

A STUDY OF THE RELATIONSHIP BETWEEN STUDY SKILLS AND MATHEMATICS ACHIEVEMENT AMONG MIDDLE SCHOOL STUDENTS

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Abstract

The purpose of this study is to study the relationship between study skills and mathematics achievement among middle school students. Quantitative research design, descriptive survey method was used to find out study skills and mathematics achievement. In terms of geographical area, three Basic Education High Schools, one Basic Education High School (Branch) and one Basic Education Middle School in Tada-U Township were selected by using simple random sampling technique. The population in this study consisted of (400) Grade 8 students. In the collection of data, two instruments: questionnaire for students' study skills and an achievement test for Grade 8 students were employed. In the analysis of data, descriptive statistics, one-way ANOVA, independent samples *t*-test, and Pearson product-moment correlation were used. One-way ANOVA was performed to ascertain whether there were differences in study skills and mathematics achievement among the selected schools. The result showed that there were differences in study skills and mathematics achievement among the selected schools. Independent samples *t*-test was used to find out the differences between mean scores of study skills and mathematics achievement in term of gender. According to the results, the female students were higher than the male students in study skills and there was significant difference between male and female students' mathematics achievement. Pearson product-moment correlation was used to assess the correlation between study skills and mathematics achievement. The results showed that there were also significant correlations between study skills and mathematics achievement. This indicated that if the study skills of the students are good, the mathematics achievement of these students will be high.

Keywords: study skills, mathematics, achievement

Introduction

Education is the process of facilitating learning. Education frequently takes place under the guidance of educators, but learners may also educate themselves in a process called autodidactic learning. Education is the process of learning and acquiring knowledge at school from a teacher, receiving knowledge at home from a parent, a family member, and even an acquaintance. Education makes them capable of interpreting things, among other things (Wikipedia, 2015).

Mathematics is an important part of ones' lives, because in the future they will get a job that deals with mathematics. Mathematics is necessary for even the most basic of life functions (Jasmine, 2008). Study skills or study strategies are approaches applied to learning. They are generally critical to success in school considered essential for acquiring good grades, and useful for learning throughout one's life (Wikipedia, 2015). The successful students not only possess knowledge of good study skills but also the ability to select appropriate skills and monitor their usage while studying. Students who possess poor study skills, on the other hand, struggle to apply good study skills to their academic tasks, particularly those skills that involve cognitive and metacognitive processes such as monitoring comprehension while reading. Study skills are

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strongly related to learning and achievement, and students should be taught basic study skills to increase their academic performance (Yip, 2007 cited in Thorpe, 2010).

Purposes of the Study

- To describe the study skills that can improve student's learning mathematics.
- To find out the mathematics achievement of the students from selected schools.
- To study the relationship between study skills and mathematics achievement of the students from selected schools.
- To give suggestions for improving study skills of students at the middle level.

Research Questions

1. Is there any significant difference in Grade 8 students' study skills in their respective schools?
2. Is there any significant difference in Grade 8 students' study skills in terms of gender?
3. Is there any significant difference in Grade 8 students' mathematics achievement in their respective schools?
4. Is there any significant difference in Grade 8 students' mathematics achievement in terms of gender?
5. Is there any significant relationship between Grade 8 students' study skills and their mathematics achievement?

Definition of Key Terms

Study Skills	-	Study skills are learning strategies that help students organize, process, and use information effectively (Kerka, 2007).
Mathematics	-	Mathematics is a way to settle in the mind of children a habit of reasoning (Locke, n. d. cited in Zubair, 2012).
Achievement	-	Achievement means an accomplishment or proficiency of performance in a given skills or body or knowledge (Sasikala, 2012).

Scope

This study is geographically restricted to Tada-U Township in Mandalay Region. The populations in this study were all Grade Eight Students from the selected schools in the academic year (2015-2016). This study is only concerned with the relationship between study skills and mathematics achievement of these students. The content area of the subject is limited to ten chapters from Mathematics Textbook Volume I and four chapters from Mathematics Textbook Volume II to find out students' mathematics achievement.

