

**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND
MATH ANXIETY OF STUDENTS**

A Thesis
Presented to the Faculty
Professional Schools
University of Mindanao
Matina, Davao City

In Partial Fulfillment of the Requirements
for the degree
Master of Arts in Education
Major In Teaching Mathematics

RECHELYN G. SALEM

October 2017

APPROVAL SHEET

This thesis entitled “**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS**”, prepared and submitted by Rechelyn Garino Salem, in partial fulfillment of the requirements for the degree, **Master of Arts in Education Major in Mathematics**, has been examined and is hereby recommended for approval and acceptance.

ELIZABETH M. MALONZO, PhD
Adviser

PANEL OF EXAMINERS

APPROVED by the Panel of Examiners on Oral examination with a grade of **PASSED**.

EUGENIO S. GUHAO, JR, DM
Chairperson

GLORIA P. GEMPES, EdD, DM, PhD
Member

RINANTE L. GENUBA, EdD
Member

GAUDENCIO G. ABELLANOSA, EdD, DPA, DBA, PhD, DM
Member

ACCEPTED in partial fulfillment of the requirements for the degree, **Master of Arts in Education Major in Mathematics**.

Comprehensive Examination: **PASSED**

PEDRO B. SAN JOSE, HD, hc
Chief Academic Officer

October 2017

ACKNOWLEDGMENT

Every success has its own story behind it; for the joy of victory is sweeter upon overcoming the sweat of failures and sacrifices. The challenge is bearable because of the people who give support and prayer in turning her desires and dreams to reality.

The researcher would like to acknowledge the following persons for their contributions to the fulfillment of the study;

To Dr. Elizabeth Malonzo, her adviser for her devoted and responsive support and supervision, patience, understanding, and motivation;

To Dr. Eugenio S. Guhao, Dean of the Professional Schools, for his fatherly support to the researcher;

To Dr. Gloria P. Gempes, for her valuable reminders, suggestions, corrections and recommendations;

To Dr. Ana Raissa T. Trinidad, as panel of the defense for her untiring support in giving recommendations in making this research;

To Dr. Rinante L. Genuba, as panel of the defense for his meaningful suggestions and recommendations for this research;

To Dr. Gaudencio G. Abellanosa, as panel of the defense for his significant suggestions and correction for this research;

To Dr. Eunice A. Atienzar, as panel of the defense for her guidance and suggestions for this research;

To Ms. Sarah Jane C. Banuelos, as editor of the defense for her effort in taking down all corrections and suggestions for the improvement of the research;

To Engr. Harry H. Magbanua, for the moral support especially during the data gathering procedure and the rest of the travels of the researcher;

To Mr. Efren and Mrs. Roquita Salem, beloved father and mother, grandparents, brothers, sisters, uncles, aunts, and cousins, nephew and niece for their financial and moral support, love, encouragement and inspiration;

To all her classmates, and friends for their care, concern and unforgettable memories to be cherished for a life time;

Above all, to God of all creation who gives them heavenly wisdom, care, love, strength and guidance for the success of this research.

R. G. S.



ABSTRACT

This study determined which domain in the pedagogical competence of math teachers best influences math anxiety of students. The quantitative-non-experimental design was used with the correlation technique. An adapted-modified questionnaire validated by the experts was used in gathering the data. The respondents of the study were the 284 Grade 10 students in Arakan district, North Cotabato during the school year 2017-2018 chosen by stratified random sampling procedure. The Mean, Pearson-r and Regression were the statistical tools employed in the analysis and interpretation of the data. Results revealed that the pedagogical competence of math teachers was high while the math anxiety of the students was moderate. Also, results showed that the pedagogical competence of math teachers and math anxiety of the students had a significant relationship, but no domain in pedagogical competence best influenced math anxiety of students.

