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SELF-EFFICACY AND ANXIETY AS DETERMINANTS OF MATHEMATICAL ACHIEVEMENT OF GRADE 7 STUDENTS: A QUAN + QUAL APPROACH

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Abstract

This study utilized concurrent triangulation mixed methods research (MMR) to explore the key determinants of the causes, and experiences in mathematical competence of Grade 7 students in Davao City. Descriptive statistics were used such as mean and standard deviation to describe the status of self-efficacy, anxiety, and mathematical achievement of grade 7 students. Linear regression was used to assess the influence of the two independent variables to mathematical achievement. The respondents of this study were two hundred (200) grade 7 students of three private schools in Toril, Davao City of Region XI. The insights on the contribution of self-efficacy and anxiety on mathematical achievement were expressed on self-efficacy which had the core ideas such as facilitate advance learning, motivates to solve Math problems independently, boosts confidence and self-esteem, and more engagement in class; and, on anxiety, core ideas are the following: Diminishes self-confidence and self-esteem, generate doubts on one's capacity, cause stress that adversely affects performance in Math, hinders active participation in class discussions, and leads to an inability to understand, the diverse learning characteristics displayed by students in today's schools make it necessary for teachers to implement a wide variety of activities in their classes to extensively cater to one's academic dilemma.

Keywords: self-efficacy, anxiety, mixed methods, mathematics, correlation achievement, thematic analysis, Philippines

INTRODUCTION

As a teacher who is teaching this particular grade level student had noticed and witnessed that some of the students lost interest in attending classes because they believe they cannot cope up with the other students who excel in the classroom. Others are shy and could not express themselves in classroom discussion or group activities; hence they tend to be absent in the class especially when they are assigned class presentations in the subject area. If the students believe they cannot succeed on specific tasks (low self-efficacy) they superficially attempt to give up quickly or avoid or resists them. Low self-efficacy beliefs, unfortunately, impede academic achievement and, in the long run, create

selffulfilling prophecies of failure and learned helplessness that can devastate psychological well-being (Pajares, 2005).

Math anxiety is the tension or fear a person feels when he or she is confronted with the need to perform mathematical tasks (Richardson & Suinn, 1972). It is connected to self-efficacy because of the influence that anxiety and stress can have on the self-efficacy of an individual (Zientek & Thompson, 2010). Rubinsten and Tanook (2010) listed several causes of math anxiety, including experiences in math classes or with math teachers, low self-efficacy or previous bad experiences with mathematics, and low intelligence or poor math ability. Students with high levels of math anxiety will tend to perform poorly on mathematics tasks (Finlayson, 2014; Lyons & Beilock, 2011; Nunez-Pena, Pellicioni, & Bono, 2013). This will lead to the decline of their mathematical achievement.

Achievement in mathematics is a big problem in the country. The result of the National Achievement Test (NAT) for the school year 2011 – 2012 had shown poor performance in mathematics. One extreme concern, which lead to a poor rendition of mathematics is the self-efficacy and the anxiety of the students.

The researcher is interested to study about self-efficacy and anxiety for it has been found to have a link on student mathematical achievement. For instance, in Pakistan, students generally struggle with the language and experienced difficulty in comprehending word problems (Jan & Rodriguez, 2012). Students seemed to encounter issues in comprehending word problem statements. It was noted in the said study that one of the causes of this problem is that students were not made to believe that they were capable of performing better in mathematics (Jan & Rodriguez, 2012).

In Philippines, many Filipino students who have completed two or three years of schooling are unable to solve even simple addition and subtraction of word problems (Verzosa, 2017). Research in Manila was conducted to find the reasons why students have difficulty in analyzing word problems especially translating word problems into mathematical equations. Results indicate that 40% of the respondents performed below the satisfactorily level in translating word problems and lack of comprehension, interchanging values, and unfamiliar words are some of the common difficulties encountered by the respondents in translating worded problems (Dela Cruz & Lapinid, 2014).

Likewise, in Davao City math anxiety is regarded as a barrier in the achievement of the students in mathematics according to a research study conducted by Senajonon (2013). The results revealed that the variation of the academic performance of students in mathematics is affected by their level of math anxiety. Ergo, making it difficult for the students to understand different math problems that may cause them fear and avoid mathematics.

This study would serve as a useful source of information for research purposes either international or local settings. To strengthen the social value of

this research paper, an action plan must be realized. This action plan was focus on the improvement of the achievement of the learners especially in mathematics. Thus, this paper may be used as a basis for rules and regulations about selfefficacy and anxiety to the learners and help teachers and administration to ease the level of anxiety in mathematics. Lastly, self-efficacy and anxiety towards mathematics achievements has not been studied yet by other researchers using mixed methods approach.

METHODS

This study employed a mixed methods design which according to John Creswell involves collecting both qualitative and quantitative data. This design was assumed to provide a complete understanding of the self-efficacy, math anxiety and mathematical achievement.

Specifically, the concurrent triangulation or the QUAN plus QUAL method was used indicating that although the study was quantitatively focused on determining how the grade 7 private student's mathematical achievement was influenced by their mathematical self-efficacy and mathematical anxiety, both quantitative and qualitative methods were employed and data from both sources were collected concurrently to have a deeper understanding of the issues. In a concurrent triangulation approach, the researcher collects both the quantitative and the qualitative data concurrently and then compares the two databases to determine if there is convergence, differences, or some combination (Creswell & Plano Clark, 2007).The quantitative component involves descriptive correlation. In a quantitative study, descriptive is used to describe the characteristics of a phenomenon being studied. It does not answer questions about why/when/how the characteristics occurred. Rather it addresses the "what" question such as what are the characteristics of the population or situation being studied (Shield & Rangarajan, 2013).

