

RESEARCH ARTICLE

SELF-EFFICACY AND ATTITUDE AS PREDICTORS OF MATHEMATICS PERFORMANCE OF SENIOR HIGH SCHOOL STUDENTS

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Abstract

This study determined the relationship of self-efficacy, attitude, and performance in mathematics of senior high school students. Specifically, the study (a) described the level of mathematics selfefficacy of studentrespondents in terms of mastery experience, vicarious experience-peers, vicarious experience-adults, social persuasions, and physiological state, (b) characterized the attitude of the student-respondents towards mathematics in terms of anxiety, confidence, enjoyment, and benefits/value, (c) described the mathematics performance of the respondents, (d) determined the significant relationship between self-efficacy, attitude, and mathematics performance of the respondents, and (e) determined the predictors of students mathematics performance. Simple random sampling was used in identifying the 229 samples from three (3) public secondary schools offering senior high school in the Tablas Island. The researchers used the validated Self-Efficacy and Attitude towards Mathematics questionnaire. It was found out that the student-respondents have moderate mathematics self-efficacy in mastery experience, vicarious experience-peers, vicarious experience-adults, social persuasions, and physiological state. It was also found out that there was a high level of attitude towards mathematics in terms of benefits/value and moderate level of attitude towards mathematics in terms of anxiety, confidence, and enjoyment. Majority of the student-respondents did not meet the expectations in terms of mathematics performance, but a significant percentage of the group was average in the acceptable range of rating as significant relationship exists between self-efficacy, attitude and mathematics performance. The study revealed that the mathematics performance was predicted by variables such as vicarious experienceadults, benefits/value, anxiety, and vicarious experience-peers.

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Introduction:-

Mathematics is the bedrock of all science and technologically based subjects. It is one of the essential cores of the school curriculum (Orton & Frobisher, 2004 in Alpacion et al., 2014). Given the vital role mathematics plays in education and most career, it is beneficial and essential to learn the competencies in Mathematics subject. More mathematics lessons are being taught in schools and colleges throughout the world than in any other subject. However, students' performance in Mathematics continues to be a problem for many countries.

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Corresponding Author:- Prof. Mario A. Fetalver Jr. Ph.D. Address:- GEPS, Romblon State University, Odiongan, Romblon, 5505 Philippines. Mathematics' low performance is also a problem in the Philippines. Based on the National Achievement Test results for Grade 12 for the school year 2017 - 2018 released by the Bureau of Education Assessment (BEA) in 2018, the National Mean Percentage Score (MPS) in Mathematics was only 29.60, which is described as below the national standard. It has the lowest score in seven subject areas covered by the test. Furthermore, MIMAROPA Region has an overall MPS of 29.13, while the Division of Romblon has a general MPS of 31.24. The result is below the passing percentage, which is 75%, and this means that students had difficulty in dealing with the subject, which is alarming and recurring situations because its neighboring Asian countries like Singapore, South Korea, Japan, Hongkong, and Chinese Taipei are among the leaders in Mathematics achievement (Mullis et al., 2011).

Several studies investigated the factors affecting the performance of students in Mathematics (Kidd et al., 2014; Barnes et al., 2014; Shafer, 2014; Grobler, 2014; Gerhard & Burn, 2014). As Mbugua, Kibet, Muthaa, and Nkonke (2012) found out that contributory factors to Mathematics low performance of students in Kenya were understaffing, lack of motivation, inadequate teaching/learning materials, and poor attitudes by students and teachers, and retrogressive practices.

Teachers are using different strategies to improve students' attitudes towards Mathematics. For example, technology-aided instruction improved the students' attitude towards the subject (Choi et al., 2013). Social networking sites are also used to help improve students' performance. As Gregory, Gregory & Eddy (2014) revealed, students who actively participate in Facebook group discussions are more engaged in Mathematics.

It was also found out that using drawing activity had a positive effect on the mathematics performance of students (Arhin & Osei, 2013). A guided hyperlearning method was also seen as effective (Fathurrohman et al., 2013). Context personalization also has a positive effect on improving academic performance in Mathematics (Walkington, Petrosino& Sherman (2013).