Keywords: *education, pedagogical competence, math anxiety, Philippines*

TABLE OF CONTENTS

	Page
TITLE PAGE	i
APPROVAL SHEET	ii
ACKNOWLEDGMENT	iii
ABSTRACT	v
TABLE OF CONTENTS	vi
LIST OF TABLES	ix
LIST OF FIGURES	x
Chapter	
1 INTRODUCTION	
Rationale	1
Research Objective	3
Hypothesis	4
Review of Related Literature	4
Theoretical Framework	21
Conceptual Framework	22
Significance of the Study	24
Definition of Terms	25
2 METHOD	
Research Design	26
Research Locale	26
Population and Sample	29
Research Instrument	30

	Data Collection	31
	Statistical Tool	33
	Ethical Consideration	34
3	RESULTS	
	Level of Pedagogical Competence of Math Teachers	36
	Level of Math Anxiety of Students	39
	Significance on the relationship between Pedagogical Competence of Math Teachers and Math Anxiety of Students	42
	Significance on the influence of Pedagogical Competence of Math Teachers on Math Anxiety of Students	44
4	DISCUSSION	
	Conclusion	49
	Recommendation	50
	REFERENCES	52
	APPENDICES	
A	Specific Items per Indicator for Table 1	60
B	Specific Items per Indicator for Table 2	64
C	Research Instrument	67
D	Letter to the Validators	73
E	Validation Sheet for Research Instrument	79
F	Letter of Permission to Conduct the Study	85
G	Certificate of Appearance	87
H	Turnitin (Plagiarism Checker) Result	91
I	Public Forum Certificate	94

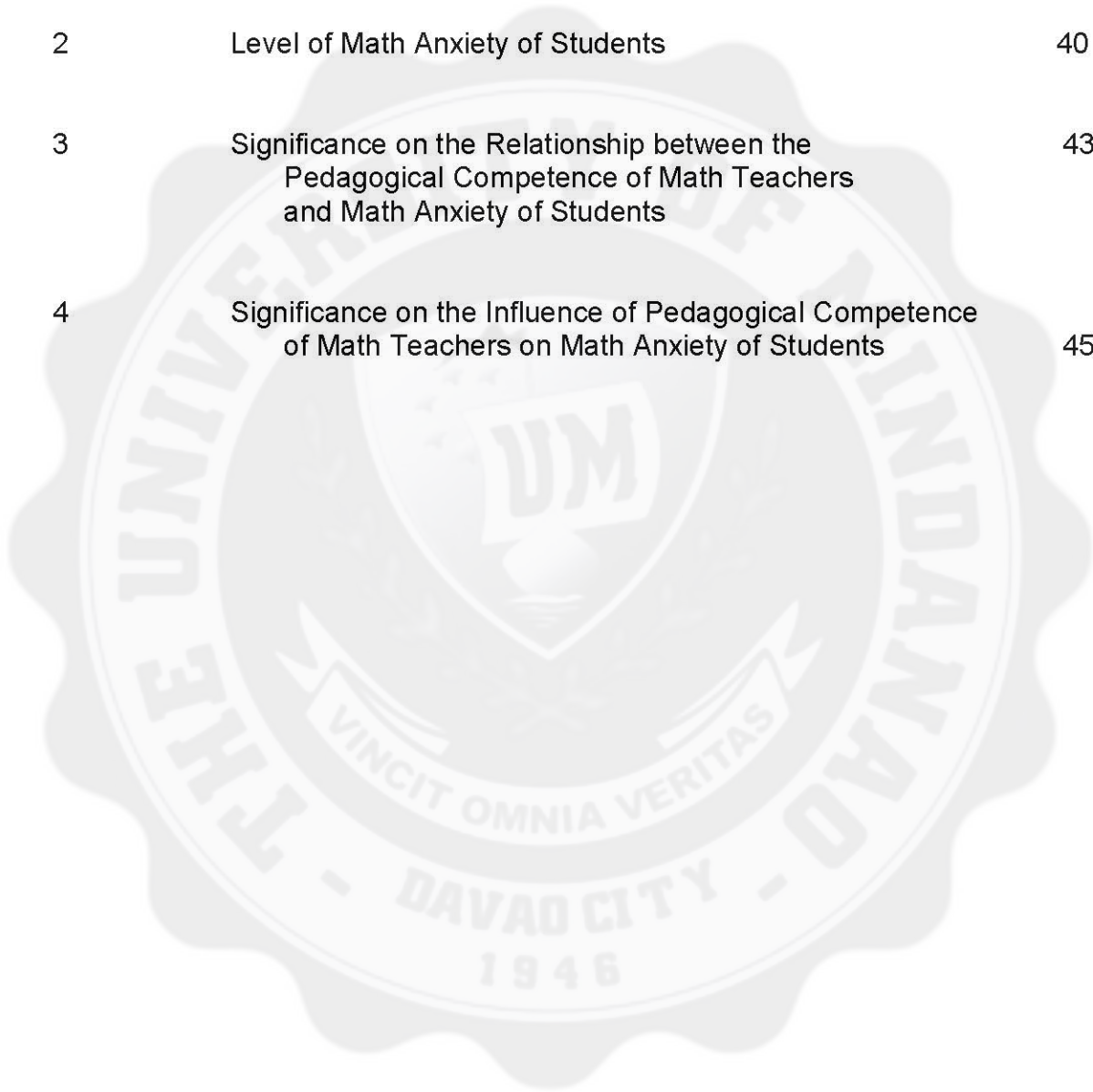
J	UMERC Certification	96
K	Editor's Certification	98