Review of Related Literature

Constructivism

Learning theory of constructivism incorporates a learning process wherein the student gains their own conclusions through the creative aid of the teacher as a facilitator. The best way to plan teachers' worksheets, lesson plans, and study skills for the students, is to create a

curriculum which allows each student to solve problems while the teacher monitors and flexibly guides the students to the correct answer, while encouraging critical thinking. Teachers and parents alike are encouraged to envelop the "scaffolding" method of communication which is a strategy aimed to simplifying tasks within learning by making smaller steps, all leading to the final outcome. This aids in maintaining any frustration while keeping in mind what is important throughout the learning process.

When evaluating study skills of the child, Bruner's theory suggests that the teachers be explicit regarding organization, help the learner to focus on the larger task at hand as well as the goals, instead of getting caught on minor details or frustrations. They are encouraged to praise the efforts put out by the learners while reminding them, helping them focus on relevant items, and encouraging them to practice and rehearse what they have learned (Teachnology, 2014).

Need and Significance of Learning Mathematics

Mathematics is regarded as the mother of all science. If our students are to function effectively at this time of rapid technological advancement and globalization, they must be mathematically literate. Those who lack mathematical competence will find such doors and options closed.

Mathematics is the only subject that encourages and develops logical thinking. It enables the student to discriminate between essentials and non-essentials. Therefore, knowledge of mathematics is very essential for training rational, trustworthy and useful citizens in a democratic society (Zubair, 2012).

Nature of Study Skills

Study skills are strategies and techniques that enable students to make the most efficient use of their time, resources, and academic potential. Developing and improving their study skills can help them:

- To make more efficient use of students' study time - get more work done in less time.
- To make their learning easier, and help retain what they have learned for longer.
- To feel the work and effort involved is worthwhile; it 'pays dividends' (Donoghue, 2006).

The use of operative study skills is linked to academic proficiency. Moreover, high-achieving students employ a variety of study tactics in a purposeful manner and that low-achieving students use a restricted range of study skills. Therefore, not only is it important for students to have a variety of study skills in their repertoires; they must also apply the skills purposefully (Gettinger and Siebert, 2002 cited in Banks, 2015).

Research Method

The research design for the study was a quantitative research design, in which the researcher seeks to determine whether, and to what degree, a relationship exists between two variables (study skills and mathematics achievement). In this study, data were mainly collected through a quantitative method. Quantitative method was used to find out study skills and mathematics achievement (Gay, 1987).

Subjects

All participants in the sample were Grade 8 students. This study was conducted in Tada-U Township, Mandalay Region. The sample schools for the study were selected by using simple random sampling technique. Three Basic Education High Schools, one Basic Education High School (Branch) and one Basic Education Middle School were included in this study. Grade 8 students from the selected schools were selected as the sample of the subject. The number of the students was 400. Participant students in this study were selected by using simple random sampling technique (see Table 1).

Table 1. Population and Sample Size

No.	Township	School	Population	No. of Students		
				Male	Female	Total
1	Tada-U	BEMS (Sar Kar Inn)	64	32	26	58
2	Tada-U	BEHS (Tada-U)	274	46	46	92
3	Tada-U	BEHS, Branch (Taung Be Lu)	117	40	60	100
4	Tada-U	BEHS (Chaung Kwa)	190	44	46	90
5	Tada-U	BEHS (Myin The)	75	31	29	60
Total				193	207	400

Note. BEMS = Basic Education Middle School, BEHS = Basic Education High Schools,

BEHS, Branch= Basic Education High School, Branch

Instrumentation

In this study, a questionnaire for students' study skills and an achievement test for Grade 8 students were used as the instruments.

