MATHEMATICS INTEREST AND THE SCHOLASTIC PERFORMANCE OF THE GRADE 7 STUDENTS

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ABSTRACT

Factors affecting math interest is a good benchmark for teachers in order to increase the students' understanding and appreciation in mathematics. This study would like to determine the factors that contributed to the math interest of junior high school students and how these factors have affected their scholastic performance. The data were collected using questionnaires. These were distributed to the 210 Grade 7 students chosen using a stratified random sampling design. The factors were correlated with the grades of the students up to the 3rd Grading period. This investigation found that teacher qualities and the strategies employed strongly affect the students' interest but factors such as math anxiety, students' attitude and classroom condition can predict the scholastic performance. Thus, teachers may affect interest but the students' perception can affect their grades. It is recommended that teachers utilize more strategies to raise the level of interest and give due attention to the students' attitudes in order to address their need to understand math. create a positive learning environment employing relevant real life problems so students appreciate Mathematics as a tool that can be used in life and that the guidance office may provide counseling sessions to students with high math anxiety.

Keywords: *Math interest, math anxiety, teacher factors, scholastic performance*

INTRODUCTION

Mathematics is a science of number that is very useful in all subject areas. This is because all fields depend on it from solving problems to predicting outcomes. People grant it as theoretical subject only because of its being abstract in nature but the truth is each branch of mathematics is developed for its practical uses. Despite of its importance however, it is unfortunate that many students have erroneous impressions about Mathematics and dislike Mathematical activities; many seem to fear, even hate Mathematics (Pia, 2015). When a student is asked what is the most difficult subject, Mathematics is sure to be on the top of their list.

One of the common goals of all Mathematics teachers of all level is that the students should learn, understand and apply mathematical concepts. Various factors are involved in shaping the understanding of students in Mathematics. However, one of the requirement for such understanding is the interest and desire of the student to learn. According to Khayati (2014), interest is a stimulus that increases the activity power. Simultaneous to active learning, students should be interested in the subject they are learning and students may resort to it in order to understand the materials and apply them. It can be observed in a common classroom setting that some students tend to lose focus or shift their attention when the teacher discusses math concepts.

It can be identified that the factors that can affect students' interest in Mathematics may include the teacher qualities, teaching strategies employed by teachers, students attitude toward the subject, Mathematics anxiety, and the classroom condition.

The main objective of this study is to determine what factors greatly affect the interest of the learners in studying mathematics and if it has any impact in their achievement on the subject. In addition, the researcher will try to relate teacher and teaching related factors to the profile of the teachers teaching mathematics subject.

THEORETICAL BACKGROUND

There are two theories used for the study. The "Self Determination Theory" by psychologists Richard Ryan, PhD and Edward Deci, PhD and Subject-Object Theory of Interest by Andreas Krapp. Self-Determination Theory (SDT) indicates that intrinsic motivation (doing something because it is inherently interesting or enjoyable and thus higher quality learning), flourishes in contexts that satisfy human needs for competence, autonomy, and relatedness.

Competence refers to knowing how to reach a certain goal or outcome and believing in one's ability to do so. Students experience competence when challenged and given prompt feedback.

Autonomy refers to one's ability to initiate and regulate their own actions. Students experience autonomy when they feel supported to explore, take initiative and develop and implement solutions for their problems.

Relatedness refers to developing satisfactory connections, or relationships, with others, particularly one's peers. Students experience relatedness when they perceive others by listening and responding to them.

When these three needs are met, students are more intrinsically motivated and actively engaged in their learning. (APA, 2004).

Subject-Object Theory of Interest on the other hand is based on a concept of interest and motivation described, as a relationship between an individual (e.g. learner) and an object (e.g. learning topic). In the context of the subject-object theory it was investigated which conditions of school instruction are fostering individual motivation. It turns out to be crucial that students experience the classroom as supportive with respect to autonomy and competence and that they have the feeling of being socially integrated.

The experience of being interested in a concrete learning situation is always the result of an interaction between personal and situational factors. In school, for example, it is assumed that a situational interest is created by the interesting "composition" of a teaching situation and/or an interesting presentation of a lesson.