CURRICULUM VITAE



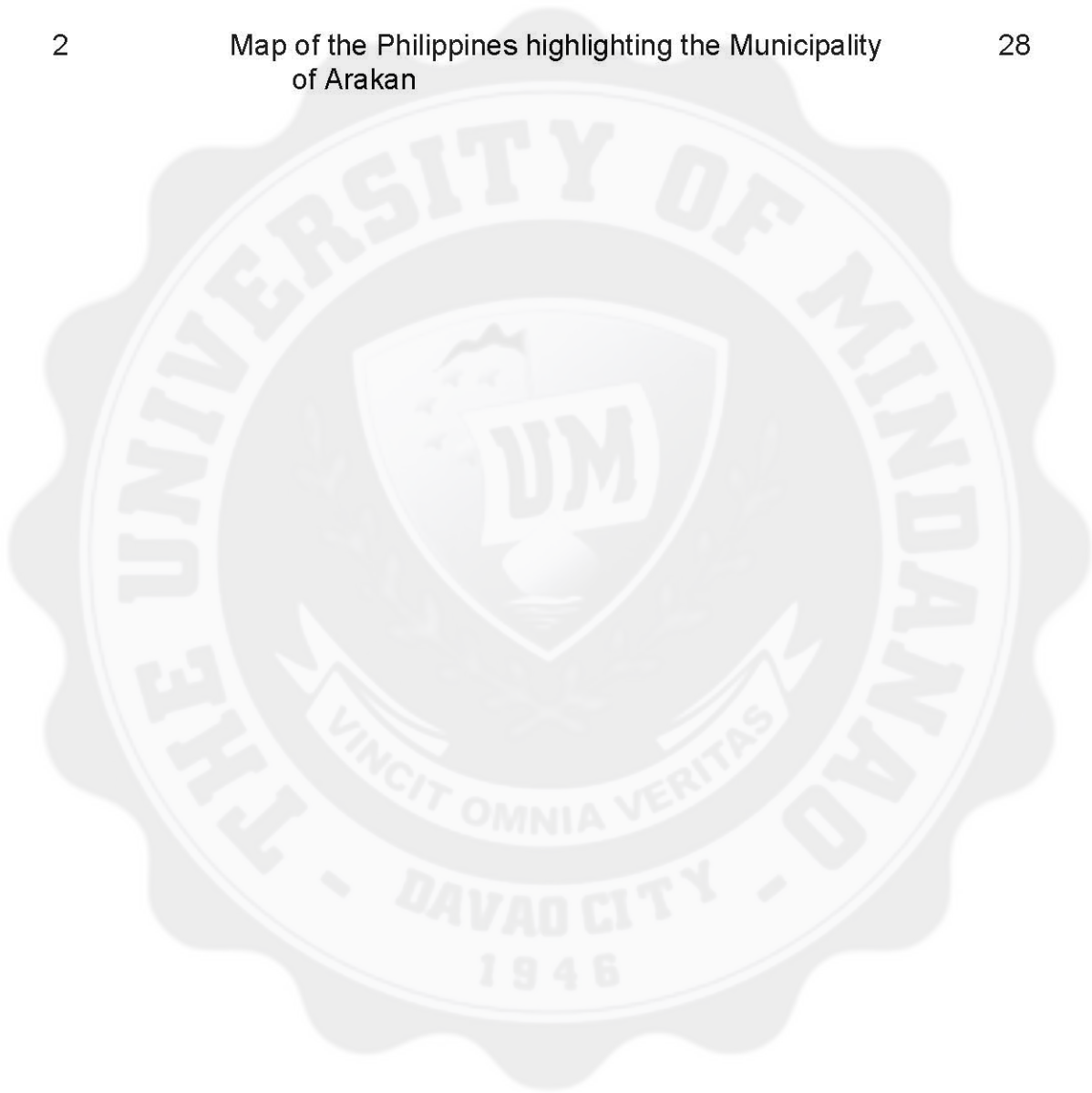
LIST OF TABLES

Table		Page
1	Level of Pedagogical Competence of Math Teachers	37
2	Level of Math Anxiety of Students	40
3	Significance on the Relationship between the Pedagogical Competence of Math Teachers and Math Anxiety of Students	43
4	Significance on the Influence of Pedagogical Competence of Math Teachers on Math Anxiety of Students	45



LIST OF FIGURES

Figure		Page
1	Conceptual Paradigm of the Study	23
2	Map of the Philippines highlighting the Municipality of Arakan	28



Chapter 1

INTRODUCTION

Rationale

Mathematics anxiety is a prevailing and one of the most severe problems faced in teaching and learning math. In Philippines, there is no doubt that among students, mathematics anxiety is a widespread and a serious problem. Thus, reducing mathematics anxiety is one of the common topics of educational and psychosocial research (Hoffman, 2010; Sparks, 2011; Sevey, 2012; Devine, Fawcett, Szucs & Dowker, 2012; Witt, 2012). It is a usual scenario that one finds it very difficult to compute automatically because of tension that hinders one's ability to do it. This problem is common not just among students but even among professionals. They experienced difficulty in doing math that led to being calculator-dependent because of the struggle in mental arithmetic computations (Virtudazo, 2012).

It is imperative to study pedagogical competence because in a teaching career, it is a universal background that is a great part of professional competence. The ability of teachers in transferring learning to the students in the most effective way is called pedagogical competence (Ryegard, 2010). Teachers, having the pedagogical competence are observed to have effective teaching plans which aim to address the learning need of the students despite the individual differences. Also, they are observed to be good in designing, assessing and evaluating learning programs in order to draw clear and concrete

