

FACTORS AFFECTING THE STUDENT'S INTEREST IN MATHEMATICS AT THE MIDDLE SCHOOL LEVEL

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Abstract

The main purpose of this study is to investigate the factors affecting the student's interest in mathematics at the middle school level. Especially, this study aims to investigate the teacher factors and student factors that affect students' interest in mathematics. Quantitative method was used to gather required data. The research method for this study was descriptive research method. Four townships were randomly selected from four districts in Yangon Region. Two high schools and one middle school from each township were selected by using stratified random sampling technique. The subjects in this study consisted of (68) middle school mathematics teachers and (600) Grade Eight students. As instruments, teacher questionnaire, student questionnaire and students' interest questionnaire were used. For obtaining questionnaire reliability of the pilot test was administered. The internal consistency (Cronbach's Alpha) of five-point Likert-type of teacher questionnaire was (.721), student questionnaire was (.745) and students' interest questionnaire was (.834). In order to know the correlation between the factors mentioned above and students' interest in mathematics, Pearson product-moment correlation was used. According to the results, the correlation between teacher factors and students' interest in mathematics was ($r = .778, p < .01$) and the correlation between student factors and their interest in mathematics was ($r = .565, p < .01$). These results showed that teacher factors and student factors were positively correlated with students' interest in mathematics.

Keywords: Factor, Interest, Mathematics.

Introduction

Education plays a tremendous role in economics and social development of country. Education is very important to everyone to lead a successful life. Also, competency in mathematics learning is vital to any individual and nation in domestic and business deals, scientific discoveries, technological breakthrough, problem-solving and decision making in different situations in life.

Mathematics is a subject that determines individuals' functionality in any given society. It is essential requirement in every field of intellectual endeavor and human development to cope with the challenges of life. To be skillfull, a genuine interest in school subjects is important as well. Students with an interest in a subject like mathematics is likely to be more motivated to manage their own learning and develop the requisite skills to become effective learners of that subject.

Hence, interest in mathematics is relevant when considering the development of effective learning strategies for mathematics. According to Voss and Schauble (1992, cited in Arthur, 2014), higher levels of interest would result in higher levels of cognitive activation leading to higher achievement. So, the researcher thought that it is important to investigate the factors that affecting students' interest in mathematics.

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Background of the Study

In several education systems all over the world, mathematics is one of the important subjects within the list of foundation subjects that constitute the core curriculum for basic education. The basic knowledge acquired in mathematics at the lower level is vital for a student to progress to upper classes in secondary schools. Mathematics is a core subject in schools all over the world and occupies a privileged position in the school curriculum.

Napoleon remarked that “The progress and improvement of mathematics is linked to the prosperity of the state. The competence gain in the study of mathematics is widely used in all spheres of human life. Mathematics plays a key role in shaping how individuals deal with the various sphere of private, social and civil life (Anthony & Walshaw, 2009, cited in Ogunkola, 2012). It is a backbone of students to achieve and develop the skill in reasoning and thinking level.

Moreover, mathematics is at the heart of many successful careers and successful lives (National Council of Teachers, 2000, cited in Ogunkola, 2012). Mathematics is a precursor of scientific discoveries and inventions. It is the foundation of any meaningful scientific endeavor and any nation that must develop in science and technology and must have a strong mathematical foundation for its youths (Hersh, 1986, cited in Ogunkola, 2012). It is also the foundation on which the whole essence of living revolves and the platform for scientific and technological innovation.

In the field of education, mathematics has become a burning problem and the numbers of low achiever students in mathematics in the school level are constantly increased. In spite of the pedagogic progress and efforts of teachers of mathematics, results in general are unsatisfactory.

This may be due to the lack of ‘interest’ of the students in the subject of mathematics. Whatever one learns, ‘interest’ plays a dominant role in making him learn that things. When a student attributes high value to a particular subject area, then it is said that the student has interest in that area. According to Gardener and Tamir, (1999, cited in Arthur, 2014) the term ‘interest’ refers to engage in some types of activities rather than others. ‘Interest’ may be regulated as a highly specific types of attitude. When we are interested in a particular phenomenon or activity, we are favorably inclined to it and give time to it. The term ‘interest’ is used also to indicate a permanent mental disposition. According to Mc Dougal, (2000), cited in Arthur, (2014), ‘taking interest’ means the bearing of a condition or subject. If a person takes ‘interest’ in a subject, then he would centralize himself in it despite being tired.