Both theories, the subject-object theory of interest and the self-determination theory are characterised by the fact that students' interest are influenced by the social environment and the individual intrinsic motivation of the learners resulting to their individual scholastic achievement. Thus, these theories are of particular importance for analysing the factors that affects interest of the students in learning mathematics.

REVIEW OF RELATED LITERATURE

One of the common goals of all mathematics teacher at all levels of education is that student should understand and learn mathematics. However, it is the only subject that is most dreaded by students among all subjects offered in school (Akinoso, 2011). Students therefore tend to respond to it with less self-confidence, negative feeling and anxiety. One of the prerequisites for understanding mathematics is interest in math and the desire of students to learn it. Khayati (2014) defines interest as a stimulus that increases the activity power. According to ANIGBO (2016), interest has to do with preparedness or mastery of background knowledge that can enable the learner to cope with next higher level of learning of the subject or related learning task. People naturally approach activities that interest them.

Researchers studying interest have focused on two different conceptions as cited by Schiefele, (1991) individual interest and situational interest. Individual interest is conceived of as a relatively enduring preference for certain topics, subject areas, or activities. Situational interest on the other hand is an emotional state brought about by situational stimuli that arouse interest. He identified two components of individual interests: feeling-related and value-related valences. Feeling-related valences refer to refer to feelings of enjoyment and involvement and are most typical type of interest. Value-related valences on the other hand refer to the personal significant to an object.

According to Maurice et. al.(2010), interest can be regarded as an important determinant of academic achievement. Higher interest can lead to academic engagement, typically with positive effect which in turn can lead to learning gains and improve achievement. This is described as self-enhanced model. However, a different relation between interest and academic achievement stems from the idea that learning gains lead to better test results or grades and to other forms of positive feedback, which might in turn foster the development of corresponding interest. This relation between achievement and interest refers to skill-development model.

John Dewey in his book "Interest and Effort in Education (1913) as cited by Schiefele, distinguished between interest-oriented learning and learning that neglects a student's interests and is based on coercion. According to Dewey, external attempts to make something interesting lead to only temporary effort and do not result in identification with the material.

Various theories by different scientists, researchers, and educators all concluded that interest is closely related to learning. Simultaneous to active learning, students should be interested in the subject they are learning and student may resort in it in order to understand

material and apply them (Khayati, 2014). However, interest in learning mathematics is affected by different factors. According to (Anigbo, 2016) Many factors have been identified in literature as reasons associated with students' lack of interest in learning mathematics. These include Students' factor, teachers' factor, mathematics anxiety, class size, government factor, infrastructural problem, instructional strategy. (Khayati, 2014) included school environment, peer, and family factors as it affects interest in learning mathematics. Of these, five factors, student factors (attitude and math anxiety), Teacher factor (Personality and Strategy) and Classroom Condition are included in this study.

Student's factor according to Anigbo (2014) is caused by math phobia and distraction through handset. Failure in mathematics as supported by some authors is associated with lack of interest in studying the subject.

According to Mohd, et. al (2011), the variable 'attitude' is one of the most potent factors that relates to achievement. He adds that the conceptions, attitudes, and expectations of students regarding mathematics and mathematics teaching have been considered to be very significant factor underlying their school experience and achievement.

According to Burns (1998) as cited by Anigbo 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.
Amelink (2012) on "Information Sheet: Female Interest in Mathematics", math anxiety can be experienced by students of both genders but more likely to occur among females, and can also negate female interest in the field. This anxiety occurs as students experience confusion when learning a new mathematical task. Among girls this confusion is believed to reinforce gender-based stereotypes that they are not or should not be "good at math," leading them to report a decreased interest in math after being faced with confusion.

Related Studies

Various studies in interest and achievement were done by several researchers. Some focused on the factors affecting interest while others on the relation of interest and achievement itself.

Khayati and Payan (2014), in the study "Effective Factors Increasing the Students' Interest in Mathematics in the Opinion of Mathematic Teachers of Zahedan", found out that class climate, doing activities outside the classroom as well as school environment can increase students' interest in math. Furthermore, separation of educational classroom of mathematics from the main classroom (which is decorated with crafts created by students themselves with regard to math book including article, wall newspaper, figures and formulas) is highly effective in increasing the students' interest in math. As for the teacher factors, the quality of teacher's teaching and behavior, activity of students while teaching at all educational levels (Elementary to High school) enhance students' interest in math. Regarding the obtained results, it showed first grade teachers play vital role in making students interested in math.