evidences to attain the intended outcomes as the main objective in teaching (Koehler, 2011).

There are a number of researches that reveal the relationship between pedagogical competence of teachers and math anxiety of the students (Barnes & McCoy, 2006; Blazer, 2011; Allen & Allen, 2011). In relation to student's math anxiety, a mixed method study was conducted which showed that although there is already an emphasis on the importance of mathematics in the future of students, they still attributed their math anxiety to their teachers (Shields, 2006).

In Cotabato, Cedeño and Daquio (2012) cited by Niegas (2015) states that students have difficulty in dealing with mathematics and have a feeling of tension that interferes with them to perform with numbers. Considering the importance of understanding the students' math anxiety, the researcher made an intensive review of related literature for the possible variable that may cause math anxiety. There are many researches that present how pedagogical competence of math teachers contributes to the math anxiety of students. Study also revealed that the character of the teacher is one of the factors of math anxiety of the students particularly during their academic life in basic education (Balbutin, 2012).

Indeed, based on this context, because of the different studies which presented the connection of math anxiety and math failure (Richardson & Woolfolk, 1980); most math-anxious students are those who had teachers who failed to explain concepts and lacked patience in the delivery of the subject matter (Blazer, 2011); therefore the researcher opted to conduct the study to examine thoroughly the relationship between the pedagogical competence of

math teachers and math anxiety of the students. Furthermore, this would enrich literature, and new generated knowledge might establish the best fit model that will provide more meaningful research findings.