It is utmost needed to create interest of students in mathematics, so that different intellectual traits like power of thinking, reasoning, analysis, synthesis, discovery etc develop in the students and there by lead the society towards a positive and constructive direction that teachers know the interest of pupils towards different subjects. Mathematics is an essential not only for education but also very useful in day to day life. Various factors are involved in shaping the understanding and learning of mathematics. However, one of the prerequisites for understanding mathematics is interest in learning mathematics and the desire to learn it.

Despite mathematics’ great importance, it is the only subject that is most dreaded to learners among all subjects offered in schools (Ashcraft & Faust, 1994; &Akinoso, 2011, cited in Chinaedum, 2015). Now a day’s student’s interest is going down and down. If the students keep interest in mathematics then automating they have high level of reasoning and achievement. Poor

achievement in mathematics may be traceable to students' lack of interest in studying the subject. So, the researcher wanted to investigate the factors affecting students' interest in mathematics at the middle school level.

Purposes of the Study

The main purpose of the study is to investigate the factors affecting students' interest in mathematics at the middle school level.

- To investigate the teacher factors that affect students' interest in mathematics.
- To investigate the student factors that affect students' interest in mathematics.
- To investigate students' interest in mathematics at the middle school level.
- To investigate the relationship between teacher factors and students' interest in mathematics.
- To investigate the relationship between student factors and their interest in mathematics.

Research Questions

The research questions of this study are as follows:

- To what extent do teacher factors affect students' interest in mathematics?
- To what extent do student factors affect students' interest in mathematics?
- To what extent do students have interest in mathematics?
- Is there a relationship between teacher factors and students' interest in mathematics?
- Is there a relationship between student factors and their interest in mathematics?

Scope of the Study

This research has its own particular limitations. The first limitation is related to the fact that the participants of the study came from only Yangon Region. Participants in this study are (68) middle school mathematics teachers and (600) Grade eight students from the twelve selected schools of the four Districts (East, West, South, and North) within the academic year (2018-2019). Eight Basic Education High Schools and Four Basic Education Middle Schools are included in this study. The second limitation is that this study is only concerned with the factors (teacher factors, student factors) that affecting students' interest in mathematics. Particularly, this study is concerned with teacher factors (teachers' knowledge, instructional strategy, attitudes towards mathematics and class size) and student factors (attitudes towards mathematics, attitudes towards their mathematics teachers and mathematics anxiety).

Definition of the Key Terms

Factor: A factor is defined as one of the elements contributing to a particular result or situation (Costello, 1992, cited in Payan, 2014).

Interest: Interest is defined as the feeling of intentness, concern and curiosity about an object (Obodo, 1991, cited in Arthur, 2014).

Mathematics: Mathematics is the gateway and key to all sciences (Bacon, n.d., cited in Zubair, 2012).

Significance of the Study

Mathematics is a highly structured subject it's also abstract in some ideas and it requires some special attention in learning. Hence, students see mathematics as difficult in nature. According to Sidhu (1995), "To arouse and maintain the student's interest in mathematics, is a major problem for the teacher. He knows that loss of interest is one of the principal causes of student failure". Lack of interest by pupils should not be allowed to prevail in a class, as effective learning might not take place. (Gagne, 1976), For example, a student who has a positive attitudes towards mathematics, studies it effectively because he like it .This is supported by Aremu (1998, cited in Arthur, 2014) who explain that when pupils express lack of interest in the subject it affects the way they react or listen to the teacher. Students work most effectively at tasks in which they are genuinely interested.

Moreover, this study is vital in mathematics education for the following reasons. First, it could provide information to mathematics teachers on why pupils lose interest and development negative attitudes in learning mathematics so that they can take steps to instill interest and positive attitudes toward learning mathematics. Secondly, it could provide information to teacher education institutions on how to arouse interest and maintain positive attitudes of which can in turn be shared with trainee teachers. Thirdly, the Curriculum Development Centre (CDC) might formulate and implement a syllabus and learning materials that arouse interest toward learning mathematics in the light of the results of this study. Lastly, the finding of this study will contribute to the existing mathematics education literature and provide information for further studies.

Review of Related Literature

Teacher Factors Affecting Students' Interest in Mathematics

If teacher is interested in mathematics, his students will also show interest in it. If, on the other hand, he dislike mathematics his students will also dislikes it. A teacher who is interested in mathematics will regularly practice it. As a result of this he will be strong in it and teach it with enthusiasms. For examples, when a teacher is confident, supportive and enthusiastic, those characteristics are communicated to the students with the result that the learning experience and the outcomes are generally positive. Thus, teachers play a pivotal role in the teaching-learning process because they manage themselves and others involved in the learning environment. In this study, teacher factors such as teachers' knowledge, instructional strategy, teacher attitudes towards mathematics and class size were studied.