Based on the result of his study, he categorized the most influential and effective factors contributing to increase in students' interest in math as follow:

1. Doing activity in math class (activity of students while teaching)
2. Previous math teachers' behaviors
3. Separation of educational classroom of mathematics from the main classroom (which is decorated with crafts created by students themselves with regard to math book including article, wall newspaper, figures and formulas)
4. Peers
5. Size and appearance of math textbook
6. First grade teachers in each educational, among whom the Elementary first grade teachers had more importance and impact
7. School environment and appropriate class climate
8. The status of family and the educational level of their parents
9. Conducting research related to mathematics, its application in daily life and other courses
10. Studying the history and background of mathematics

The findings of Anigbo's study (2016) " Factors Affecting Students' Interest in Mathematics in Secondary Schools in Enugu State" showed that teacher factor, student factor, class size, government factor, instructional strategy, math anxiety and infrastructural problem are factors influencing students' mathematics interest. These factors were found to be significantly influencing the students' mathematics interest. These independent variables were effective in predicting students' mathematics interest.

Hill, Rowan and Ball (2005) in their study "Effects of Teachers' Mathematical Knowledge for Teaching on Student Achievement." found out that teachers' mathematical knowledge for teaching positively predicted student gains in mathematics achievement. It also shows that teacher's content knowledge plays a role even in the teaching of very elementary concept. He concluded that teachers' mathematical behaviour- in particular, their classroom explanations, representations, and interactions with students' mathematical thinking affects student outcomes.

Heinze et.al (2005) in the study "Mathematics Achievement and Interest in Mathematics from a Differential Perspective" has a different finding. In their investigation of interest and motivation indicates that students face mathematics instruction comparatively fearless but pay a certain amount of attention because of fear of failure, boredom, and achievement motivation. They observed that many students on the lower level is mainly extrinsically motivated and only few develop above-average interest in mathematics. They differ the general interest in mathematics and an interest in mathematical activities that go beyond the level of calculations.

However, Lazarides and Ittel (2012) in their study " Mathematics Interest and Achievement: What Role Do Perceived Parent and Teacher Support Play? A Longitudinal Analysis", it is found out that high perceived teacher support was associated with low mathematics grades. A possible interpretation of this negative relationship is a reciprocal effect from student achievement to teacher beliefs and behaviors: Low-achieving students might receive higher levels of teacher support.

Turner et.al (2002) on "The Classroom Environment and Students' Reports of Avoidance Strategies in Mathematics: A Multimethod Study" studied the relation between aspects of the classroom environment and students' reported use of avoidance strategies in mathematics was examined. Using survey data and hierarchical linear modelling, it was found that self-handicapping, avoidance of help seeking, and a preference to avoid novel approaches to engaging in academic work varied significantly among the 65 participating classrooms. Students reported using avoidance strategies significantly less in classrooms perceived as emphasizing learning, understanding, effort, and enjoyment. Students reported higher incidences of avoidance strategies in classrooms in which teachers devoted little attention to helping students build understanding and in which motivational support was low.

METHODS

Research Design

To achieve the purpose of the study, the researcher utilized the descriptive method using a modified questionnaire as the instrument in gathering data. To achieve the purpose of the study, the researcher utilized the descriptive method using a modified questionnaire as the instrument in gathering data.

Research Environment

The locale of this study are the five secondary schools in the District of Lazi, Siquijor. Four of these schools are Public High Schools namely, Campalanas National High School in Campalans, Leon Parami High School in Poo, Kinamandagan High School in Kinamandagan and Lazi National Agricultural School in Tigbawan and one is a private school, the St. Isidore the Farmer Catholic School in Catamboan.

Research Respondents

The respondents of the study are a complete list of math teachers teaching grade 7 mathematics and randomly selected Grade 7 high school students enrolled in the identified schools in the district of Lazi with a total population of 440.