Questionnaire for Students' Study Skills and Mathematics Achievement Test for Students

In this study, this questionnaire is used to measure the study skills of Grade 8 students under five dimensions. They are (1) time management, (2) concentration and memory, (3) note taking, (4) test strategies and test anxiety and (5) motivation.

Each component contains eight items. There are forty items in this questionnaire. Questionnaire on five-point Likert-scale was developed; strongly disagree, disagree, undecided, agree and strongly agree. In order to measure the mathematics achievement of the students, an instrument was conducted. It was based on the content area of Grade Eight mathematics textbook. This test is a (30) item multiple choice test and each item consists of four alternatives. This test covers (14) chapters: (10) chapters from mathematics textbook volume I (Basic Education Curriculum, Syllabus and Text Book Committee, 2015-2016) and (4) chapters from mathematics textbook volume II (Basic Education Curriculum, Syllabus and Text Book Committee, 2015-2016).

After preparing the questionnaire and the test, experts review was conducted by five expert teachers from SUOE. After that, the questionnaire and the test were modified. The questionnaire and the test validated through pilot testing on a non-sample group of (30) Grade 8

students including boys and girls from Practicing High School, Sagaing. The internal consistency for the questionnaire and that of the test were determined to be (0.795) and (0.615) using Cronbach's Alpha.

Procedure

First, in order of the required data, the instruments were constructed under the guidance of the supervisor. Content validity was determined by expert judgment. After getting the validity of these instruments, a pilot testing was conducted. The pilot testing for the instruments was conducted in October 12, 2015. The modified instruments were distributed to all participants of the five sample schools and administered with the help of the teachers of those schools in November, 2015. After two weeks all the instruments were returned, and then the data were entered into a computer data file and were analyzed using the Statistical Package for the Social Science (SPSS 20).

Data Analysis

The data were analyzed by using descriptive statistics. Moreover, one-way ANOVA, independent samples *t*-test and Pearson product-moment correlation were used to analyze students' study skills and their mathematics achievement.

Findings

Analysis of Grade 8 Students' Study Skills in terms of Schools

Table 2. Mean Scores and Standard Deviations of Student's Study Skills in the Selected Schools

Schools	N	Mean	Standard Deviation	Minimum	Maximum
S1	58	159.72	14.799	125	184
S2	92	163.88	13.893	126	191
S3	100	167.81	11.728	131	195
S4	90	160.84	13.441	130	185
S5	60	168.67	12.112	143	197
Total	400	164.29	13.534	125	197