On the other hand, as stated by Creswell (2012), correlation design is used when the researcher wants to measure the degree of association of two or more variables or sets of scores. In addition, it determines whether or not two variables are correlated. This means to study whether an increase or decrease in one variable corresponds to an increase or decrease in the other variable (Explorable, 2017).

The qualitative component employed the phenomenological approach which includes a thorough interview and focus group discussion. This part provided an in-depth understanding of the lived experiences of grade 7 students as regards their mathematical competence. A narrative report was extracted from the viewpoint of the participant from a thematic approach.

The primary objective of a phenomenological study was to analyze and develop meaning, structure, and essence of the live experiences of a person or a group of people around a specific phenomenon. It allows the researcher to look into the perspective, understanding and feelings of those people who have

experience the phenomena. Furthermore, it attempts to set aside biases and preconceived assumptions about human experiences, feelings, and responses to a particular situation (Christened et al, 2010).

Moreover, phenomenological research is a strategy of inquiry in which the researcher identifies the essence of human experiences about a phenomenon as described by participants. In this process, the researcher brackets or sets aside his or her own experiences in order to understand those of the participants in the study (Creswell, 2009).

The researcher recognized the mixed methods approach as the most appropriate design in this study because the research topic requires a detailed and thorough investigation which can only be achieved through the mixed method.

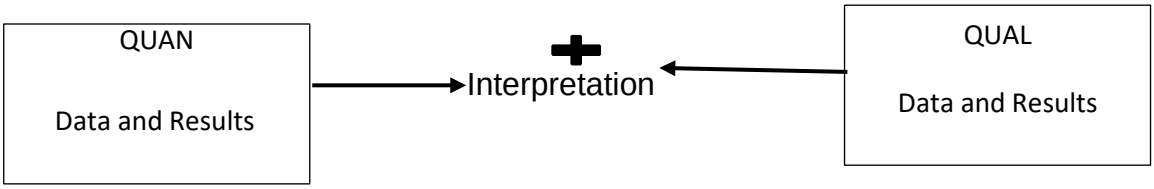

Figure 2. Mixed Methods Concurrent Triangulation Design

Figure 2 shows the particular type of mixed methods design that the researcher was used in this study. It illustrates that the qualitative and quantitative data was compared and contrasted to achieve a corroborated interpretation of the results. This means that the results in the survey questionnaire (quantitative) were interpreted concerning the results of the interview and FGD data (qualitative).

RESULTS

Status of Self-Efficiency, Anxiety, and Mathematics Achievement

Table 1.1 shows the status of self-efficacy with an overall mean of 3.09, which is labeled to be moderately high and an SD of 0.69. This indicates that selfefficacy is sometimes manifested. Specifically, the statements with a description of high are *"I will be able to use mathematics in my future career when needed (3.87)" and "I can learn well in a mathematics course (3.44)"*. Further, the statements, "*completing all of the assignments in a mathematics course* (3.27)" and "*trying my best to do well in future mathematics course (3.16*)" are described as moderate. Likewise, the standard deviations of all statements are above 1, which implies that the students have dispersed answers, which also denote that the group chosen as respondents was heterogeneous.

Table 1.1
Status of Self-Efficacy

Statements	Mean	SD	Description
1. performing in mathematics test	3.10	1.00	Moderate
2. completing all of the assignments in a mathematics course.	3.27	1.10	Moderate
3. being a person who is good at mathematics.	2.69	1.15	Moderate
4. using mathematics in my future career when needed.	3.87	1.20	High
5. understanding the content in a mathematics course.	3.11	0.99	Moderate
6. getting a grade of 90-100 when I am in a mathematics course.	2.77	1.03	Moderate
7. learning well in a mathematics course.	3.44	1.07	High
8. being the type of person who can solve advanced mathematics problems.	3.02	1.13	Moderate
9. doing the derivation of formulas in a mathematics course.	3.06	1.12	Moderate
10. thinking like a mathematician.	2.65	1.17	Moderate
11. being confident when taking a mathematics test.	3.03	1.09	Moderate
12. trying my best to do well in future mathematics course.	3.16	1.19	Moderate
13. being confident enough to ask questions in my mathematics class.	3.06	1.02	Moderate
14. being confident when using mathematics applications outside of the school.	3.07	1.12	Moderate
Overall Mean	**3.09**	**0.69**	**Moderate**

Table 1.2
Status of Anxiety

Statements	Mean	SD	Description
1. not using mathematics in my future career when needed	2.80	1.25	Moderate
2. not getting a good grade in my mathematics course.	3.23	1.16	Moderate
3. not doing well in mathematics test.	3.20	1.15	Moderate
4. not knowing enough mathematics to do well in future mathematics course.	2.99	1.14	Moderate
5. not completing every assignment in a mathematics course.	2.98	1.07	Moderate
6. not understanding the topic in the mathematics class.	3.02	1.19	Moderate
7. not getting a grade of 90-100 in my mathematics course.	2.94	1.23	Moderate
8. not learning well in my mathematics course.	2.97	1.24	Moderate
9. being tense when preparing for a mathematics test.	3.05	1.14	Moderate
10. being nervous when taking a mathematics test.	3.36	1.27	Moderate
11. being nervous when I need to use mathematics application outside of the school.	2.79	1.27	Moderate
12. being nervous when asking questions in Mathematics class.	2.80	1.16	Moderate
13. feeling stressed solving mathematics problem.	2.83	1.21	Moderate
14. feeling stressed while listening to my mathematics instructor in class.	2.44	1.14	Low
15. being afraid to give an incorrect answer while solving problems in my mathematics class.	3.46	1.21	Moderate
Overall Mean	**2.99**	**.69**	**Moderate**

Table 1.2 shows the status of anxiety of the respondents. The overall mean of 2.98 means a moderately high anxiety of the students. This indicates that anxiety felt by the student respondents is sometimes evident. Majority of the

statements are labeled to be moderately high, specifically "*being afraid to give an incorrect answer while solving problems in my mathematics class* (3.46)" and "*being nervous when taking a mathematics test* (3.36)". Moreover, the statement, *"I feel stressed while listening to my mathematics instructor in class,*" has obtained the lowest mean of 2.44 with a description of low. Likewise, the SD of all statements are above 1, which implies that the students have varied answers, which also denote that the group chosen as respondents was heterogeneous.