Research Objective

The main thrust of the study was to find out which domain in the pedagogical competence of Math Teachers best influences math anxiety of the students. Moreover, it sought to answer the following objectives:

1. To describe the pedagogical competence of math teachers in terms of:
 - 1.1 professional ethics;
 - 1.2 planning;
 - 1.3 lesson implementation;
 - 1.4 classroom environment and management skills;
 - 1.5 assessment and evaluation;
 - 1.6 reflection and self-evaluation.
2. To determine the level of math anxiety among students in terms of:
 - 2.1 physical and emotional factors;
 - 2.2 assessment factors;
 - 2.3 social factors.
3. To determine the significant relationship between pedagogical competence of math teachers and math anxiety of the students
4. To determine the domain in the pedagogical competence of math teachers that best influences math anxiety of the students

Hypothesis

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between the pedagogical competence of math teachers and math anxiety of the students.
2. There is no domain of the pedagogical competence that best influences math anxiety of the students.

Review of Related Literature

Presented in this section are the related literature and studies from different authors whose ideas and concepts are helpful in the analysis of the data and support every result of this study. The measure used in identifying the level of pedagogical competence of math teachers was adopted and downloaded from the study of Smadi and Al-ghazo (2013) with the indicators *professional ethics, planning, lesson implementation, classroom environment and management skills, assessment and evaluation, and reflection and self-evaluation*. For the dependent variable, the math anxiety test was downloaded from a site maintained and updated by Roberts (2011) where the identified themes and core ideas relating to math anxiety among students were considered as the indicators of the study namely: *physical and emotional factors, assessment factors, and social factors*.

Pedagogical Competence

Basing on the teaching career, it is a universal background that pedagogical competence is a great part of professional competence. Based on the definition, the ability of an individual to utilize different resources in order to make the teaching-learning process effective and efficient is termed as pedagogical competence (Madhavaram & Laverie, 2010). Pedagogical competence represents the ability to promote learning to the students in the most effective way (Ryegard, 2010). Teachers, having pedagogical competence are observed to have effective teaching plans which aim to address the learning need of the students despite the individual differences (Koehler, 2011). Also, they are observed to be good in designing, assessing and evaluating learning programs in order to draw clear and concrete evidences to attain the intended outcomes as the main objective in teaching.

Furthermore, many researchers recognize the study of pedagogical competences. In the early training programmes, the perspective of language teachers on pedagogical competence is the different behaviour in the practice of teaching (Richards, 2011). On the other hand, according to current approaches, there are three main categories of pedagogical competence: the cognitive component which refers to knowledge and understanding; the behavioural component which denotes strategies and skills; and lastly the attitudinal component which signifies values.

The first indicator of pedagogical competence is professional ethics. There was a study which emphasized that in the bond with international research

with respect to pedagogical competence, there has been a strong development from what was formerly referred to as teaching ability or teaching skill to a more comprehensive description of pedagogical competence (Ryegard, 2010). It is clearly stated in the preamble of code of ethics for professional teachers that a professional teacher should possess dignity and high moral values including the competence in the practice of profession both technical and professional (Anangisye, 2010). Furthermore, in teacher education, the goals are to produce professional teachers with high moral standards and competence both academically and professionally.

Moreover, in the teaching and learning process, students' respect can be earned through the teacher's action and appearance. It was mentioned that it is highly required for a teacher to have high level of professionalism even in what they wear. There should be a limitation and boundary between the relationship of students and teachers. Teachers should rarely dress exactly the same as the students' preferred fashion. Moreover, teachers should also refrain from wearing a suit or dress that may elicit negative responses from the students, making them frightened to approach the teacher whenever they need it (Grubaugh & Houston, 2013). Therefore, a balance should come into play. The teacher should have authority in the classroom but must also show genuine care towards the students, especially with regards to their problems or questions. Lastly, in order to do this, teachers dress should be modest and relaxed.

In addition, it was shown in a study that teachers are considered the best visual to the students. They are central to classroom instruction and they have

important roles in learning of the students (Wong & Wong, 2009). There are many essential relationships that may influence the students within the school context; these include student to student and student to teacher relationship (Diedrich, 2010). In line with this, many research studies demonstrate the role of teachers in motivating students to perform well in the classroom through building relationships and interacting with the students.