Teachers' Knowledge

Excellent teachers of mathematics have a sound, coherent knowledge of mathematics appropriate to the student level they teach, and understanding of the broader mathematics curriculum. They understand how mathematics is represented and communicated, and why mathematics is taught. Fennema and Franke (1992, cited in Turnuklu & Yesildere, 2007) determined the components of mathematics teachers' knowledge as;

- 1) Knowledge of mathematics
 - Content knowledge
 - The nature of mathematics
 - The mental organization of teacher knowledge

- 2) Knowledge of mathematical representations
- 3) Knowledge of students
 - Knowledge of students' cognitions
- 4) Knowledge of teaching and decision making

Instructional Strategy

A qualified mathematics teacher can easily use different approaches/ methods, styles, illustrations, examples, and improvise materials in teaching students mathematics concepts, principles or ideas which counterpart (unqualified mathematics teacher) cannot do. This suggests student mathematics interest is depended on qualification of mathematics teacher. A qualified mathematics teacher can arouse students' interest in mathematics learning and ensure success in the learning of the subject through the use of appropriate instructional strategies in teaching the student. There are effective instructional strategies as follow.

Teachers' Attitudes towards Mathematics

Neal (1969, cited in Jacobs, 2010) defied attitude towards mathematics as a tendency to engage in or avoid mathematics activities, a belief that one is good or bad in mathematics is useful or useless. An understanding of how attitudes are learned should establish a connection between teachers and students' attitudes and performance. Schofield (1981, cited in Jacobs, 2010) reports that positive teacher attitudes towards mathematics were significantly related to high achievement in pupils. Teachers are the key to improving mathematics education. The preparation, certification, ongoing professional and attitude of teachers define the outcome of their students.

Class Size

The number of students in a mathematics class otherwise referred to as class size is a factor of interest to learn mathematics. According to Ifamuyiwa (2005), uncooperative attitude of the students and large class size contribute to student' poor performance in mathematics. More so, probably because of the negative effect of large class size that Claiber Associates (2005, cited in Vandenberg, 2012), reported that class size of not more than 18 students per teacher is required to produce the greatest benefits. Large class size therefore affects preparatory training such as students' interest to further learning of mathematics.

Student Factors Affecting their Interest in Mathematics

Chung (1998, cited in Mensah et al., 2013), in his study of 11-13 years old, also discovered positive correlation between attitude and mathematics achievement. The correlation showed that the more positive the attitude, the higher the level of achievement as well as interest in the student. In this study, student factors such as (attitude towards mathematics, attitude towards their teacher and mathematics anxiety) were studied.

Students' Attitudes towards Mathematics

Attitude towards mathematics is an important variable, which steers the behavior of students about mathematics lessons as how they should be and which have contribution for their motivation, in other words, it can be considered as the determinant of personal emotions (Bayturan, 2004). It is important for the success in mathematics (Enemark & Wise, 1981, cited in

Akkaya, 2012), has an important role for explaining mathematics success of students. Moreover, students' success and interest in mathematics depend on their attitudes towards mathematics.

Students' Attitudes towards their Mathematics Teachers

Students' attitudes towards their teachers play a crucial role in the teaching and learning process of mathematics. Teachers are, invariably, role models whose behaviors are copied by students. So, students follow like their teacher behavior. If the teacher is interested in mathematics, his students will show interest in it. Thus, all mathematics teachers should support and encourage their students to develop positive attitude towards mathematics.

Mathematics Anxiety

According to Burns (1998, cited in Wigfield, 1998), many students have fears and loathsome experiences about mathematics. Such negative experiences are caused by mathematics anxiety which knows no boundaries irrespective of age or gender. Mathematics anxiety is the feeling of tension, helplessness, mental disorganization and dread one when required to manipulate numbers and shapes and the solving of mathematics anxiety is poor mathematics achievement and competence (Ashcraft, 2002). Students who are infested with mathematics anxiety will lack interest to learn mathematics and consequently may tend to achieve poverty in the subject.

Research Method

This study is concerned with the factors that affect students' interest in mathematics from the selected schools. The factors such as teacher factors and student factors were investigated to be able to determine whether these factors affect students' interest in mathematics or not. Research design and procedure, instruments, population and sample size, and data analysis are presented in this chapter to address the research questions.