Note. S1= BEMS, Sar Kar Inn, S2= BEHS, Tada-U, S3= BEHS Branch, Taung Be Lu

S4= BEHS, Chaung Kwa, S5= BEHS, Myin The

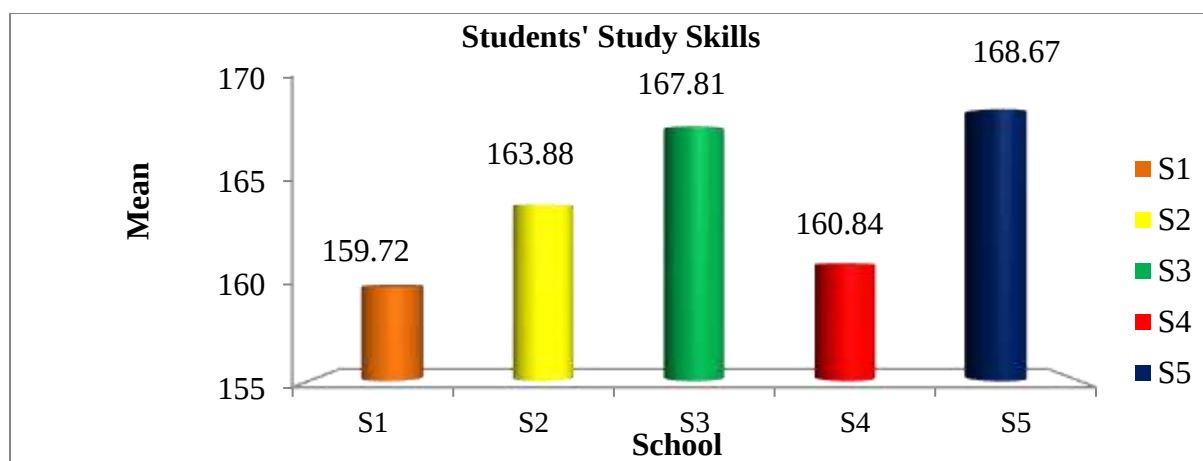


Figure 1. The Comparison of Mean Scores for Students' Study Skills by Schools

Figure 1 shows the comparison of the mean scores of students' study skills by the selected schools. According to the results, the lowest mean score and the highest mean score were (159.72) and (168.67) respectively. It was found that students' study skills of Basic Education Middle School, Sa Kar Inn were the lowest and students' study skills of Basic Education High School, Myin The were the highest among the selected schools (see Table 2).

Moreover, it is necessary to measure whether there is significant difference in students' study skills among the selected schools. Therefore, a one-way ANOVA was used to examine the differences among the selected schools. It was found that there were significant differences among the schools concerning the students' study skills, ($F = 6.759$, $p < .001$) (see Table 3). This means that study skills of Grade 8 students differ among the selected schools.

Table 3. ANOVA Results of Student' Study Skills in the Selected Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4681.373	4	1170.343	6.759	.000***
Within Groups	68399.817	395	173.164		
Total	73081.190	399			

Note: *** $p < .001$

Analysis of Grade 8 Students' Study Skills in terms of Gender

Table 4. t Values for Students' Study Skills in terms of Gender

Gender	No. of Students	Mean	Standard Deviation	Mean Difference	t	df	Sig. (2-tailed)
Male	193	161.67	14.208	-5.07	-3.803	398	.000***
Female	207	166.74	12.417				

Note: *** $p < .001$

According to Table 4, the mean scores for study skills of male and female students were (161.67) and (166.74). From the two groups' means, it indicated that the average mean score of study skills of the female students was higher than the average mean score of study skills of the

male students. It can be interpreted that the study skills of the female students were higher than the study skills of the male students. Thus, the female students can always motivate and well manage time themselves in studying more than the male students. When concentration and taking note, the female students can do more than the male students. Moreover, the female students can control test anxiety more than the male students. This finding indicated that there was significant difference between male and female in study skills, ($t = -3.803, p < .001$). Figure 2 illustrated the comparison of mean scores for the male students' study skills and the female students' study skills based on the results of t -values.

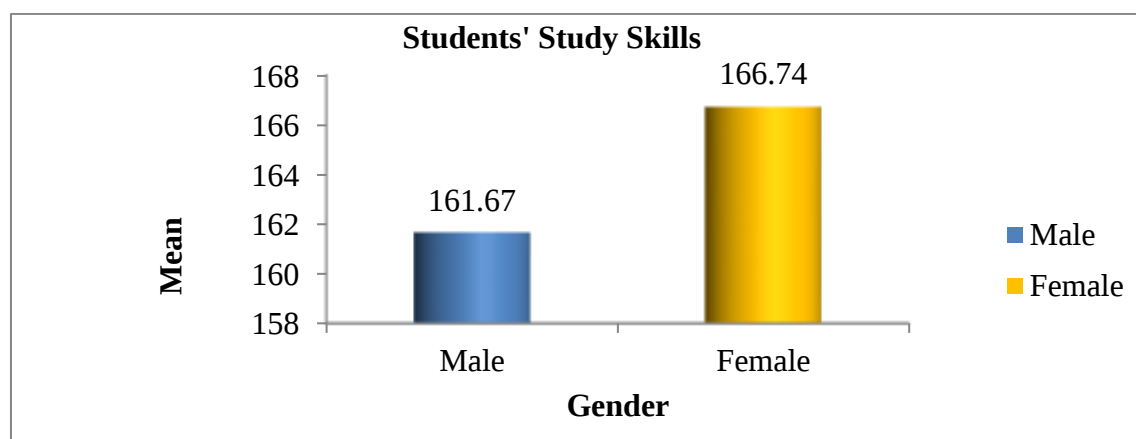


Figure 2. The Comparison of Mean Scores for Students' Study Skills in terms of Gender