The second indicator of pedagogical competence is lesson planning. Lesson planning is considered the breath of an effective and efficient teacher. This includes the creativity of teachers on how to implement a certain subject matter based on the curriculum considering the learning needs of students. Also, lesson planning serves as the self-evaluation of teachers on their mastery of the content (Reed & Michaud, 2010). In this era, many individuals can be teachers, but the problem is, can they all be effective teachers? Definitely, in order to become one is not as easy as others think it might be (Rubio, 2009); to be an effective teacher does not only require complete understanding of the contents, but also the skills in planning, organizing, managing and communicating; and skill in planning and implementing instruction based on what is suitable for the learning needs of the students including the appropriate administration of assessment and reasonable evaluation.

On the contrary, a well-planned lesson is useless if it is without proper and effective implementation (Richard, 2013). The third indicator of pedagogical competence is lesson implementation. There are various styles to implement the lesson and one of these is to vary the methods used and to employ activities that

will enhance students' learning (Minato & Yanase, 1984). The methods may be best for the students if they are engaged in different activities which will allow them to analyze the situation, work for it in various ways, and reflect the importance of the content. Correspondingly, math teachers must teach students not just to give solution to different problems but also the way to learn problem-solving in the subject (MacMath, Wallace & Chi, 2009). While there are students who can develop procedural fluency, there is a possibility that they often lack the deep conceptual understanding vital in solving new problems or making connections between mathematical ideas. Research highlights the essence of problem-based learning in extending student thinking and creativity.

Additionally, the use of questions has been widely utilized as a teaching tool in accessing the knowledge of students, promoting comprehension, and stimulating critical thinking. On the other hand, there were many objections raised to emphasize the appropriate process of crafting different questions which should be highly considered since only well-constructed questions can motivate students interaction which will lead to learning. On the contrary, those questions which are not made properly will just lead to students' confusion and will limit their critical thinking skill (Gose, 2009). Hence, the result of spending time and effort in making accurate questions is the opportunity given to the students to think creatively and critically and the development of their confidence.

Likewise, it was suggested that teachers must give priority in providing higher order questions which will allow the students to analyze, synthesize and evaluate, rather than focusing on lower order questions which will only allow

them to simply recall or comprehend. Likewise, it was pointed in a recent World Summit that there is a need for teachers to guide the students to have higher order thinking skills which includes creative and critical thinking especially in solving problems and in decision-making (OECD, 2009). Also, there is a need for emphasizing harmony and collaboration in working as well as utilizing technology for the information and communication in order to succeed in this modern generation.

The fourth indicator is classroom environment and management skills; there are only two possible results of the classroom environment prepared by the teachers to their students; this can either let them feel comfortable and accepted or inferior and alienated. To achieve success in the teaching-learning process, the classroom environment should promote cooperation together with acceptance of individual differences (Bucholz & Sheffler, 2009). It was cited that a well-managed classroom allows students to be deeply engaged with their work (Wong & Wong, 2009); lets students know what is expected outcome, possess little wasted time and permits students to feel relaxed and motivated even in times of many tasks.

Also, it is essential to create a good classroom environment by developing rapport with students. Having a good bond with the students can be difficult, though, in maintaining authority if it is mishandled (Grubaugh & Houston, 2013). But, there are a few strategies that can be used by teachers in establishing good relationship with the students that will not threaten them to raise questions as a part of the learning process.

From a theoretical perspective, environment is associated with the design in the classroom; the physical environment of the classroom serves as the silent curriculum while the classroom environment design serves as the overt curriculum which facilitates and improves the learning process (Taylor & Vlastos, 2009). As a support to this idea, there is a research which cited the strong connection between good quality teaching and student's positive feelings (Knoell, 2012). Teaching is not merely about following the competencies and becoming proficient in the use of techniques, but also about being able to connect to the students and a satisfaction in work and promoting a class environment which provides friendly environment so that learning can take place.

Likewise, it is necessary for teachers to know their students, including their backgrounds as a helpful guide in making appropriate plan of challenging activities with respect to individual differences inside the classroom. The author claims that there are a greater possibility for students to behave and participate in different learning tasks if teachers pursue positive interactions with the students which offer an approachable condition to allow students construct their own meaning for a better and long-lasting learning (Liberante, 2012). Thus, teachers have a big contribution on the academic performance of the students.