Research Design and Procedure

The research design for this study was a descriptive research design, in which the researcher seeks to determine whether, and to what degree, a relationship exists between two or more quantifiable variables (teacher factors, student factors and students' interest in mathematics). In this study, data were collected through a quantitative method. Quantitative method is research technique that is used to gather quantitative data-information dealing with numbers and anything that is measurable (Gay & Airasian, 2003).

First of all, the researcher sought out the relevant literature concerning with the research through reading books. Moreover, the researcher studied the literature from the Internet sources. Secondly, in order to get the required data, the researcher constructed the instruments. Content validity was determined by experienced teachers' judgment. After getting the validity of these instruments, a pilot testing was conducted. The pilot testing for the instrument was conducted in November, 2018. The modified instruments were distributed to all participants of the twelve sample schools with the help of the headmaster/ headmistress of those schools in December 2018. After all instruments were returned, and then the data were entered the computer data file and were analyzed using the Statistical Package for the Social Science (SPSS 22).

Instrumentation

In this study, two types of questionnaire (questionnaire for teacher and questionnaire for student) for Grade Eight students were used as the instruments. Questionnaire for teachers' knowledge was mainly based on "The Components of Mathematics Teachers' Knowledge" (Fennema and Franke, 1992). Questionnaire for instructional strategy was mainly based on "Effective Instructional Strategies" (Sinay, E., & Nahornick, A., 2016). Questionnaire developed by Meece (1981) was adapted to investigate mathematics anxiety of students. Questionnaire for class size was mainly based on Kristy Chandler Vandenberg (2012). Questionnaire developed by Tapia and Marsh (2004) was adapted to investigate teachers' attitudes towards mathematics, students' attitudes towards mathematics and students' attitudes towards their mathematics teacher. Questionnaire for students' interest in mathematics was developed by the researcher based on four dimensions by "The Four-Phase Model of Interest Development" (Hidi & Renninger, 2006).

Population and Sample size

All participants in the sample were Grade Eight students and middle school mathematics teachers. This study was conducted in Yangon Region in which there are four districts and thus one township was randomly selected from each district. Two high schools and one middle school were selected from each township as the sample schools by using stratified random sampling technique. Therefore, twelve schools (eight high schools and four middle schools) are included in this study. Middle school mathematics teachers and Grade Eight students from the selected schools were selected as the sample of the subjects by using equal size random sampling. So, the participants in this study were consisted of (600) students and (68) teachers respectively.

Data Analysis

In this study, the data were analyzed by using descriptive statistics such as mean, standard deviation, percentage and person product-moment correlation. In order to know teacher factors, student factors and students' interest in mathematics mean, standard deviation and percentage were used. Person product-moment correlation was used to assess whether there was relationship between teacher factors and students' interest in mathematics and student factors and their' interest in mathematics at the middle school level.

Findings

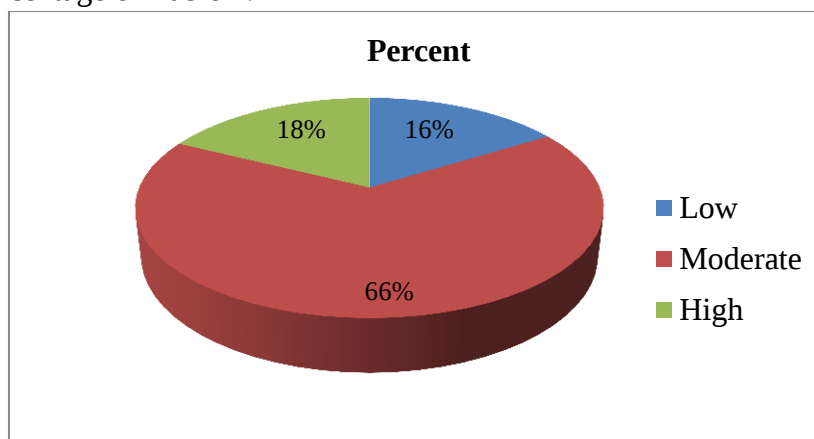
Findings of Teacher Factors in the Selected Schools

In order to find out teacher factors, a questionnaire for mathematics teachers was used. It is necessary to examine the percentage of the teachers who had low, moderate and high level of performance in teacher factors. There were involved 68 numbers of teachers in teacher factors. The full score for teacher factors was (200). The sample mean and standard deviation in teacher factors were (164.51) and (10.887) respectively. Based on the scores in respective areas of teacher factors, teachers with scores below (153.62) were identified as those who had low level of teachers' performance and teachers with scores above (175.40) were identified as those who had high level of teachers' performance. Then, teachers with scores between and equal (153.62) and (175.40) were considered as those who had moderate level of teachers' performance. The percentage of the teachers in low, moderate and high levels of performance were 16% (N=11), 66% (N=45) and 18% (N=12) respectively (see Table 1).