Analysis of Grade 8 Students' Mathematics Achievement in terms of Schools

Table 5. Mean Scores and Standard Deviations of Students' Mathematics Achievement in the Selected Schools

Schools	N	Mean Scores	Standard Deviation	Minimum	Maximum
BEMS, Sar Kar Inn	58	23.28	3.397	15	28
BEHS, Tada-U	92	24.23	2.594	17	29
BEHS Branch, Taung Be Lu	100	24.67	1.364	19	28
BEHS, Chaung Kwa	90	24.31	2.448	18	29
BEHS, Myin The	60	24.52	1.944	20	28
Total	400	24.26	2.394	15	29

Based on the result of the mean scores, Figure 3 is illustrated. It shows the comparison of the mean scores of students' mathematics achievement for the selected schools. According to the results, the lowest mean scores and the highest mean scores were (23.28) and (24.67) respectively (see Table 5). It was found that the achievement level of Basic Education Middle School, Sar Kar Inn was the lowest and the achievement level of Basic Education High School (Branch), Taung Be Lu was the highest among the selected schools. In order to see clearly, Figure 3 presents the mean scores of all the selected schools.

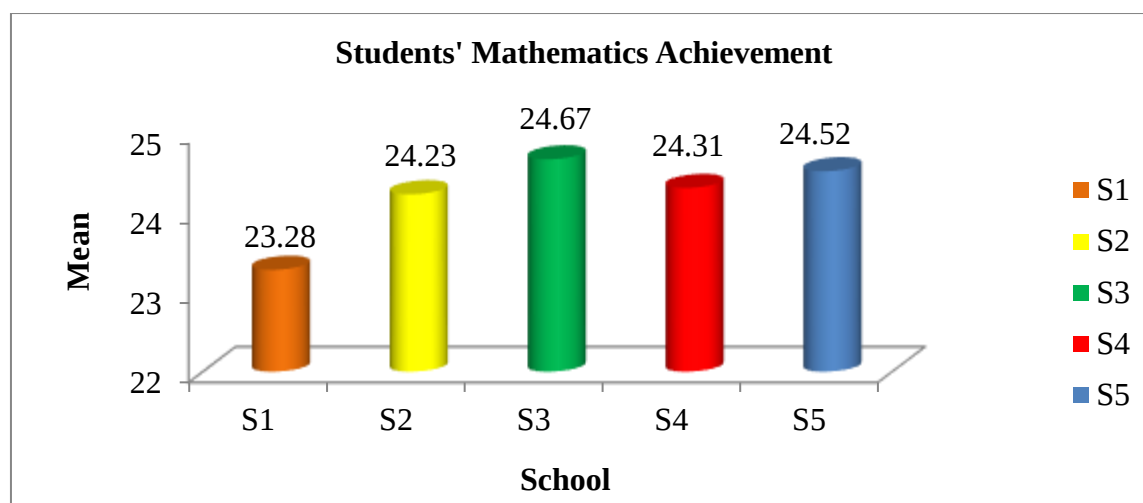


Figure 3. The Comparison of Mean Scores for Students' Mathematics Achievement by Schools

Moreover, it is necessary to measure whether there is significant difference in students' mathematics achievement among the schools. Therefore, a one-way ANOVA was used to examine the differences among the schools. It was found that there was significant difference among the schools concerning the students' mathematics achievement, ($F= 3.452$, $p<.01$) (see Table 6).