Research Instruments

The researcher prepared a modified questionnaire based on different questionnaires given from various sources related to this study. This questionnaire is used to gather the students' sex and statement that affect students interest in learning mathematics distributed evenly based on the following factors; teacher's factor, teaching strategies employed, classroom condition, mathematics anxiety of students and attitude toward learning mathematics.

Another set of teacher-made questionnaire was done to gather the profile of the teachers teaching grade 7 mathematics subject.

Statistical Treatment of Data

Percentage was used on the academic performance and the student's and teachers' profile.

Median, Mode and Interquartile Range (IQR) were used to find extent of students' interest in Math as affected by the given factors.

Math Multiple Regression was used in testing relationship between students' math interest and Scholastic Ratings.

Mann-Whitney U test was used in testing significant difference on factors affecting students' interest in Math between male and female students.

Chi-square was used in testing the extent of students' interest in math as affected by the profile of the teacher.

Data Gathering Procedure

The researcher used questionnaires for gathering specific data for the research. It was structured on a checklist form. Before the actual conduct of the distribution of questionnaires to the respondents, a reliability test was conducted. The respondents given the pilot test are randomly chosen grade 7 students of Lazi National Agricultural School. These students belong to the researchers mathematics class and not included in the actual research.

After testing the reliability of the questionnaire, the researcher sent a letter of request to the principals to seek approval to conduct the study to grade 7 students in their respective school.

Another set of questionnaire was also given to the teachers handling the grade 7 mathematics class in order to Another set of questionnaire was also given to the teachers in order to relate their profile and the factors that greatly affect the interest of the learners in studying mathematics.

RESULTS AND DISCUSSIONS

Table 1. Sex of the Respondents

Sex	Frequency	Percent
Male	87	41.4
Female	123	58.6
Total	210	100.0

Table 1 shows that majority of the respondents are female with 59% of the total number of respondents.

Table 2. Scholastic Rating of the Respondents

Grade	Frequency	Percent
75 – 79	35	16.7
80 – 84	71	33.8
85 – 89	55	26.2
90 – 94	38	18.1
95 – 99	11	5.2
Total	210	100.0

Table 2 shows that 51% or majority of the respondents have grades below 85%.

Table 3. Age of the Teacher Respondents

Age	Frequency	Percent
24-30	3	42.9
31-37	0	0
38-44	2	28.6
45-51	1	14.3
52-58	1	14.3
Total	7	100.00

Table 3 depicts that the majority or 72% of the respondents are less than 45 years old.

Table 4. Sex of the Teacher Respondents

Sex	Frequency	Percent
Male	2	28.6
Female	4	71.4
Total	6	100.0

Table 4 shows that the majority of the teacher respondents are female with 71%.

Table 5. Highest Educational Attainment Of The Teacher Respondents

Educational Attainment	Frequency	Percent
College Graduate	2	28.6
MS/MA Units	5	71.4
Ph.D/Ed.D Units	0	0
Total	7	100.00

Table 5 presents the highest educational attainment of the teacher respondents. Majority of the teacher respondents have MS/MA Units with 71%.

Table 6. Mathematics Of The Teacher Respondents

Number of Years	Frequency	Percent
3-5	3	42.9
6-8	1	14.3
9-11	1	14.3
12-14	0	0
15-17	2	28.6
Total	7	100.00

Table 6 depicts that the majority or 57% of the teacher respondents have taught grade 7/ 1st year students for less than 9 years.

Qualities of the Teacher	Strongly Agree/ Strongly Affects (4)	Agree/ Affects (3)	Disagree/ Slightly Affects (2)	Strongly Disagree/ Doesn't Affect at all (1)	Mdn	IQR
My Mathematics teacher makes math interesting	134 (63.8%)	74 (35.2%)	2 (1%)	0	4	1
My Mathematics teacher presents the topic clearly	150 (71.4%)	60 (28.6%)	0	0	4	1
My mathematics teacher helps us when we have trouble with our work	142 (67.6%)	58 (27.6%)	10 (4.8%)	0	4	1
My Mathematics teacher doesn't embarrass the students in front of the class	121 (57.6%)	70 (33.3%)	11 (5.2%)	8 (3.8%)	4	1
My Mathematics teacher doesn't interrupt students who are answering	111 (52.9%)	83 (39.5)	9 (4.3%)	7 (3.3%)	4	1
My Mathematics teacher gives compliments or rewards	126 (60%)	67 (31.9%)	11 (5.2%)	6 (2.9%)	4	1

The Extent Of The Students, Interest In Mathematics As Affected By The Qualities Of The Teacher

Legend: Mdn = Median,
IQR=Interquartile Range

On "My Mathematics teacher knows the topic he/she teaching", about 84% of the respondents strongly agreed with the statement with Mdn = 4, and IQR = 0, which means the responses are very much clustered within the median.