Table 1 Level of Teachers' Performance in Teacher Factors

Level of Teachers' Performance	Score (x)	No. of Teacher	Percentage (%)
Low	$x < 153.62$	11	16
Moderate	$153.62 \leq x \leq 175.40$	45	66
High	$x > 175.40$	12	18
Total		68	100

Figure 1 displays the percentage of the teachers' performance in each level based on the results of the percentage of Table 1.

**Figure 1** Level of Teachers' Performance in Teacher Factors

Findings of Student Factors in the Selected Schools

In order to find out student factors, a questionnaire for students was used. It is necessary to examine the percentage of the students who had low, moderate and high level of performance in student factors. There were involved 600 numbers of students in student factors. The full score for student factors was (120). The sample mean and standard deviation in student factors were (94.67) and (7.408) respectively. Based on the scores in respective areas of student factors, students with scores below (87.26) were identified as those who had low level of students' performance and students with scores above (102.08) were identified as those who had high level of students' performance. Then, students with scores between and equal (87.26) and (102.08) were considered as those who had moderate level of students' performance. The percentage of the students in low, moderate and high levels of performance were 4 % (N=25), 37 % (N=220) and 59 % (N=355) respectively (see Table 2).

Table 2 Level of Students' Performance in Student Factors

Level of Students' Performance	Score (x)	No. of Student	Percentage (%)
Low	$x < 87.26$	25	4
Moderate	$87.26 \leq x \leq 102.08$	220	37
High	$x > 102.08$	355	59
Total		600	100

Figure 2 displays the percentage of the students in each level based on the results of the percentage of Table 2.

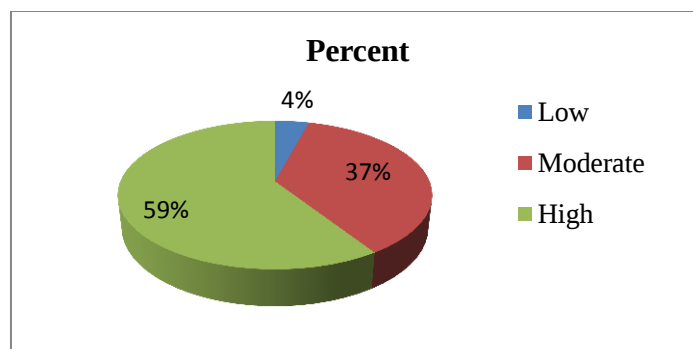


Figure 2 Level of Students' Performance in Student Factor

Finding of Students' Interest in Mathematics in the Selected Schools

In order to find out students' interest, a questionnaire for students' interest in mathematics was used. It is necessary to examine the percentage of the students who possessed low, moderate and high level of interest in mathematics. There were involved (600) numbers of students in this study. The full score for students' interest in mathematics was (140). The sample mean and standard deviation were (110.30) and (12.426) respectively. Based on the scores in respective interest items, students with scores below (97.87) were identified as those who possessed low level of interest and students with scores above (122.73) were identified as those who possessed high level of interest. Then, students with scores between and equal (97.87) and (122.73) were considered as those who possessed moderate level of interest. The percentage of the students in low, moderate and high levels of interest were 16 % (N=95), 66 % (N=398) and 18 % (N=107) respectively (see Table 3).

Table 3 Level of Students' Interest in Mathematics

Level of Interest	Score (x)	No. of Student	Percentage (%)
Low	$x < 97.87$	95	16
Moderate	$97.87 \leq x \leq 122.73$	398	66
High	$x > 122.73$	107	18
Total		600	100

Figure 3 displays the percentage of the students in each level of students' interest in mathematics based on the results of the percentage of Table 3.