Table 1.3
Status of Math Competency

Grading Scale	Frequency	Percent	Description
90-100	5	2.5	Very high
80-84	4	2.0	Average
75-79	2	1.0	Low
74-& Below	189	94.5	Very low
Total	200	100.0	
Mean		58.4	Very low
Std. Deviation	9.17		

Table 1.3 reveals the status of Math competency of the learners. The overall competency level of the learners is 58.4%, corresponding to a score of 16.73 out of 50, which is very low. This finding established a very poor performance of the students in mathematics. Also, from the result, it shows that majority or 94.5 percent of the learners have obtained a grade of 74 percent and below. Data also reveal that 1.0 percent obtained 75-79 percent, 2.0 percent have reached average grades of 80-84% and 2.5 percent have reached 90-100% grade.

Table 2
Significance of the Influence of Self-Efficacy and Anxiety to Mathematical Achievement

Predictors	Beta Coefficient	t	p value	Interpretation
Self-efficacy	.245	3.564	.000	significant
Anxiety	-.155	-2.256	.000	significant

Predictors	R^2	F	p value	Interpretation

Combined	.096	10.465	.000	significant

Table 2 shows the linear regression data for self-efficacy and anxiety to mathematical achievement. Based on the results, self-efficacy (p value=.000) and anxiety (p value=.000) are predictors of mathematical achievement. Further, the result means that for every one unit increase in the self-efficacy of the students, mathematical achievement would be increased by .245. Likewise, for every unit increase in the anxiety of the students, mathematical achievement decreases by .155. Moreover, the data shows that 9.6% of the variance of mathematical achievement can significantly be attributed to its relationship to the combined effect of self-efficacy and anxiety, and the remaining 90.4% are due to other factors that influences mathematical achievement not covered in this study.

Table 3.1
Participants' Information

PseudonymCode	Sex	Grade Level	Location	Study Group
1. Mr.Fair / FGD_01	Male	7	Toril, Davao City	FGD
2. Mr. Right / FGD_02	Male	7	Toril, Davao City	FGD
3. Ms. Bell / FGD_03	Female	7	Toril, Davao City	FGD
4. Mr. Wolfe / FGD_04	Male	7	Toril, Davao City	FGD
5. Ms. Boz / FGD_05	Female	7	Toril, Davao City	FGD
6. Ms. Gray / FGD_06	Female	7	Toril, Davao City	FGD
7. Mr. Box / FGD_07	Male	7	Toril, Davao City	FGD
8. Mr. Henry / IDI_01	Male	7	Toril, Davao City	IDI
9. Mr. Paul / IDI_02	Male	7	Toril, Davao City	IDI
10. Ms. Rose / IDI_03	Female	7	Toril, Davao City	IDI
11. Ms. Elia / IDI_04	Female	7	Toril, Davao City	IDI
12. Mr. Seuss / IDI_05	Male	7	Toril, Davao City	IDI
13. Ms. Twain / IDI 06	Female	7	Toril, Davao City	IDI
14. Mr. French / IDI_07	Male	7	Toril, Davao City	IDI
15. Mr. Whisp / IDI_08	Male	7	Toril, Davao City	IDI
16. Ms. Ellis / IDI _09	Female	7	Toril, Davao City	IDI
17. Ms. Bright / IDI_10	Female	7	Toril, Davao City	IDI

Table 3.1 reveals the information of the learners. The participants are represented through their pseudonym or code, their sex, grade level, location, and study group.

Table 3.2

The Lived Experiences of the Grade 7 Students as Regards their Mathematical Achievement

Issues Probed	Core Ideas	Codes Categories	Essential Themes
Math Subject Dynamics	Interesting yet challenging	Usefulness of Math	Mathematics appreciation
	The joy of learning new concepts thru problem solving		
	Essence of the concepts' practical applications		
	Visual aids facilitate learning		
	Provision of creative and understandable instructional materials	Facilitative Instructional Materials	
	Collaborative learning	Happy episodes in learning	Fun through cooperative learning
	Group dynamics thru games		
	Active participation of the class		
	Teachers' motivation		
	Difficulty of some topics	Learning Struggles	
	Inability to comprehend the math problem		
	Insufficient knowledge on the techniques		
Teachers' Characteristics	Evidence of the ability to teach effectively	Competence	Teacher factor
	Knowledgeable on the subject matter		
	Approachable	Attitude	
	Manifest impartiality		
	Manifest strictness with kindness and gentleness		
Coping Mechanism	Provision of ample time for studying	Time management	Persistence and time management
	Prioritize studying than gaming		
	Listening and asking questions	Approaches	
	More focused when studying		
	Constancy of reading, researching and solving		

Table 3.2 reveals the lived experiences of the Grade 7 students as regards their mathematical achievement. Based on the results, the issues probed are Math subject dynamics, teachers' characteristics, and coping mechanisms. On Math subject dynamics, two essential themes emerged: Mathematics Appreciation and Fun through Cooperative Learning.