Despite all the different strategies and techniques applied in teaching mathematics, the problem of low performance continues. One of the reasons is the students' self-efficacy towards the subject. It should give attention if one is serious in advancing the mathematics performance of the students. Several studies revealed a strong relationship between self-efficacy and Mathematics performance (Pampaka et al., 2011; Fast et al., 2010; Liang, 2010). Mathematics self-efficacy is developed with positive teacher support and personal relevance (Aldridge et al., 2013). To maximize the impact of self-efficacy, Cheema (2013) concluded that simple and basic measurements of math self-efficacy are likened to the effectiveness such as mathematically elegant and complex counterparts. Also, found out that mathematics self-efficacy is strongly related to the student's attitude towards the subject (Vukovic et al., 2013).

Objectives:-

The study's main concern was to determine the relationship between mathematics self-efficacy, attitude towards mathematics, and mathematics performance of senior high school students. Specifically, the study was conducted:

- 1. To describe the level of mathematics self-efficacy of senior high school students in terms of the mastery experience, vicarious experience peers, vicarious experience adults, social persuasions, and physiological state.
- 2. To describe the attitude of the senior high school students towards mathematics in terms of anxiety, confidence, enjoyment, and benefits/value.
- 3. To describe the mathematics performance of senior high school students.
- 4. To determine the significant relationship between the mathematics self-efficacy, attitude towards mathematics, and mathematics performance of senior high school students.
- 5. To determine the significant predictors of mathematics performance among senior high school students based on their mathematics self-efficacy and attitude towards mathematics.

Methodology:-

Research design.

The study used a quantitative research design. This was the most appropriate design since the study determined the students' mathematics self-efficacy, attitude towards mathematics, and the performance of the respondents through numerical data. This also determined the connection between the variables through statistical methods.

Research Method:-

This study used the descriptive-correlational type of research. This is a process that involves establishing relationships among studied variables. The study emphasized the relationship between students' mathematics self-efficacy, attitude toward mathematics, and performance of senior high school students.

Sampling Procedure

Stratified random sampling was used in the choice of the respondents (N=536, n=229). Slovin's formula was used to determine the sample size. The study was conducted in four public secondary schools in the District of San Agustin-Sta. Maria-Calatrava, Division of Romblon Philippines. These schools were selected because they offer senior high school programs. The study involved the grade 11 students across the four target schools. The breakdown of the respondents for every school is shown below:



Figure 1:- Population and Samples of the study.

Research Instrumentation.

The researchers used the following self-made/developed research instrument to gather relevant data. Scale for Mathematics Self-Efficacy. This was used to determine the level of mathematics self-efficacy of senior high school students. It was composed of 44 items across four (4) sources of mathematics self-efficacy: mastery experience, vicarious experience (peers and adults), social persuasions, and physiological state. Attitude Towards Mathematics Scale. This was used to determine the students' attitudes towards Mathematics. The scale was composed of 37 items covering four (4) factors such as anxiety, confidence, enjoyment, and benefits/value. Mathematics Performance Test. This was used to determine the mathematics performance of the respondents in core subjects in Senior High School. Their scores and ratings were used to determine the performance of the respondents. The test was composed of 50 questions based on the table of specifications (TOS) that was prepared by the researcher. The test covered the topics discussed in the two core mathematics subjects of senior high school: General Mathematics and Statistics and Probability. Research instruments for mathematics self-efficacy and attitudes and the mathematics performance test was prepared by the researcher. The research instruments and test was subjected to content and construct validation by the experts.

Data Analysis Techniques

The researchers prepared the Table of Specifications (TOS) for the performance test. It was patterned from the Curriculum Guide of the subjects encompassing all topics discussed in all schools. Further, the research instruments for students' mathematics self-efficacy and attitude towards mathematics were also prepared. The test was subjected to content and construct validation by expert teachers in Mathematics, while the research instruments were validated by the expert professors of Romblon State University. Then, the researchers conducted a pilot testing of the prepared test to grade 12 respondent-students to see if there was any problem with the stem and options. They were chosen as they have already undergone mathematics subjects in Senior High School.