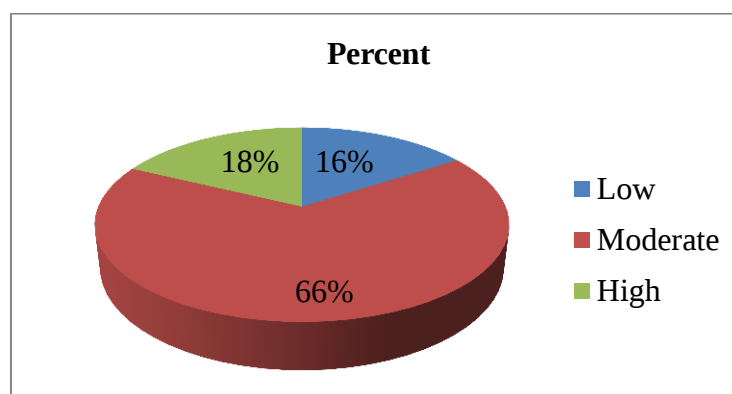


Figure 3 Level of Students' Interest in Mathematics

Relationships of Teacher Factors, Student Factors and Students' Interest in Mathematics

The relationship between teacher factors and students' interest in mathematics, and the relationship between student factors and their interest in mathematics are presented as follows:

Relationship between Teacher Factors and Students' Interest in Mathematics

To examine the relationship between teacher factors and students' interest in mathematics, Person product-moment correlation was used. It was found that there was a significant correlation $r = .778$, $p < .01$. This result shows that there was a significant correlation between teacher factors and students' interest in mathematics. The result shows that the direction of correlation was positive. This means that if the function of teacher factors is high, the interest of students in mathematics is likely to be high or if the function of teacher is low, the interest of students in mathematics is likely to be low. Table 4 shows the correlation between teacher factors and students' interest in mathematics.

Table 4 Correlation between Teacher Factors and Students' Interest in Mathematics

Correlation			
		Teacher Factors	Students' Interest in Mathematics
Teacher Factors	Pearson Correlation	1	.778**
	Sig. (2-tailed)		.003
	N	12	12
Students' Interest In Mathematics	Pearson Correlation	.778**	1
	Sig. (2-tailed)	.003	
	N	12	12

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

After that, the correlation between the respective areas of teacher factors and students' interest in mathematics is presented in Table 5.

Table 5 Correlation between Respective Areas of Teacher Factors and Students' Interest in Mathematics

Correlation					
	SI	TK	IS	TA	CS
Students' Interest in Mathematics (SI)	1	.712**	.758**	.777**	-.591*
Teachers' Knowledge (TK)		1	.737**	.445	-.610*
Instructional Strategy (IS)			1	.534	-.567
Teachers' Attitudes towards Mathematics (TA)				1	-.460
Class Size (CS)					1

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

* . Correlation is significant at the 0.05 level (2-tailed).

Relationship between Student Factors and their Interest in Mathematics

To examine the relationship between student factors and their interest in mathematics, Person product-moment correlation was used. It was found that there was a significant correlation $r = .565$, $p < .01$. This result shows that there was a significant correlation between

student factors and their interest in mathematics. The result shows that the direction of correlation was positive. This means that if the function of student factors is high, their interest in mathematics is likely to be high or if the function of student is low, their interest in mathematics is likely to be low. Table 6 shows the correlation between student factors and their interest in mathematics.

Table 6 Correlation between Student Factors and their Interest in Mathematics

Correlation			
		Student Factors	Students' Interest in Mathematics
Student Factors	Pearson Correlation	1	.565**
	Sig. (2-tailed)		.000
	N	12	12
Students' Interest In Mathematics	Pearson Correlation	.565**	1
	Sig. (2-tailed)	.000	
	N	12	12

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

After that, the correlation between the respective areas of teacher factors and students' interest in mathematics is presented in Table 7.

Table 7 Correlation between Respective Areas of Student Factors and their Interest in Mathematics

Correlation				
	SI	SAM	SAT	MA
Students' Interest in Mathematics (SI)	1	.614**	.481**	-.563**
Students' Attitudes towards Mathematics (SAM)		1	.360**	-.262
Students' Attitudes towards their teachers (SAT)			1	-.301
Mathematics Anxiety (MA)				1

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

Summary of Findings

To sum up, the findings can be generalized as follows:

- The percentage of the teachers in low, moderate and high levels of performance were 16% (N=11), 66% (N=45) and 18% (N=12) respectively.
- The percentage of the students in low, moderate and high levels of performance were 4 % (N=25), 37 % (N=220) and 59 % (N=355) respectively.
- The percentage of the students in low, moderate and high levels of interest were 16 % (N=95), 66 % (N=398) and 18 % (N=107) respectively.
- Teacher factors have positively correlated with students' interest in mathematics ($r = .778$, $p < .01$).
- Student factors have positively correlated with their interest in mathematics ($r = .565$, $p < .01$).

Based on the research findings, discussion, suggestions and conclusion will be presented in the next chapter.