According to the participants, they appreciate mathematics because,

"Math is interesting..and challenging" (IDI_ 01)

"I had fun solving problems" (FGD_04)

" The visual aids help us in learning more the subject" (FGD_06)

Moreover, the participants also find that mathematics is filled with fun through cooperative learning, as expressed in their sharing, as follows:

"I enjoy the group dynamics..games" (IDI_05)

"Most of us ar participating in the games" (IDI_09)

" Though we had difficulty understanding the techniques…games made it easier.." (IDI_10)

On teachers' characteristics, the essential theme that emerged is Teacher Factor. According to the participants:

"My teacher knows how to teach us" (IDI_02)

"If the topic is difficult, she is able to make it simple" (FGD_07)

"She is strict but knows how to deal with us" (FGD_03)

Lastly, on coping mechanism, Persistence and Time Management is the essential theme that emerged. The participants shared:

"I spend more time studying math compared to my other subjects"

(IDI_04)

"I study first before playing games" (IDI_09)

Table 4

Insights on the Contribution of Self-efficacy and Anxiety on Mathematical Achievement

Issues Probed	Core Ideas	Codes Categories	Essential Themes
Self-Efficacy	Facilitate advance learning	Proficiency	Self-efficacy enhancement
	Motivates to solve Math problems independently		
	It boosts confidence and self-esteem	Behavior	
	More engagement in class		
Anxiety	Diminishes self-confidence and self-esteem	Confidence	Minimizing mathematics anxiety
	Generate doubts on one's capacity		
	Cause stress that adversely affect performance in Math	Performance	
	Hinders active participation in class discussions		
	Leads to inability to understand		

Table 4 displays the insights on the contribution of self-efficacy and anxiety on mathematical achievement. The issues probed are self-efficacy and anxiety.

On self-efficacy, the essential theme, Self-efficacy Enhancement emerged.

According to the participants:

"I have to believe in myself in solving math for me to easily understand it" (IDI_07)

"I can solve math problems easily every time I trust myself" (IDI_08)

"Once more of us participate. We can understand math" (FGD_10)

On anxiety, the essential theme that emerged is minimizing mathematics anxiety, they said:

"Once I'm scared, I do not understand math" (IDI_05)

"I do not participate in class…I am not sure about the answer" (FGD_08)

Table 5
Joint Display of the Salient Quantitative and Qualitative Findings

Focal Points	Quantitative Findings	Qualitative Findings	Data Integration (Nature-Function)
Math Competency	The Math Competency of the participants is very low as manifested by an average rating of 58.4%. (Refer to Table 1.3)	The participants shared their struggles in Math as captured in the following core ideas: - Difficulty of some topics - Inability to comprehend the math problem - Insufficient knowledge on the techniques (Refer to Table 3)	Mergingconverging

Significance of the influence of self-efficacy and anxiety on mathematical achievement	Self-efficacy b = .245, p-value = 0 Anxiety b = -.155, p-value = 0 Combined Rsquared = .096 (Refer to Table 2)	The participants claimed that selfefficacy has a favorable effect on their academic achievement as manifested by the theme: Selfefficacy leads to better performance. Also, anxiety affects in a negative way, the mathematical performance. (Refer to Table 4)	Mergingconverging

Table 5 provides details on joint display of the salient quantitative and qualitative findings. The focal points are Math Competency and Significance of the influence of self-efficacy and anxiety on mathematical achievement.

There is a merging-converging nature for math competency as the quantitative findings underscore that math competency of the participants is very low as manifested by an average rating of 58.4% and it jibes with the qualitative results, where the participants shared their struggles in math as captured in the core ideas: the difficulty of some topics, inability to comprehend the math problem, and insufficient knowledge on the techniques.

The same nature of data integration, which is merging-converging is established for the significance of the influence of self-Efficacy and anxiety to math competency since the quantitative findings on the linear regression result: selfefficacy (b=.245, p value=.000), anxiety (b=-.155, p value=.000) and r squared of .096 (p-value = .000) correspond to the themes self-efficacy enhancement and minimizing anxiety, which were believed to assure better performance in mathematics.

PROPOSED ACTION PROGRAM TO ENHANCE MATHEMATICAL ACHIEVEMENT OF LEARNERS

Description

This proposed action program was developed to enhance the mathematical achievement of Grade 7 learners based from the results of the study conducted from three (3) private secondary schools in Toril, Davao City. In general, findings and conclusion of the study revealed that the status of Math competency of the students is very poor. It is also concluded from the findings that students need both skill and self-efficacy to perform the task successfully.

In this context, a proposed Action Program is being developed to initially increase the level of Math competency of the learners, as well as, to improve their skills and efficacy to perform their tasks successfully. This would also allow the teachers handling Math subjects to assess and adjust their lesson content to meet their student needs which can be done by enhancing their skills and knowledge on new learning styles that caters to academic dilemma through attendance to training and seminars to be conducted by accredited learning organizations. However, it is recommended that the proposed program may be reviewed by the administrators so as to evaluate and assess the necessity of continuing the activities after its initial implementation

General Objectives

- The main objective of this action program is to provide quality learning programs to enhance mathematical competency of learners in private secondary schools in Toril, Davao City
- Another important objective this program wishes to achieve is to increase teacher's productivity through an excellent quality teaching program

Specific Objectives

Specifically, this action program has the following specific objectives to achieve:

1. To improve the level of Math competency of the learners by properly designating Math lessons that will cater the multiple skills of learners
2. To improve the level skills and self-efficacy of the learners by evaluating the lesson content engaged by the learners
3. To improve the competency of the teachers by assessing educational trainings and seminars imposed for the application of math learning in catering dilemma and issues

Table 6

PROPOSED ACTION PROGRAM TO ENHANCE MATHEMATICAL ACHIEVEMENT OF LEARNERS

Activity/program	Objectives	Time Frame	Materials involved	Persons	Remarks
Designation of math lessons	To cater multiple skills of learners	(2-3 weeks)	Books, LCD projector, handouts	Students and teachers	This should be done after the whole process of lesson planning within those weeks.
Assessment and adjustment of lesson content to meet students' needs	To evaluate lesson content engaged by the learners	(1-3 weeks)	books, handouts , lesson logs and plans	Learners and teachers	This is showcased with the lesson plans on hand and with the arrangement of proposed
					activities in it.