The likeliest response on "My Mathematics teacher presents the topic clearly" is Strongly Agree/ Strongly Affect with IQR = 1 which means that responses clustered around the median.

This supports the study of Hill, Rowan, and Ball "Effects of Teachers' Mathematical Knowledge for Teaching on Students Achievement" who says that teacher's mathematical knowledge for teaching positively predicts gains in mathematics achievement.

In summary, 7 out of 8 factors on the qualities of the teachers strongly affect students' interest in mathematics.

Table 8. The Extent of the Students' Interest in Mathematics as Affected by the Strategies Employed by the Teacher

Strategies Employed by the Teacher	Strongly Agree/ Strongly Affects (4)	Agree/ Affects (3)	Disagree/ Slightly Affects (2)	Strongly Disagree/ Doesn't Affect at all (1)	Mdn	IQR
The teacher gives jokes and humour in discussion	90 (42.9%)	99 (47.1%)	14 (6.7%)	7 (3.3%)	3	1
The teacher employs games and interesting activities in class	68 (32.4%)	122 (58.1%)	17 (8.1%)	3 (1.4%)	3	1
The teacher encourages us to participate during class discussion	170 (81%)	37 (17.6%)	2 (1%)	1 (0.5%)	4	0
The teacher gives group activity and let us discuss the result of the activity in class	144 (68.6%)	48 (22.9%)	17 (8.1%)	1 (0.5%)	4	1
The teacher uses relevant examples on the topics being discussed	170 (81%)	39 (18.6%)	1 (0.5%)	0	4	0
The teacher employs "explain – practice – test" in class	154 (73.3%)	46 (21.9%)	10 (4.8%)	0	4	1
The teacher gives difficult exams	25	107	68	10	3	1

Legend: Mdn = Median,
IQR=Interquartile Range

On "The teacher encourages us to participate during class discussion" and "The teacher uses relevant examples on the topics being discussed", 81% of the respondents answered strongly agree or strongly affect with Mdn = 4, and IQR = 0, which means the responses are very much clustered within the median.

The likeliest response on "The teacher gives

difficult exams" is Agree/ Affect with IQR = 1 which means that responses clustered around the median.

For the statement "The teacher proceeds to new topic even we haven't mastered the previous topic" the respondents Disagree with IQR=2 which means that the responses are scattered across the median.

In summary, the extent of students' interest in Mathematics is strongly affected by the strategies employed by the teacher.

Table 9. The Extent Of Students' Interest in Mathematics as Affected by Mathematics Anxiety

Mathematics Anxiety	Strongly Agree/ Strongly Affects (4)	Agree/ Affects (3)	Disagree/ Slightly Affects (2)	Strongly Disagree/ Doesn't Affect at all (1)	Mdn	IQR
Mathematics is useful in everyday life	180 (85.7%)	28 (13.3%)	2 (1%)	0	4	0
Mathematics is a difficult subject	15 (7.1%)	108 (51.4%)	62 (29.5%	25 (11.9%)	3	1
I am afraid of my mathematics teacher	16 (7.6%)	29 (13.8%)	51 (24.3%)	114 (54.3%)	1	1
I am not good in mathematics	18 (8.6%)	77 (36.7%)	97 (46.2%)	18 (8.6%)	2	1
I get very tense when there is a math quiz	22 (10.5%)	70 (33.3%)	94 (44.8%)	24 (11.4%)	2	1
I worry that I will get poor grades in mathematics	94 (44.8%)	74 (35.2%)	29 (13.8%)	13 (6.2%)	3	1
No matter how hard I try, I cannot understand topics in mathematics	14 (6.7%)	28 (13.3%)	95 (45.2%)	73 (34.8%	2	1
I feel nervous when the teacher asks me a question about the topic	18 (18.6%)	93 (44.3%)	73 (34.8%)	26 (12.4%)	3	1

Legend: Mdn = Median, IQR=Interquartile Range

About 86% of the responses to the statement "Mathematics is useful in everyday life" is Strongly Agree with Mdn = 1 and IQR = 0.