Conclusion

This chapter will present the discussion, suggestion and conclusion.

Discussion

From the research findings (Table 1), it was observed that there were involved 68 numbers of teachers in teacher factors. The sample mean and standard deviation in teacher factors were (164.51) and (10.887) respectively. It was observed that 16 % (N=11) of the teachers were low level teachers' performance, 66 % (N=45) of the teachers were moderate level teachers' performance and 18 % (N=12) of the teachers were high level teachers' performance in teacher factors. It can be interpreted that most teachers were moderate level of teachers' performance in teacher factors. So, this finding revealed that the answer of the first question: To what extent do teacher factors that affect students' interest in mathematics? Moreover, this finding shows that most teachers have average level of ability in teachers' knowledge, instructional strategy, teachers' attitudes towards mathematics and interaction with students in teaching mathematics.

From the research findings (Table 2), it was observed that there were involved 600 numbers of students in student factors. The sample mean and standard deviation in student factors were (94.67) and (7.408) respectively. It was observed that 4 % (N=25) of the students were low level, 37 % (N=220) of the students were moderate level and 59 % (N=355) of the students were high level in student factors. It can be interpreted that most students were high level in student factors. So, this finding revealed that the answer of the second question: To what extent do student factors that affect their interest in mathematics? Moreover, this finding shows that most students were good condition in their attitudes towards mathematics, attitudes towards their mathematics teachers and mathematics anxiety in learning mathematics.

From the research findings (Table 3), it was observed that there were involved 600 numbers of students in this study. The sample mean and standard deviation in students' interest in mathematics were (110.30) and (12.426) respectively. It was observed that 16 % (N=95) of the students possessed low level of interest, 66 % (N=398) of the students possessed moderate level of interest and 18 % (N=107) of the students possessed high level of interest in mathematics. It can be interpreted that most students had moderate level of interest in mathematics. So, this finding revealed that the answer of the third question: To what extent do students have interest in mathematics? Moreover, this finding shows that most students have average level of interest in learning mathematics. So, they need to improve their interest in learning mathematics.

According to the research findings (Table 4), the correlation between teacher factors and students' interest in mathematics was found that the correlation ($r = .778$, $p < .01$). This result shows that the direction of correlation was positive and it was pointed out that if the functions of mathematics teachers are high, students' interest in mathematics is also high. So, this finding revealed that the fourth question: Is there a relationship between teacher factors and students' interest in mathematics?

From the research findings (Table 6), the correlation between student factors and their interest in mathematics was found that the correlation ($r = .565$, $p < .01$). This result shows that the direction of correlation was positive and it was pointed out that if the functions of students are

high, their interest in mathematics is also high. So, this finding revealed that the fifth question: Is there a relationship between student factors and their interest in mathematics?

According to research findings (Table 5), the correlation between respective area of teacher factors and students' interest in mathematics were found that the correlation between mathematics teachers' knowledge and students' interest in mathematics was .712, the correlation between instructional strategy and students' interest in mathematics was .758, the correlation between mathematics teachers' attitudes towards mathematics and students' interest in mathematics was .777 and the correlation between class size and students' interest in mathematics was -.591. These findings revealed that mathematics teachers' knowledge, instructional strategy and mathematics teacher attitudes towards mathematics were positively correlated with students' interest in mathematics. Among respective area of teacher factors, the fourth area, class size was negatively correlated with students' interest in mathematics. This result shows that the direction of correlation was negative and if the ratio of class size is large, students' interest in mathematics is low or if the ratio of class size is small, students' interest in mathematics is to be high.

Based on the result of research findings (Table 7), the correlation between respective area of student factors and their interest in mathematics were found that the correlation between students' attitudes towards mathematics and their interest in mathematics was .614, the correlation between students' attitudes towards their mathematics teachers and their interest in mathematics was .481 and the correlation between mathematics anxiety and their interest in mathematics was -.563. These findings revealed that students' attitudes towards mathematics and students' attitudes towards their mathematics teachers were positively correlated with their interest in mathematics. . Among respective area of student factors, the third area, mathematics anxiety was negatively correlated with students' interest in mathematics. This result shows that the direction of correlation was negative and if the mathematics anxiety is high, students' interest in mathematics is low or if the mathematics anxiety is low, students' interest in mathematics is to be high.

The research findings reveal that teacher factors and student factors affect students' interest in mathematics. These findings can support the finding of Leonard Chinaedum (2015): teacher factors, student factors, instructional strategy, mathematics anxiety and class size have significant relative effects on mathematics interest.