Checking out educational seminars/training s that improves the application of math learning to cater issues and academic dilemma	To assess educationa l trainings and seminars imposed for the application of math learning in catering dilemma and issues	(3-4weeks)	*Lesson logs, papers with proposed trainings and seminars , LCD projector*	School heads, teachers , and students	This is particularly needed to elevate the enhancemen t of learners towards math lesson leading to one's achievement .

From the interviews, the participants have established the need for any designated lessons based on. With this, it is shared that any group of students is likely to demonstrate considerable variation in their learning characteristics and behaviors that would assess one's anxiety and self-efficacy. When the group includes students with learning deficiencies or other learning disorders, the amount of variation in learning is significantly increased. Further, the diverse learning characteristics displayed by students in today's schools make it necessary for teachers to implement a wide variety of activities in their classes to extensively cater to one's academic dilemma. In connection, the assessment and adjustment of lesson content to meet students' needs is highly necessary. They further added that multiple and varied instruction is appropriate for virtually all general education classes and is particularly beneficial to students with an array of learning challenges and anxiety. Students demonstrate varying learning abilities, academic levels, learning styles, and learning preferences and need tailored instruction to meet their unique needs.

DISCUSSION

Status of Self-Efficacy

Self-efficacy of the learners are sometimes manifested. This statement means that they can complete their assignments in math, they try their best in math and they also ask questions. This supports the study Croissant (2014) which revealed that the students tend to find ways and means to solve problems in mathematics when they are recognized for their performances. Furthermore, also, students need both skill and self-efficacy to perform the task successfully.

Nevertheless, a student with a given the same level of skill and differences in self-efficacy would lead to different performance outcomes. For instance, if two students take the same college entrance examination with the same curriculum and get the same scores, they would not likely graduate with the same average of their grades (Bandura, 1989). However, with the statements, *"using mathematics in my future career when needed"* and "t*rying my best to do well in future mathematics course"* gained the highest mean*.* This proves that self-efficacy is oftentimes manifested*.* Research revealed that when individuals have the skills to perform the task and have a high level of self-efficacy, they are more focused on accomplishing the task. The finding supports the research of Wismath (2014) which revealed that students' mathematical engagement is attributable to some factors like teachers' support, encouragement from peers and parents, feeling of accomplishment, and respect from others.

The over-all result supports Albert Bandura (1977) on his self-efficacy as part of his theory, the Social Learning Theory. This theory focuses on how cognitive, behavioral, personal, and environmental factors interrelated to motivation and behavior (Crothers, Hughes,& Morne, 2008). The concern of this theory was to explain how students learn and develop their motivation, affective states, behavioral beliefs and collective efficacy. Research revealed that students are stimulated to perform mathematical problems when they are made to believe that they can perform better. He added that self-efficacy will help students to believe in their ability to execute and successfully solve a task or to perform a task at designated levels. Students can acquire a good self-efficacy if they can identify and learn what are the sources or factors of self-efficacy. In contrast, persons with low self-efficacy may doubt their ability and have no focus on performing the task
(Bandura, 1977).

Status of Anxiety

Anxiety of the learners is sometimes evident. The result implies that the learners are getting low grades in math, they are not doing well during exams and they are nervous when taking math test. The anxiety level that is relatively low to moderate can be positive, thus the moderate level of anxiety facilitates performance and learning (Mutodi, 2015). It helps students to be motivated and pursue math. The result is parallel to study of Beilock and Maloney (2015) who found out that high level of math anxiety upholds counterproductive in terms of performance and skills, specifically in higher cognitive processes and activities.

The higher math-anxious individual is characterized by a tendency of math avoidance, which eventually weakens his/her math competency and skills.

Math anxiety was a complex phenomenon that happens due to combinational factors (Strawderman, 2015). This may be in the form of cognitive predisposition, influence from society and learning environment, and the exposure to negative attitudes and disposition.

Mutodi (2014) adds that math anxiety is a general term for quite a few disorders that causes fear, apprehension, nervousness, and worrying in dealing with mathematics. It is the fear of not doing the task or the fear of math that is too hard or the fear to fail. Math anxiety was commonly experienced inside and outside of mathematics class, which affects how students feel, behave and learn which eventually leads to poor math performance and avoidance of mathematics. Assessment of program for International Student Assessment (2012) in 15 yearsold academic achievements, revealed that a high level of math anxiety is negatively related to math performance and achievement (Foley, Herts, Borgonovi, Guerriero, Levine, & Beilock, 2017).

However, anxiety is rarely evident when the students are listening to their math instructor. This result is in contrast to the findings of the study of Estonanto and Dio (2019), which revealed that almost all of the participants have either high or moderate mathematics anxiety level. The teaching style and attitude of the teacher, and the poor comprehension and analytical skills of the students were the major factors that caused the mathematics anxiety of the participants. Also, from the recommendations of the study conducted by Olango (2016), it was stipulated that teachers can cut students' test anxiety in test taking situations through planned strategies of both teaching as well as preparing students for tests.

Status of Math Competency

The Math competency of the learners is very poor. This result was confirmed by Nambatac, (2011), who stated that among the 41 participant countries, Filipinos performed poorly in Mathematics. Moreover, it is reported that Filipino students have poor performance in Science and Mathematics subjects. In fact, the National Mean Percentage Score in Math in 2012 was only 48.90 which is described as below the national standard and it is among the lowest in the five subjects in the National Achievement Test (NETRC, 2012).