Data Gathering Procedures

The researchers secured permit from the Office of the Schools Division Superintendent of Romblon, and School Heads. Then, the researchers coordinated with the head or coordinator of the Senior High School (SHS) Departments to identify the respondents. Then, they administered the research instruments.

Statistical Treatment of Data

The researchers used the following statistical tools in describing, determining, analyzing, and interpreting the gathered data. Frequency and Percentage were used describe the mathematics performance of student-respondents. The Mean was used to describe the mathematics self-efficacy and attitudes of senior high school students. Pearson's r was used to determine the relationship of mathematics self-efficacy, attitudes, and performance, while the Multiple Regression was used to determine the predictors of mathematics performance student-respondents based on their mathematics self-efficacy and attitude towards mathematics.

Result and Discussion: -

The researchers present the information, analysis, interpretation of the gathered data of the study.

1			
Mathematics Self-Efficacy	Mean	Description	Level of Mathematics self-efficacy
Mastery Experience	3.15	Fairly agree	Moderate
Vicarious Experience – Peers	3.49	Fairly agree	Moderate
Vicarious Experience – Adults	3.40	Fairly agree	Moderate
Social Persuasions	3.08	Fairly agree	Moderate
Physiological State	2.78	Fairly agree	Moderate
Over-all Mean	3 18	Fairly agree	Moderate

 Table 1:- Descriptive characteristics of Mathematics self-efficacy of the student-respondents.

Over-all Mean3.18Fairly agreeModerateLegend: Scale in interpreting the level of self-efficacy: 4.51 – 5.00 (Strongly agree, and Very high); 3.51 – 4.50(Agree, and High); 2.51 – 3.50 (Fairly agree, and Moderate); 1.51 – 2.50 (Disagree, and Low); 1.00 – 1.50(Strongly disagree, and Very low)

Table 1 presents the level of mathematics self-efficacy of the students in terms of mastery experience with a weighted mean of 3.15 could describe the score as "Fairly Agree," which means that the respondents have a moderate mathematics self-efficacy in terms of mastery experience. Results of research studies revealed that mastery experience was an influential source of self-efficacy since this experience included evidence of whether or not students were able to master the necessary tasks (Usher and Pajares, 2009).

Mathematics self-efficacy of the students in terms of vicarious experience-peers revealed that the studentrespondents have great respect for classmates who are math achievers described weighted mean of 3.49 could describe the score as "Fairly Agree," which means that they have a moderate mathematics self-efficacy in terms of vicarious experience - peers.

In the same table, the level of mathematics self-efficacy of the students was also shown in terms of vicarious experience-adults with the descriptive weighted mean of 3.40 describing the score as fairly agree on, which means that they have a moderate mathematics self-efficacy in terms of vicarious experience-adults. This means that seeing and experiencing mathematics with adults who did well in mathematics inspired and admired them for doing the same. This also means that students admired teachers who are usually mathematics teachers.

Mathematics self-efficacy of the students in terms of social persuasions with a descriptive weighted mean of 3.08 describing the mean as fairly agree on, which means that they have a moderate mathematics self-efficacy in terms of social persuasions. This also means that the student-respondents felt confident if their parents could tell them that they do well in math, and their teachers believed and often appreciated them as they showed math ability. However, the physiological state with the descriptive weighted mean of 2.78 described the mathematics self-efficacy of the students as "Fairly Agree," which means that they have a moderate mathematics self-efficacy in terms of physiological state.