About 51% on the other hand answered Agree to statement "Mathematics is a difficult subject with a Mdn = 2 and IQR=1. This supports the work of Gafoor and Kurukaan (2015) in their work "Why High School Students Feel Mathematics Difficult? An Exploration of Affective Beliefs" when they found out that 75% of their respondents believe that Mathematics is a difficult subject.

In summary, 7 out of 8 factors on the strategies employed by the teacher slightly affect to strongly affect students' interest in mathematics.

Table 10. The Extent Of Students' Interest In Mathematics As Affected By The Students Attitude In A Mathematics Class

Students' Attitude in a Mathematics Class	Strongly Agree/ Strongly Affects (4)	Agree/ Affects (3)	Disagree/ Slightly Affects (2)	Strongly Disagree/ Doesn't Affect at all (1)	Mdn	IQR
The only reason I'm taking mathematics class is because I have to	59 (28.1%)	46 (21.9%)	53 (25.2%)	52 (24.8%)	3	2.25
I feel upset whenever I get wrong answers	73 (34.8%)	83 (39.5%)	41 (19.5%)	13 (6.2%)	3	2
I like to listen to the teachers discussion	127 (60.5%)	66 (31.4%)	11 (5.2%)	6 (2.9%)	4	1
I like to use my cellphone during class	6 (2.9%)	21 (10%)	40 (19%)	143 (68.1%)	1	1
I am eager to answer math quizzes	52 (24.8%)	107 (51%)	44 (21%)	7 (3.3%)	3	0.25
I can't concentrate on the topic because I am thinking what will I do after class	14 (6.7%)	42 (20%)	84 (40%)	70 (33.3%)	2	2
I am excited that our math class is over	44 (21%)	63 (30%)	76 (36.2%)	27 (12.9%)	2	1
I like to talk to my classmates topics that	13 (6.2%)	45 (21.4%)	97 (46.2%)	55 26.2%)	2	2

Legend: Mdn = Median, IQR=Interquartile Range

Majority or 68% of the students answered Strongly Disagree to the statement "I like to use my cellphone during class". This implies that the use of cellphone in a classroom doesn't affect the interest of the students with an IQR of 2.5, the responses for "The only reason I'm taking mathematics class is because I have to" is scattered across the responses. This means that there is a variation of responses among the students when given the statement.

In summary, 6 out of 8 factors on mathematics anxiety affect and slightly affect students' interest in mathematics.

Table 11 . The Extent of Students' Interest In Mathematics As Affected By The Classroom Condition

Classroom Condition	Strongly Agree/ Strongly Affects (4)	Agree/ Affects (3)	Disagree/ Slightly Affects (2)	Strongly Disagree/ Doesn't Affect at all (1)	Mdn	IQR
The classroom is well-lighted	131 (62.4%)	64 (30.5%)	13 (6.2%)	2 (1%)	4	1
The classroom is well ventilated	77 (36.7%)	101 (48.1%)	25 (11.9%)	7 (3.3%)	3	1
The seats are well-spaced from each other	100 (47.6%)	80 (38.1%)	24 (11.4%)	6 (2.9%)	3	1
I am comfortable with our sitting arrangement	104 (49.5%)	61 (29%)	36 (17.1%)	9 (4.3%)	3	1
The size of our class affects my concentration	32 (15.2%)	75 (35.7%)	60 (28.6%)	43 (20.5%)	3	1
The writing on the blackboard are not readable	20 (9.5%)	47 (22.4%)	76 (36.2%)	67 (31.9%)	2	2
Students passing the classroom affect my concentration	43 (20.5%)	86 (41%)	57 (27.1%)	24 (11.4%)	3	1
The time of our math class is very long	26	64	77	43	2	1

Legend: Mdn = Median,
IQR=Interquartile Range

On "The classroom is well-lighted", about 81% of the respondents strongly agreed or the statement strongly affects the interest of the students with Mdn = 1, and IQR = 1, which means the responses are clustered within the median.

