with the right training. By strengthening weak semantic memory to be strong, the performance of students can be improved in the teaching - learning situations. For above reasons, it is hoped that this study will serve as a baseline for educators and psychologists in one side or another to improve academic achievement in the educational process.

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