Table 2:- Descriptive characteristics of attitudes of respondent-students towards mathematics.Mathematics Self-Efficacy in terms ofMeanDescriptionLevel of Attitudes towards Mathematics

Anxiety	2.78	Fairly agree	Moderate
Confidence	3.00	Fairly agree	Moderate
Enjoyment	3.04	Fairly agree	Moderate
Benefits/Value	3.75	Agree	Moderate
Over-all Mean	3.14	Fairly agree	Moderate

Legend: Scale in interpreting the level of self-efficacy: 4.51 - 5.00 (Strongly agree, and ery high); 3.51 - 4.50 (Agree, and High); 2.51 - 3.50 (Fairly agree, and Moderate); 1.51 - 2.50 (Disagree, and Low); 1.00 - 1.50 (Strongly disagree, and Very low)

Table 2 presents the attitude towards the mathematics of the students in terms of anxiety (WM: 2.78) described the rating as fairly agree, which means that they have a moderate level of attitude towards mathematics in terms of anxiety. This also means getting sinking feelings, insecurity, nervousness, stress, and frustration on the part of the respondents.

Attitude in terms of confidence revealed the weighted mean of 3.00, which described the rating as fairly agree, which means that they have a moderate level of attitude towards mathematics in terms of confidence. Moderation has something to do with learning math, taking a math test, and solving math problems with difficulty. With mathematics complexity, student-respondents found it hard to learn math. Thus, their confidence in learning the subject is affected. It is essential to enhance their confidence in learning the subject so that their attitudes towards the subject would also be improved. As Mohamed and Waheed (2011) in their study about secondary students' confidence in math and its usefulness, they found out that there was a moderately positive attitude of the respondents towards mathematics.

They also fairly agreed (WM=3.04) on how they enjoyed learning math with friends, as they expressed that they were happy doing math problems and activities, and as mathematics for them is very interesting.

The weighted mean of 3.04 also described that they have a moderate level of attitude towards mathematics in terms of enjoyment.

The respondents also agreed that math is important in their everyday life (WM=3.75). This described that they have a high level of attitude towards mathematics in terms of benefits/value. Assessing the perceptions of the students on the mathematics value in their life exhibits their attitudes towards the subject. Capuno et al. (2019) found out that the respondents had positive attitudes in terms of the value of math. Students expressed that math is essential in their life because they can apply these concepts in some of their daily activities. However, these positive attitudes still need to be improved to inculcate in them that math is beneficial no matter what the person's status in life is. The overall weighted mean description of the level of attitudes of the respondent-students towards mathematics.

Score	F	%	Rating	Description
41 - 50	7	3.1	91 - 100	Outstanding
35 - 40	12	5.2	85 - 90	Very Satisfactory
30 - 34	25	10.9	80 - 84	Satisfactory
25 - 29	39	17	75 – 79	Fairly Satisfactory
24 and below	146	63.8	74 and below	Did Not Meet Expectations
Total	229	100		

Table 3:- Mathematics performance of students in core subjects.

Table 3 presents the Mathematics performance of students in core subjects. To compute the rating of the scores, the score obtained was divided by the highest possible score (50), multiplied by 50, and added 50. The classification of ratings was anchored on DepEd Order No. 8, s. 2015. One hundred forty-six (146) or 63.8% of the respondents had a rating of 74 and below, which means that they did not meet the expectations in Mathematics performance. Thirty-nine (39) or 17% of them had a fairly satisfactory rating, and seven (7) or 3.15% of them were in the outstanding performance. The results showed that while there are exemplary students in mathematics, particularly in General Mathematics and Statistics and Probability, the majority of students still need to be guided to improve their performance in the two subjects. Capuno et al. (2019) found that the attitudes, study habits, and performance of the junior high school students in mathematicshad a satisfactory performance. Thus, it is essential to minimize the

activities or factors that would distract the students from focusing on their studies and enhance those that will help improve their performance (Capuno et al., 2019).