The likeliest response on "Students passing the classroom affects my concentration" however is Agree with IQR = 1 which means that responses clustered around the median.

The result supports the study of Khayati and Payan (2014) who concluded that school environment and class climate is highly effective in increasing students interest in Mathematics.

In summary, 6 out of 8 factors on students' attitude in a mathematics class affect and slightly affect students' interest in mathematics.

Table 12. Summary of Multiple Regression Analyses for the Factors Affecting the Scholastic Ratings in Mathematics of Grade 7 Students

Variable	F	R	R^2	P-value	Level of significance	Desicion	Remarks
Teachers Qualities	1.580	.087	.008	.210	.05	Failed to Reject H_o	Insignificant
Teaching Strategies	.294	.038	.001	.588	.05	Failed to Reject H_o	Insignificant
Math Anxiety	7.059	.181	.033	.008	.05	Reject H_o	Significant
Students' Attitude	19.805	.295	.087	.000	.05	Reject H_o	Significant
Classroom Condition	7.956	.192	.037	.005	.05	Reject H_o	Significant

Value of R

Strength of Relationship

$\pm$ 0.50 to $\pm$ 1.0
strong relationship

$\pm$ 0.30 to $\pm$ 0.49
moderate relationship

$\pm$ 0.10 to $\pm$ 0.29
weak relationship

$\pm$ 0.01 to $\pm$ 0.09
very weak relationship

Table 12 shows the summary of multiple regression analyses for variables affecting the respondents scholastic ratings in Mathematics of the Grade 7-students. It can be gleaned from the table that the multiple correlation coefficient (R) 0.181, 0.295, and 0.192 imply a weak level of prediction. These coefficient of determination (R2) values of 0.033, 0.087, and 0.037 indicate that 3.3%, 8.7%, and 3.7% in the variances in the scholastic ratings of the respondents is explained by some factors affecting students' mathematics interest. As evidenced by the F-value of 7.059, 19.805, and 7.956 with p-value 0.008, 0.000, and 0.005 the overall multiple regression model is a good fit for the data. This finding implies that the factors affecting the interest in mathematics particularly math anxiety, students' attitude, and the classroom condition can significantly predict their scholastic ratings in mathematics. However, the factors of teacher qualities and teaching strategies did not affect the scholastic ratings of the respondents.

Table 13. Difference on the Factors Affecting Students' Interest in Mathematics When Grouped According to their Sex

Factors	Mean Rank		Computed U-Value	P-value	Alpha	Decision	Remarks
	Male	Female					
Teachers Qualities	128.35	89.34	3362.500	.000	.05	Reject H_o	Significant
Teaching Strategies	124.85	91.81	3667.0	.000	.05	Reject H_o	Significant
Math Anxiety	108.72	103.22	5070.0	.516	.05	Failed to Reject H_o	Inignificant
Students' Attitude	92.06	115.01	4181.0	.007	.05	Reject H_o	Significant
Classroom Condition	102.45	107.65	5085.5	.539	.05	Failed to Reject H_o	Insignificant

It can be gleaned from the table that two variables Math Anxiety and Classroom Condition have P-values of 0.516 and 0.539 respectively which are greater than the significance level of 0.05. Hence, the Mann-Whitney U test did not warrant the rejection of the Null hypotheses. Evidence is sufficient to suggest that the male and female grade 7-students have equally perceived the extent of factors affecting their interest in Mathematics.

Meanwhile, three variables have P-values 0.000, 0.000, and 0.007 are lesser than the significance level. There is sufficient evidence to reject the null hypothesis. This implies that the difference in the extent of the factors affecting mathematics interest between male and female students is statistically significant. Male perceived factors on teachers qualities and teaching strategies affecting their interest in mathematics, while female perceived factors on students' attitude affects their interest.