Furthermore, in Magpet National High School in North Cotabato, it gained the following MPS in National Achievement Test (NAT) which is administered nationwide yearly: in SY: 2012- 2013- 61.56, SY: 2013- 2014- 55.26, SY: 2014- 2015- 45.65. Hence, the MPS for Mathematics in 2015 is only 50.55. As observed in the statistics, the MPS for the past years of the school were diminishing. 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. Moreover, the study of (Pagtulon- an & Tan, 2018) states that students perform poorly in mathematics as reflected in their scores. Additionally, its findings are expected due to insufficient basic foundation or they don't have a strong foundation of the concepts. Hence, it is believed that the majority of students feel tiresome to learn mathematics. Thus, it is a big responsibility of the teachers to earn a couple of solutions in coping with these problems in the classroom. One of these, the teacher must incorporate cooperative learning in the class.

Hence, it is important for teachers to be sensitive to students' understanding and misconceptions and determine their learning gaps in mathematics. Principles and Standards for School Mathematics of NCTM (2000) acknowledge that there are significant challenges in meeting the vision for enhancing mathematics education. The vision calls for involvement of teachers, school administrators, institutions of higher learning, professional organizations, parents, students and other stakeholders. The combined efforts of the groups might result in brighter hope in the fulfillment of the vision and developing shared commitment in terms of improvement of mathematics instruction in the Philippines. Moreover, Horario, as cited by Andamon (2015), that mathematics is the second most difficult subject in both elementary and high school levels.

Thus, Senator Angara, chairman of the Senate Committee on Education, Arts and Culture stressed the insufficiency of competence and skills in mathematics, science and technology which are the major causes of the country's poverty and distress (Tan & Guita, 2018).

Significance of the Influence of Self-efficacy and Anxiety to Mathematics achievement

Self-efficacy and anxiety influences mathematics achievement, this means that the learner's belief in their capacity to understand math helped them to get better grades in math. However, if the learners are more anxious, they have more difficulty in learning math. The result conforms the study of Strawderman (2015) who stated that influence of the society, students tend to have math anxiety that produces discomfort towards mathematics which results in fewer students who pursue the subject while others choose to avoid it.

Students pursuing math will tend to be successful in the study. But Students who avoid math will lead to failure because a person who avoids math tends to experience failure in the said subject which eventually lowers his/her confidence in performing mathematical tasks. This is in consonance with what Mutodi (2014) said that math avoidance would cause students to be less competitive, lack of skills and knowledge, mathematically unprepared, failure to do mathematical tasks, and lower level of confidence.

Moreover, the result said otherwise in the study of Zhang, Zhao, and Kong (2019) where no correlation between the math anxiety and the mathematics performance. This was moderated by geographical region, grade level, measurement of MA, measurement aspects of math performance and measurement forms of math performance which included a meta-analysis of 49 studies. The math anxiety-performance link was stronger among Asian students than among European/American students. Moreover, this negative link was strongest among senior high school students.

Also, a different result came out in the study of Kitsantas, Cheema and Ware (2011) where no significant correlation was found between self-efficacy beliefs, time spent on homework, homework resources, and mathematics achievement. They also explored how gender and race impacted the correlation between mathematics achievement and self-efficacy. Using data obtained from the
2003 Program for International Student Assessment (PISA) as well as school and student questionnaires from the 2003 National Center for Educational Statistics (NCES), they randomly selected a sample of 5,200 students consisting of 2,603

boys and 2,597 girls with an ethnic composition of 59.56% Caucasian, 15.36% African American, 16.98% Latino, 3.25% Asian, and the rest of mixed or other ethnicity. The researchers' analysis of the data showed that the introduction of homework support materials significantly increased mathematics achievement while reducing the achievement gap between minority students and their White counterparts.

Interestingly, the research indicated that increasing the amount of time spent in mathematics actually reduced math achievement, a probable consequence of inefficient and disproportionate effort. Similarly, Trautwein, Köller, Schmitz, and Baumert (2002) argued that although the frequency of mathematics homework improved achievement, the amount of homework and time taken to complete it had no discernible effect on achievement.

The Lived Experiences of Grade 7 Students as Regards their Mathematic Achievement

For mathematics appreciation and fun through cooperative learning, the core ideas established were captured in phrases such as *interesting yet challenging, the joy of learning new concepts through problem solving, and essence of the concepts practical applications*. These results support Aquino (2009) who stated that cooperative learning supports problem-solving skills and are a way of deliberate thinking which is important in developing higher-order thinking skills (HOTS). It is considered as the most complex of all intellectual functions and has been defined as a higher-order cognitive process that requires the modulation and control of more routine or fundamental skills.

Moreover, according to Bunga, Pilariza, and Soriano (2016) problemsolving skill concerns about the ability to learn how to think more productive thinking, directed thinking, creative thinking, reflective thinking, convergent thinking, divergent thinking, and critical thinking. Learners who are good at problem-solving skills re able to organize information in a logical way and can easily solve mathematical problems. Research showed that students who have problem solving skills focused more on relevant factors, they are skilled in decoding the problem, in recognizing the relevant factors and self-regulating concentration (Tsai et a.l, 2012).

Similarly, Merrienboer and Jeroen (2013) investigated the perspectives on problem solving and instruction. It was found that problem-solving should not be limited to well-structured problem solving but be extended to real-life problem solving because some students cannot understand the problems easily because it needs higher comprehension. This is related to the Gestalt Theory of Problem Solving, as described by Karl Duncher (1945) and Wertheimer (1959) that problem solving occurs with a flash of insight. This is in consonance with what Mayer (1996) said that these insights occurred when a learner moves from the state of not knowing how to solve the given problem to knowing how to solve it. During the learning experiences, the learners draw many solutions mentally and reforming different representations of a problem until they will get the right answer.