Table 6. ANOVA Results of Student's Mathematics Achievement in the Selected Schools

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	77.263	4	19.316	3.452	.009**
Within Groups	2210.175	395	5.595		
Total	2287.438	399			

Note: ** $p<.01$

Analysis of Grade 8 Students' Mathematics Achievement in terms of Gender

Table 7. t Values for Students' Mathematics Achievement in Terms of Gender

Gender	No. of Students	Mean	Standard Deviation	Mean Difference	t	df	Sig (2-tailed)
Male	193	23.9	2.487	-0.7	-2.939	398	.003**
Female	207	24.6	2.260				

Note: ** $p<.01$

According to Table 7, the mean scores for mathematics achievement of male and female students were (23.9) and (24.6). From the two groups' means, it indicated that the average mean score of mathematics achievement of the female students was higher than the average mean score of mathematics achievement of the male students. It can be interpreted that mathematics achievement of the female students was higher than mathematics achievement of the male students. Moreover, the female students more calculate in mathematical problems and use better study strategies than the male students. This finding indicated that there was significant

difference between male and female students' mathematics achievement, ($t = -2.939$, $p < .01$). Figure 4 illustrated the comparison of mean scores for the male students' mathematics achievement and the female students' mathematics achievement based on the results of t -values.

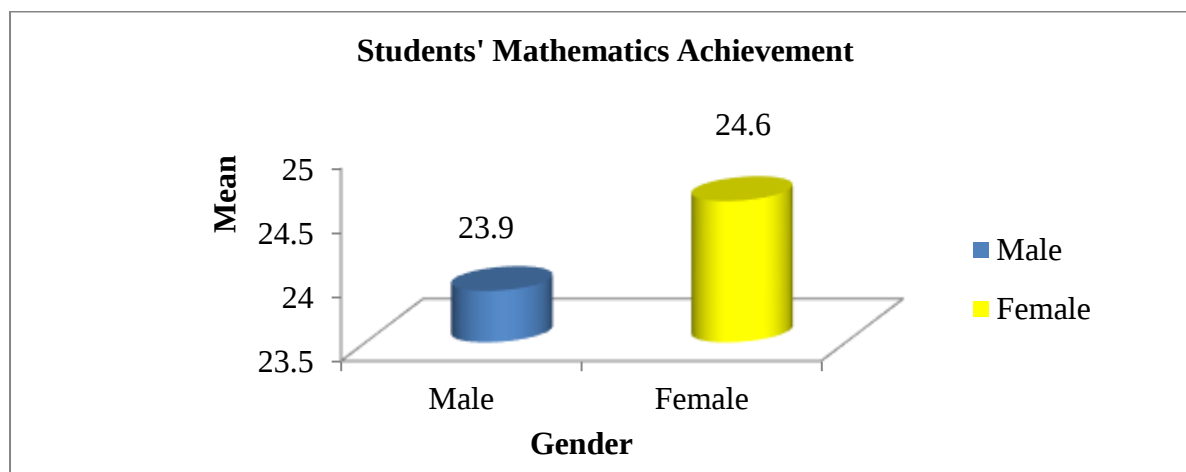


Figure 4. The Comparison of Mean Scores for Students' Mathematics Achievement in terms of Gender

Analysis of the Relationship between Grade 8 Students' Study Skills and Their Mathematics Achievement

Table 8. Correlation between Students' Study Skills and Mathematics Achievement

Correlations			
		Study Skills	Mathematics Achievement
Study Skills	Pearson Correlation	1	.439**
	Sig. (2-tailed)	-	.000
	N	400	400
Mathematics Achievement	Pearson Correlation	.439**	1
	Sig. (2-tailed)	.000	-
	N	400	400

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

According to Table 8, there was a significant, positive relationship between students' study skills and their mathematics achievement. It can be interpreted that if students' study skills are good, their mathematics achievement will be high.