According to the above results, a generalization can be drawn that teacher factors and student factors are significantly influenced on students' interest in mathematics. Therefore, it can be realized that these factors are essential for improving students' interest in mathematics.

Suggestions

Based on the research findings, it was found that most students possess moderate level of interest in learning mathematics. In order to motivate student' interest, the mathematics teachers need to be creative in their teaching methods. To increase students' interest, the teacher should use a variety of visual aids, instead of the usual paper and pencil test and they should use continuous assessment. Moreover, mathematics lessons should be prepared to address a variety of learning styles. Students should be encouraged to learn mathematics. The mathematics teacher needs to know their pupils well, in general, so that the needs of the pupils are well catered for. This will enable the teacher to plan a lesson which will absorb all the pupils' interests.

Moreover, based on the findings of this study, it is suggested that mathematics teachers should develop positive attitude towards the subject and make mathematics interesting and appealing to students in order to help them a positive attitude towards it. Thus, mathematics teacher ought to create interesting and non-threatening environments in their mathematics classroom and model enthusiasm for the teaching and learning of the subject. In this way, the students may develop positive attitude and more interest in learning mathematics.

Furthermore, interest is one of the most important ingredients in the learning process which builds a strong inner feeling or motion to have an appetite to learn concepts no matter how challenging the task may be. So, a mathematics teacher should well verse with means and techniques of arousing and maintaining interest in mathematics. To arouse and maintain interest in mathematics, the following points should be considered in depth.

The teacher should explain to the child the usefulness of learning mathematics in their daily life and for higher studies.

- The teacher should correlate the contents of mathematics with other school subject.
- The teacher should remove the fear from the mind of the child that is not a difficult subject rather very easy and interesting.
- The teacher should use different methods of teaching.
- The teacher should use Audio-visual aids in learning.
- The teacher should give interesting puzzles to the learner in teaching mathematics lessons.
- The teacher should give incentives to the learner.

In this study, sample schools were randomly selected from only Yangon Region. So, further research should be carried out for the rest States and Region for replication. Thus, carrying out a larger research in a nationally representative area in a longer duration is highly recommended to validate the present research results. Moreover, this research concerned with the middle school level students. That is so, other studies with the primary and high school level students should be conducted.

In addition, this study dealt with the factors that affect students' interest in mathematics such as teacher factors (teachers' knowledge, instructional strategy, teachers' attitudes towards mathematics, class size), and student factors (students' attitudes towards mathematics, students' attitudes towards their mathematics teachers, mathematics anxiety). Therefore, further studies should be conducted with many other factors.

Conclusion

One of the objectives of mathematics of secondary school stage is to develop interest in mathematics (Zubair, 2012). For pupils to learn mathematics, they need to have interest and a positive attitude. The challenges of mathematics learning for today's education are that it requires disciplined study, concentration and motivation. To meet these challenges learners must be focused and motivation to progress. This requires pupils having interest and positive attitude. All good teaching should arouse attention and interest. Interest is important in the teaching of a teacher and in the required absorption of the children in their learning. Firsov (2004) stated that interest leads to learning – if students are interested in a subject they will succeed.

So, there is a need to catch and hold students' interest in mathematics, to tap the full potential of talent within this domain -both male and female- and to encourage them to pursue related careers. When pupils lack interest towards learning mathematics might they may have low achievement or poor performance in the subject. Thus, the researcher wanted to know what factors that affect students' interest in learning mathematics. This is the main reason for conducting this research study.

According to the above results, it can be seen that there is a relationship between teacher factors and students' interest in mathematics and student factors and their interest in mathematics. Thus, teachers must revise formal teaching methods which often do not match the students' learning styles and skills needed to be productive in society.

Therefore, the researcher would like to put forward the following conclusive remarks.

- Students today have a need for practical mathematics. Mathematics needs to be relevant to their everyday life.
- Students must be engaged in exploring, conjecturing, and thinking rather than engaged in only rote learning of rules and procedures.
- Teaching methods must be re-examined and there should be more emphasis placed on the specific methods which include less lecture, more student directed classes, and more discussion.
- Teachers not only need knowledge of a particular subject matter but also need to have pedagogical knowledge and knowledge of students.
- Teachers need to be creative in their teaching methods, so students do not lose interest.
- To engage students in mathematics, a teacher can focus on active involvement and student-centered activities, connect to everyday life, support conceptual competences, encourage active involvement, allow students to problematize the content, empower them to address the problems using their own authority and provide relevant resources.

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