Variables	8	Math Performance	ME	VEP	VEA	SP	PS	A	с	E	BV
Mathemati	ics Self-Efficac	y									
ME	<i>p-value,</i> Pearson r	p=0.00, r=,449**	1.00								
VEP	<i>p-value</i> , Pearson r	p=0.00, r≈.487**	p=0.00, r=.720**	1.00							
VEA	<i>p-value</i> , Pearson r	p=0.00, r=.515**	p=0.00, r=.708**	p=0.00, r=.737**	1.00						
SP	p-value, Pearson r	p=0.00, r=.426**	p=0.00, r≈.798 ^{**}	p≈0.00, r≈.638**	p=0.00, r=.744 ^{**}	1.00					
PS	<i>p-value</i> , Pearson r	p=0.00, r=319**	p=0.00, r=- .384	p=0.00, r=342**	p=0.00, r=338**	p=0.00, r=389**	1.00				
Attitude T	owards Mather	matics									
A	p-value, Pearson r	p=0.00, r=-,390 **	p=0.00, r=-	p=0.00, r=0391 **	p=0.00, r=-,436**	p=0.00, r=.,437**	p≈0.00, r=.796**	1.00			
с	<i>p-value,</i> Pearson r	p=0.00, r=.410	p=0.00, r=.739**	p=0.00, r=0.357**	p≈0.00, r=.632**	p=0.00. r=.777**	p=0.00, r=_451**	p=0.00, r=526 **	1.00		
E	<i>p-value,</i> Pearson r	p=0.00, r=.466**	p=0.00; r=.734**	p=0.00, r=0.604**	p=0.00, r=.690**	p=0.00, r=.797**	p=0.00, r=_374**	p=0.00, r=455 **	p=0.00, r=,865**	1.00	
BV	<i>p-value</i> , Pearson r	p=0.00, r=.462**	p=0.00, r=.532**	p=0.00, r≈0.561 **	p=0.00, r=.606**	p=0.00, r=.588**	p=0.00, r=_305**	p=0.00, r=377**	p=0.00, r=.622**	p=0.00, r=.650**	1.00

Table 4:- Relationship between self-efficacy, attitude, and mathematics performance of the respondents.

**Correlation is significant at the 0.05 and 0.01 level (2-tailed); n = 229

Legend:

mastery experience (ME), vicarious experience-peers (VEP), vicarious experience-adults (VEA), social persuasions (SP), and physiological state (PS), attitudes towards mathematics as to anxiety (A), confidence (C), enjoyment (E), and benefits/value (BV).

Pearson r	Strer	igth of Relationship	Degree of Relationship
$r=\pm~0.10$ to \pm	0.29	Weak	Almost Negligible Correlation
$r=\pm~0.30$ to \pm	0.49	Moderate	Substantial or Marked Correlation
$r=\pm$ 0.50 to \pm	1.00	Strong	High Correlation
		6	e

Table 4 shows the correlation between mathematics self-efficacy, attitude towards mathematics, and performance of senior high school students. It can be noticed that students' performance has a significant relationship at 5% and 1% levels on all sources of mathematics self-efficacy. Performance has a significant relationship on mastery experience (r = 0.449, sig. = 0.000). This reveals that there is a moderate relationship of substantial or marked correlation between the two variables. This indicates that r = 0.449 when squared, only 20.16 percent shared variance between the variables. Also, it has a significant relationship at 5% and 1% level on vicarious experience - peers (r = 0.486, sig. = 0.000). This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = 0.486 when squared, only 23.62 percent shared variance between the variables. Further, it has a significant relationship at 5% and 1% level on vicarious experience - adults (r = 0.515, sig. = 0.000). This reveals that there is a strong relationship or high correlation between the two variables. This indicates that r =0.515 when squared, only 26.52 percent shared variance between the variables. Moreover, social persuasion has a significant relationship at 5% and 1% level (r = 0.425, sig. = 0.000. This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = 0.425 when squared, only 18.06 percent shared variance between the variables. Meanwhile, physiological state has a significant relationship at 5% and 1% level (r = -0.319, sig. = 0.000). This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = -0.319 when squared, only 10.18 percent shared variance between the variables. Based on the preceding presentations, it is safe to infer that the hypothesis is hereby rejected. It means that there is a significant relationship between mathematics self-efficacy and the performance of senior high school students.