Table 14. *Chi-square results on the extent of the teacher's qualities and profile of the teachers.*

Profile	Chi-square Value	Cramer's V	Level of Association	P-value	Level of Significance	Decision	Remarks
Age	66.912	.326	Strong	.001	.05	Reject H_o	Significant
Sex	18.375	.296	Moderately Strong	.105	.05	Failed to Reject H_o	Insignificant
Highest Educational Attainment	14.480	.263	Moderately Strong	.271	.05	Failed to Reject H_o	Insignificant
Number of years teaching	78.356	.353	Very Strong	.000	.05	Reject H_o	Significant

Table 14 shows that variables on age and number of years in teaching have P-values of 0.001 and 0.000 which are less than the level of significance at 0.05. There is sufficient evidence to reject the null hypothesis. As evidenced by their corresponding Cramer's V of 0.326, and 0.353, there exist a strong and very strong level of association between the extent of the teacher's qualities and the profile of the teachers particularly on age and number of years teaching grade 7 students hence, relationship existed.

However, the educational attainment and the sex of the teachers are not significantly related to the extent of the teacher's qualities.

Table 15. *Chi-square results on the extent of teaching strategies and profile of the teachers.*

Profile	Chi-square Value	Cramer's V	Level of Association	P-value	Alpha	Decision	Remarks
Age	70.544	.335	Strong	.004	.05	Reject H_o	Significant
Sex	14.290	.261	Moderately Strong	.428	.05	Failed to Reject H_o	Insignificant
Highest Educational Attainment	11.628	.235	Moderate	.636	.05	Failed to Reject H_o	Insignificant
Number of years teaching	66.742	.325	Strong	.009	.05	Reject H_o	Significant

Table 15 shows that variables on age and number of years in teaching have P-values of 0.004 and 0.009 which are less than the level of significance at 0.05. There is sufficient evidence to reject the null hypothesis. As evidenced by their corresponding Cramer's V of 0.335, and 0.325, there exist a strong level of association between the extent of the teaching strategies employed by the teacher and the profile of the teachers particularly on age and number of years teaching grade 7 students hence, relationship existed.

However, the educational attainment and the sex of the teachers are not significantly related to the extent of the teacher's qualities.

CONCLUSION AND RECOMMENDATIONS

Based on the findings of the study, the following concepts are generated:

Majority of the respondents are female with grades below 85%. Majority of the teacher respondents are female and with age above 37 years old. Most of them have MS/ MA units and have less than 9 years of experience teaching grade 7/ first year.

Different factors such as teacher's quality, teaching strategies, mathematics anxiety, students attitude in a math class and the classroom conditions affects students' interest in mathematics. The extent of the students' interest in Mathematics as affected by the qualities of the teachers in Mathematics

7 and strategies employed by the mathematics teacher is Strongly Affect. Mathematics anxiety, Attitude of the student towards Mathematics class, and the Classroom condition on the other hand, affects or slightly affects mathematics interest of the students.

There is a significant relationship between the factors affecting the interest in mathematics particularly math anxiety, students' attitude, and the classroom condition. However, the factors of teacher qualities and teaching strategies did not affect the scholastic ratings of the respondents. There is a significant difference in the extent of the factors on teacher qualities, teaching strategies, and students' attitude affecting between male and female students. There is no significant difference found on math anxiety and classroom condition. There is a significant relationship between the extent of teacher's qualities and teaching strategies and the age and teaching experience of the teachers. However, relationship between the extent of teacher's qualities and teaching strategies and sex and highest educational attainment of the teacher is insignificant.

The researcher recommends the following to improve students' interest in mathematics and enhance their academic performance.

Teachers must utilize different strategies and techniques in order to have productive classroom activities to maximize students' learning and enhance their academic performance. The teacher should develop lessons and individualized learning materials that incorporate students' interests, needs, and experiences to cater all type of learners including fast and slow ones. Teachers should possess a child-friendly classroom environment and encourage students in maintaining such classroom condition. Include in the homeroom guidance activities, topic and activities that address math anxiety and promote anxiety reduction techniques or strategies.

Government should organize refresher courses for mathematics teachers regularly from which teachers can be equipped with various effective instructional strategies. Parents should pay attention on how their children do in school. Teachers should continue pursuing their studies to equip themselves with skills they can apply in the field of teaching.

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