In teacher factor, it revolves around the ideas of *evidence of the ability to teach effectively, knowledgeable on the subject matter, approachable, and manifest impartiality.* These findings agreed upon what was posited by Mutodi

(2014) that teachers can also trigger students' math anxiety by placing too much emphasis on memorization of formula and patterns, as well as the teacher's selfconfidence, enthusiasm, and interest in teaching math. Students who are under with high math anxiety teachers, learn less mathematics over the school year than those students who are with teachers with low math anxiety. Thus, evidence from the United States suggested that children who interact with high math anxiety adults show weaknesses in math performance as cited by Foley et al (2017).

For the persistence and time management, it is made up of the following ideas such as provision of ample time for studying, prioritize studying than gaming, and more focused on studying. This findings support the claim of Ramdass & Zimmerman (2011), which states that quality measures of homework such as managing distractions, self-efficacy and perceived responsibility for learning, setting goals, self-reflection, managing time, and setting a place for homework completion are more effective than only measuring the amount of time spent on homework.

Insights on the Contribution of the Self-efficiency and Anxiety on Mathematical Achievement

Table 4 expressed insights on the contribution of self-efficacy and anxiety on mathematical achievement. The themes are self-efficacy enhancement and minimizing mathematics anxiety.

In self-efficacy enhancement, the learners needs to develop proficiency and positive behavior in learning mathematics. These findings supports the study Bandura (1989) wherein he stated that students need both skill and self-efficacy to perform the task successfully. Nevertheless, a student with a given the same level of skill and differences in self-efficacy would lead to different performance outcomes. For instance, if two students take the same college entrance examination with the same curriculum and get the same scores, they would not likely graduate with the same average of their grades (Bandura, 1989). The research study of Wismath (2014) revealed that students' mathematical engagement is attributable to some factors like teachers' support, encouragement from peers and parents, feeling of accomplishment, and respect from others.

In minimizing mathematics anxiety, the learners need to enhance their confidence and performance. Bandura (1986) stated that self-efficacy would help students to believe in their ability to execute and successfully solve a task or to perform a task at designated levels. Students can acquire a good self-efficacy if they can identify and learn what are the sources or factors of self-efficacy. Research revealed that when individuals have the skills to perform the task and have a high level of self-efficacy, they are more focused on accomplishing the task.

In contrast, persons with low self-efficacy may doubt their ability and have no focus on performing the task.

On the other hand, Strawderman (2015) agreed to the results which stated that math anxiety factor which is the social domain includes those influence from family, friends and the society itself that manifest a person to do so, which is associated with the behavior. This domain is also comprised of motivation. In some cases, extrinsic motivation in the form of extrinsic reinforcers for academic achievement and productive behavior may be the only thing that can help

students to be successful in classroom learning and have productive behavior, and yet intrinsic motivation ultimately help the students to sustain over the long run and encourage them to continue.

Likewise, Strawderman (2015) stated that due to the influence of the society, students tend to have math anxiety that produces discomfort towards mathematics which results in fewer students who pursue the subject while others choose to avoid it. Students pursuing math would tend to be successful in the study. But Students who avoid math would lead to failure because a person who avoids math tends to experience failure in the said subject which eventually lowers his/her confidence in performing mathematical tasks. This is in consonance with what Mutodi (2014) said that math avoidance would cause students to be less competitive, lack of skills and knowledge, mathematically unprepared, failure to do mathematical tasks, and lower level of confidence.

Joint Display of the Salient Quantitative and Qualitative Findings

Table 5 provided details on the joint display of the salient quantitative and qualitative findings. In this manner, focal points were given such as Math Competency and Significance of the Influence of Self-Efficacy and Anxiety to Math Competency.

For math competency, the qualitative findings confirm the quantitative finding. This means that the learners have a difficult time in learning math. The influence of cognitive aspects concluded some math achievement factors and specifically, it includes knowledge and skills that an individual has or expected to learn concerning his or her perception of success or failure. The continuum associated with this domain is the achievement which also included the extremes of success or failure, subjective to the assessment of an individual regarding the acquisition of skills and concepts of mathematics. In addition, this intellectual domain comprised most of the educational influence towards an individual. The rote calculation, memorization, false application, complex problem solving and authoritarianism served as factors that restrain students from having success in math (Strawderman, 2015).

For the significance of the influence of self-efficacy and anxiety to math competency, the findings establish that learners need to have a stronger belief on their capacity to solve math and not allow anxiety to take over them. Likewise, exposure to teaching-learning strategies that are based on behaviorist theory such as rote memorization of rules and manipulation of numbers and symbols also hinders the students to understand and acquire math concepts that contribute to mathematical anxiety (Mutodi, 2014).

On the other hand, Andrade et al. noted that when students wrote extensively, their self-efficacy for writing increased. Hence, performance experience improved their self-efficacy. Likewise, a quantitative research study by Hailikari, Nevgi, and Komulainen (2008) used structural equation modeling to examine the relationship between previous knowledge, academic beliefs, and prior study success in predicting the achievement of 139 students in a university mathematics course. The research findings revealed that prior knowledge was the strongest predictor of student achievement over and above other variables included in the model.

Moreover, academic self-beliefs strongly correlated with previous study success and had a strong direct influence on prior knowledge test performance. According to this research, performance experience is enhanced through prior knowledge and self-belief. The results suggested that both prior knowledge and self-beliefs were essential and had to be taken into consideration to support educators in teaching mathematics.