It was indicated by Liu and Koirala (2009) that mathematics self-efficacy and mathematics performance were positively related. Students with high self-efficacy were associated with high mathematics performance. Specifically, students who were confident that they could do an excellent job on math tests, they could understand the most challenging material presented in math texts, they could understand the most challenging material presented by math teachers, they could do an excellent job on math assignments, and they could master the skills being taught in their math classes, were more likely to have better mathematics achievement and performance.

There was a direct as well as the indirect influence of self-efficacy on mathematics performance. This finding emphasized the importance of students' self-efficacy to their learning and success. It showed that students high in self-efficacy would adopt deeper learning approaches and consequently attain better performance and achievement outcomes than their low-efficacy counterparts (Firouzeh and Mahmoudi, 2014).

In terms of attitude towards mathematics and performance of senior high school students, it found out that the students' performance has a significant relationship at 5% and 1% level on all factors of attitude towards mathematics. Performance has a significant relationship on anxiety (r = -0.390, sig. = 0.000). This reveals that there is a moderate relationship or substantial or marked correlation between the two variables. This indicates that r = -0.390 when squared, only 15.21 percent shared variance between the variables. Also, it has a significant relationship at 5% and 1% level on confidence (r = 0.410, sig. = 0.000). This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = 0.410 when squared, only 16.81 percent shared variance between the variables. Further, it has a significant relationship at 5% and 1% level on enjoyment (r = 0.466, sig. = 0.000). This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = 0.466 when squared, only 21.72 percent shared variance between the variables. Moreover, benefit/value has a significant relationship at 5% and 1% level (r = 0.462, sig. = 0.000. This reveals that there is a moderated relationship or substantial or marked correlation between the two variables. This indicates that r = 0.462 when squared, only 21.34 percent shared variance between the variables. Based on the preceding presentations, it is safe to infer that the hypothesis is hereby rejected. It means that there is a significant relationship between attitude towards mathematics and the performance of senior high school students.

Karjanto (2017) investigated and revealed that the student-respondents in mathematics who are enrolled in Nazarbayev University using the Attitudes towards Mathematics Inventory (ATMI) by Tapia and Marsh (2004) had shown a positive attitude towards mathematics. Further, there was a significant positive correlation between achievement in math and the attitudes of the students. Also, Sirmaci (2010) found out in Grade 9 students in Erzurum that there is a relationship between students' attitudes and performance.

0 2	1	1	000					
Predictor Variables	Unstandardized	l Coefficients	Standardized Coefficients	Т	Sig.			
Fledictor Variables	В	Std. Error	Beta					
(Constant)	5.576	3.864		1.443	.150			
Vicarious Experience-Adults (X ₁)	2.504	1.016	.215	2.464	.014			
Benefits/Value (X ₂)	1.691	.672	.178	2.515	.013			
Anxiety (X ₃)	-1.559	.579	165	-2.692	.008			
Vicarious Experience-Peers (X ₄)	2.076	1.047	.164	1.982	.049			
DV: Mathematics Performance: n = 229								

Table 5:- Regression analysis of the predictors of mathematics performance among senior high school students.

Legend: Multiple R = 0.580

ANOVA F (4, 224) = 28.43

R square = 0.337Sig F Change = 0.049 Sig = 0.000

Table 5 shows the regression analysis of the predictors of mathematics performance among senior high school students (Model 4). The sig. value of vicarious experience-adults, benefits/value, anxiety and vicarious experiencepeers are lower than 0.05 with multiple R = 0.580, R square = 0.337, sig F change = 0.049, ANOVA F (4, 224) = 28.43, and sig. = 0.000. The multiple R of 0.580 when squared results to R square that is 0.337 which implies that 33.70 percent of the combined variance of the variables as to vicarious experience-adults (X_1) , benefits/value (X_2) , anxiety (X_3) , and vicarious experience-peers (X_4) , could explain the regression equation. However, 63.70 percent of other variables could still explain the regression.