Discussion and Suggestions

Discussion

Many researchers have documented that study skills of students can influence their mathematics achievement. So, the purpose of this study was to study the relationship between study skills and mathematics achievement among Grade 8 students. Specifically, five dimensions of study skills and mathematics achievement of students were highly correlated.

Students who have a high level of study skills can perform well for their achievement in mathematics. By analyzing the statistical result, there were significant differences among the selected schools concerning students' study skills. By comparing the mean scores of students' study skills, it was found that the mean score of students' study skills of Basic Education Middle School, Sa Kar Inn were the lowest and students' study skills of Basic Education High School, Myin The were the highest among the selected schools.

According to the obtained data, male and female students have statistically significant differences in study skills. By comparing the mean scores, it was found out that the mean score of the female students' study skills was significantly higher than that of the study skills of the male students. Fazal (2012) asserted that there was significant difference between male and female that was found in his study in which the mean study skills score of female students was higher than that of male participants. Therefore, it can be concluded that the female students were higher than the male students in study skills level according to the findings of this study.

The obtained data indicated that there were significant differences among the selected schools concerning students' mathematics achievement. By comparing the mean scores of students' mathematics achievement, it was found that the mean scores of students from Basic Education Middle School, Sar Kar Inn was the lowest and the mean scores of students from Basic Education High School (Branch), Taung Be Lu was the highest among the selected schools.

Results regarding gender and mathematics achievement are parallel to those of Chudgar and Sankar (2008) who found that the performance of males was better than females in overall in mathematics achievement. However, Schoenfeld (1992) concluded that females had higher achievement in mathematics than males. In the study conducted by Zaman (2011), there was no significant difference in achievement though females were slightly better course grades. In the present study, according to the results of *t*-test, mathematics achievement of the female students was slightly higher than that of the male students. Therefore, the result of the present study is consistent with the result of Schoenfeld (1992).

The descriptive result indicated that there was a positive and significant correlation between students' study skills and their mathematics achievement. It is also suggested that statistical analysis showed study skills and mathematics achievement of students positively correlated with each other. This means that if the study skills level of the students is high, the mathematics achievement level of these students will be high. Thus, study skills are more related to mathematics achievement. The study conducted by Nouhi et al. (2008) stated that there was a positively significant correlation between two variables. Therefore, findings of this study are consistent with their study according to Pearson *r*.

Suggestions

It was found that study skills of the students play an important role in students' mathematics achievement according to the research study. Thus, the students should always motivate and should well manage time themselves to learn and study. Moreover, the students should concentrate in studying and memorizing the lessons and should systematically take note. When sitting the test, students should reduce anxiety about the test. As the parents, they should practice their children to be good at study skills and should train to well manage these skills. And

then, according to the results of this study, further research into other dimensions of study skills significantly correlate with student's academic achievement should be done in other subjects. Further studies should also explore the relationship between students' study skills and their mathematics achievement using other grade levels. Further research conducted in different regions of the country would provide greater perspective to the results. The small size of the sample population shed doubt on the reliability of the results. Thus, the larger size of the sample population would increase the statistical power of the results and should be extended with other subjects in order to obtain reliable and generalizable results. Further research should be conducted to explore the ways and means of developing students' study skills that would obtain high mathematics achievement.

Conclusion

Nouhi et al. (2008) stated that study skills are important factors influencing academic achievement of students. The main purpose of this study is to study the relationship between study skills and mathematics achievement among the middle school students. According to the research findings, there was a positive correlation between students' study skills and their mathematics achievement. Thus, study skills can be applied to any learning situation. These skills are important not just for academic learning, but also for everyday life (Kerka, 2007). Fazal (2012) pointed out the use of a range of study skills would have positive effect on academic achievement. Therefore, today mathematics teacher should emphasize improving and using the wide range of study skills in mathematics. Moreover, students should also realize that study skills are mainly influential in achievement in mathematics and if students have good study skills, they will achieve higher mathematics achievement.

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