Findings:

The objective of the study was to explore and understand the key determinants of the causes, experiences, and issues of learners towards mathematical competence of Grade 7 students in Davao City. The findings of the study were summarized as follows:

1. The status of self-efficacy has an overall mean of 3.08 which is labeled to be Moderately High. On the other hand, the statements, “I will be able to use mathematics in my future career when needed,” “I can learn well in a mathematics course,” are described to be the only High in the group. Further, the overall status of anxiety has an overall mean of 2.99 which is described to be Moderately High. All of the statements under such category are labeled to be Moderately High, however, the statement, “I feel stressed while listening to my mathematics instructor in class,” has obtained the lowest mean of 2.44; and, it is revealed that on the status of competency, 94.5 percent of the learners have obtained a grade of 74 percent and below which is described to be Very Low. On the other hand, 1.0 percent of them have gained 75-79 percent of the grades which is low; 2.0 percent have reached an average grade of 80-84 %, and only 2.5 have reached 90-100% which is Very High.
2. The beta coefficients for self-efficacy and anxiety, respectively were .245, p-value < .05; -.155, p-value < .05, and R-squared = .096, p-value < .05, established their significant influence to mathematical competence.
3. The lived experiences of the Grade 7 students as regards to their Mathematical Achievement were intended to have issues probed such as math subject dynamics which has the following core ideas of interesting yet challenging, the joy of learning new concepts thru problem-solving, the essence of the concepts’ practical applications, visual aids facilitate learning materials; on teachers’ characteristics, the following core ideas were given such as evidence of the ability to teach effectively, knowledgeable on the subject matter, being approachable, manifest impartiality, manifest strictness with kindness and gentleness, and lastly, on the coping mechanism, intended core ideas were the following: provision of ample time for studying, prioritize studying than gaming, listening and asking questions, more focused when studying, and constancy of reading, researching and solving with an essential theme of persistence thru time management and focus.

4. The insights on the contribution of self-efficacy and anxiety on mathematical achievement were expressed on self-efficacy which has the achieved core ideas such as to facilitate advance learning, motivates to solve Math problems independently, boosts confidence and self-esteem, and more engagement in class; and, on anxiety, core ideas were the following:
   Diminishes self-confidence and self-esteem, generate doubts on one's capacity, cause stress that adversely affects performance in Math, hinders active participation in class discussions, and leads to an inability to understand.

5. On the joint display of the salient quantitative and qualitative findings, on Math competency on the quantitative findings, the Math Competency of the participants was very low as manifested by an average rating of 58.4% while qualitatively, the participants shared their struggles in Math as captured in the following core ideas: the difficulty of some topics, inability to comprehend the math problem, and insufficient knowledge on the techniques and for the significant influence of Self-Efficacy and Anxiety on Math Competency in terms of its quantitative findings, the beta coefficients and R-squared revealed a significant influence of self-efficacy and anxiety to math competency. Qualitatively, the participants claimed that self-efficacy has a favorable effect on their academic achievement as manifested by the theme: Self-efficacy leads to better performance and the participants shared that anxiety causes stress, which hindered them to perform well in class and these were captured in the theme: Unfavorable effect of Anxiety on Math Performance.
6. On the actions proposed, the participants have established the need for any designated lessons based on. With this, it is shared that any group of students is likely to demonstrate considerable variation in their learning characteristics and behaviors that would assess one's anxiety and self-efficacy. When the group includes students with learning deficiencies or other learning disorders, the amount of variation in learning is significantly increased. Further, the diverse learning characteristics displayed by students in today's schools make it necessary for teachers to implement a wide variety of activities in their classes to extensively cater to one's academic dilemma.

Conclusions

Based on the findings of the study, the following conclusions were drawn:

1. The status of self-efficacy is indicated to be sometimes manifested. Also, the status of anxiety is sometimes evident and the status of Math competency is Very Poor.
2. There was a significant influence of self-efficacy and anxiety on mathematical achievement. The higher level of self-efficacy, the

better performance in mathematics; the lower level of anxiety, the higher level of mathematical competence.

3. In math subject dynamics, it was observed to be as interesting yet challenging, the joy of learning new concepts through problem solving, and essence of the concepts practical applications. In teachers' characteristics, it was indicated to be revolving around the ideas of evidence of the ability to teach effectively, knowledgeable on the subject matter, approachable, and manifest impartiality. Lastly, coping mechanism has the provision of ample time for studying, prioritize studying than gaming, and more focused on studying.
4. It is concluded from the findings that students need both skill and self--efficacy to perform the task successfully. Nevertheless, a student with a given the same level of skill and differences in self-efficacy would lead to different performance outcomes.

5. From the results, teachers can also trigger students' math anxiety by placing too much emphasis on memorization of formula and patterns, as well as the teacher's self-confidence, enthusiasm, and interest in teaching math. Students who are under with high math anxiety teachers, learn less mathematics over the school year than those students who are with teachers with low math anxiety.
6. Checking out educational seminars/trainings that improves the application of differentiated instruction is the goal of differentiated instruction which provides a maximum student growth and individual success.

Recommendations

Based on the findings and conclusions, the following recommendations are given:

1. The teachers may assess and give students more established tasks and activities that would cater to their multiple skills, anxiety, and self-efficacy. Teachers are meant to be one of the foundations of the students. Every adjustment of a learner in terms of his/her anxiety depends on the implemented tasks given.
2. The learners may have to focus on improving their abilities and weaknesses in terms of anxiety and self-efficacy. Further, they may have to elevate their ways of grasping knowledge and ideas by being active and enhanced which would lead to elevating mathematical competence.
3. The institution may build programs and more activities and tasks that may help learners to become more responsible in managing math anxiety and self-efficacy. In addition, teachers and parents may have to be the best support system in handling these matters on achievement and coping challenges.
4. Future Career Takers. This study may be used as future reference and roadmap on the best processes and ways to

determine and assess learners' math anxiety and self-efficacy as a strategy to improve academic achievement in Mathematics.

5. Future Researchers. Future researchers may gain insight that would help them with their further studies; they can also use this study as a secondary source of data with future related researches on math anxiety, self-efficacy, and math achievement.

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