The ANOVA F (4,224) = 28.43 with sig of F = 0.000 implies that in Model 4 the entered variables in terms of vicarious experience-adults (\mathbf{X}_1), benefits/value (\mathbf{X}_2), anxiety (\mathbf{X}_3), and vicarious experience-peers (\mathbf{X}_4), are the significant predictors of mathematics performance ($\hat{\mathbf{Y}}$). This rejects the null hypothesis stating that these variables as to vicarious experience-adults (\mathbf{X}_1), benefits/value (\mathbf{X}_2), anxiety (\mathbf{X}_3), and vicarious experience-peers (\mathbf{X}_4) do not predict the mathematics performance ($\hat{\mathbf{Y}}$) among senior high school students. Therefore, these variables as to vicarious experience-adults (\mathbf{X}_1), benefits/value (\mathbf{X}_2), anxiety (\mathbf{X}_3), and vicarious experience-peers (\mathbf{X}_4) predict the mathematics performance ($\hat{\mathbf{Y}}$) among senior high school students. Therefore, these variables as to vicarious experience-adults (\mathbf{X}_1), benefits/value (\mathbf{X}_2), anxiety (\mathbf{X}_3), and vicarious experience-peers (\mathbf{X}_4) predict the mathematics performance ($\hat{\mathbf{Y}}$) among senior high school students.

The equation shows the computation below with the model graph.



Figure2:- Equation model showing the variable-predictors of mathematics performance of the student-respondents.

Regression analysis indicated that the most essential factors in this environment are vicarious experiences, followed by affective/physiological influences. One distinct feature of the study was that students were attending a course offered in a learning environment that was unfamiliar to them.

The result of this study is inconsistent with the quantitative studies of Usher, 2009; Burnham, 2011; Joet, Usher &Bressoux, 2011; Phan, 2012 that have shown that mastery experience has the most significant influence. Bandura (1997) explained that mastery experience was the most significant efficacy source because it provided the most authentic evidence of whether one could muster whatever it takes to succeed.

Olango (2016) determined the direct and indirect effects of mathematics anxiety on achievement in mathematics of first-year science and engineering students and concluded that all the anxiety factors have significant direct effects on mathematics achievement.

Conclusion and Recommendations:-

Conclusion:-

In light of the findings, the researchers concluded that (a) the respondents have a moderate level of mathematics self-efficacy in terms of mastery experience, vicarious experience-peers, vicarious experience-adults, social persuasions, and physiological state, (b) the respondents have a high level of attitude towards mathematics in terms of benefits/value and a moderate level of attitude towards mathematics in terms of anxiety, confidence, and enjoyment, (c) the majority of respondents did not meet the expectations in mathematics performance. However, a significant percentage of the group has fairly satisfactory and satisfactory mathematics, and performance of senior high school students not accepting the hypothesis stating that these variables do not show relationship, and (e) the p-values of vicarious experience - adults, benefits/value, anxiety, and vicarious experience - peers are lower than 0.05. Thus, there are significant predictors of mathematics performance of the respondents. The hypothesis is hereby rejected.

Recommendations:-

Based on the conclusions drawn, the researchers recommended that (a) the teachers should use different teaching methods to assure that students deeply understand mathematical concepts to increase student's self-efficacy and attitude towards the subject by providing students opportunities to master ideas and to consistently experience mathematical successes either through carefully selected problems and group work. They should also pay, as much attention to students' perceptions of capability as to actual capability, for it is these perceptions that may more accurately predict students' behavior, (b) teachers should apply new teaching methods such as using audiovisuals in presenting mathematics lessons to sustain students' interest and facilitate their understanding to help them develop a more positive attitude of students towards the subject, (c) parents should provide opportunities to their children at home that will boost their self-efficacy and positive attitudes by giving encouragement and helping them in their school-related activities, (d) the school administrators and supervisors should facilitate activities, training or seminars that will help teachers grow professionally during the in-service training (INSET) and school learning action cell (SLAC) session particularly on but not limited to topics such as methods and strategies that enable to enhance the self-efficacy and attitudes of students, and (e) lastly, the future researchers would explore other variables that may be deemed important considerations in determining the performance of students such as family backgrounds and orientations, student's motivation, teacher's self-efficacy, among others to ensure the above-par performance of students in Mathematics.

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