The fifth indicator is assessment and evaluation. Assessment can either serves as basis in planning and monitoring students' level of attainment as well as their difficulties or a tool in certifying what students know and can do including their level of proficiency that will reveal success of the curriculum outcomes (Gardiner, 2012). Assessment serves as evidences, from which information

about the students, institutions, programs, courses, and teachers are developed (Fernandes, 2009). Also, assessment is an integral part of the curriculum development because of its major role during the implementation of the instruction.

The last indicator of pedagogical competence is reflection and self-evaluation. The teacher is a needed component in professional teaching and therefore needs careful conceptualization (Kelchtermans, 2009). Teachers are considered as the most significant resource in raising education standards in schools. Besides, to improve the efficiency and equity of providing quality education, there is a great need in ensuring that teachers are competent, resourceful, and motivated to give their best (OECD, 2009). The meaningful evaluation of teachers is very crucial because it involves accurate judgment of the result of teaching; identification of success and areas for improvement; and proper feedback, and opportunities for professional development.

Mathematics Anxiety

In the discussion of competence in mathematics, math anxiety has been one of the identified predictors of math achievement (Ma, 1999). It was defined that math anxiety is the term used for the uneasy feeling in doing math. It is the anxiety of being in the situation of not being able to understand and solve the given math problems, or the anxiety of committing failures because of lack of confidence (Makari, 2008). Also, it is a common condition inside or outside a mathematics class. As a result, mathematics anxiety really affects the feeling and

behaviour of students. On the other hand, the effect of this experience depends on how students handle it. For some, it may lead to the development of math phobia while for other who take it positively; it may lead to improved achievement.

The first indicator of math anxiety is physical and emotional factor. Math anxiety refers to the negative emotion that hinders the confidence of solving problems in math (Blazer, 2011). It is capable of giving serious implications to math achievement of the student because of its ability to interfere with problem solving. There are studies which present the connection of math anxiety and failure in doing math (Richardson & Woolfolk, 1980), and the results of avoiding any mathematical or numeral tasks (Krinzinger, Kaufmann & Willmes, 2009). In addition, it results to an increased negative attitude when performing numerical undertaking (Beilock & Lyons, 2010). In addition, including the prospect of doing math is found to be enough in eliciting undesirable emotional response among students who are experiencing high math anxiety.

However, there is an ironic finding in a research conducted which shows that it is not the actual ability of a person, but the anxiety in math, is the greatest obstruction to math attainment. Students' success in mathematics often influences their confidence in overall academic achievement which has a relationship with their self-esteem (Beilock & Maloney, 2012). Therefore, it is very troubling that many of the students have math anxiety because it could be the cause of a low math success; worse, many students continue to believe that their lack of success is due to their incompetence. Math anxiety and math test scores

are found to have a strong correlation; when math anxiety increases, the math test score decreases. The seriousness of math anxiety of the students can hinder the successful performance and achievement goals in education (Blazer, 2011). Also, students negative emotions related to math; this can frighten students to be engaged in any situation that may involve math such as math classes in the future.

Furthermore, there is a study at Harper Adams University College that discovered that those students who were confident in dealing with mathematics performed better than those who were not (Parsons, Croft & Harrison, 2009). In addition, a student who is not self-assured will truly have difficulty to accomplish the given task at a high level. This scenario led some of the students to freely utter that they will never be good in math and overtime affects the students negatively. It also indicates the result from a research that students who are facing difficulty in doing math are also identified with a high math anxiety. Due to this concern, students who have poor attitudes towards mathematics are also performing poorly and below grade level based on the class assessment (Slavin, Lake, Chambers, Cheung & Davis, 2009). It was reported in a meta-analysis of middle and high school mathematics programs that well-structured cooperative learning curricula and supplemental computer-assisted instruction (CAI) may have greater effects on mathematics achievement when combined by themselves.

Moreover, math anxiety was described as a feeling of being helpless, mentally paralyzed, disorganized and panicky when tasked to compute

mathematical problems (Hlalele, 2012). Literature further indicates the negative effect of math anxiety which can hinder the ability of the person to manipulate problems that involves numbers both in a classroom and ordinary setting (Khatoon & Mahmood, 2010; Leppavirta, 2011). Thus, math anxiety results to discomfort and distress in doing mathematical tasks (Sparks, 2011). A Research has shown that most of the students with math anxiety are very dependent on mathematical procedures as a contrast to the main goal in learning mathematics which is to understand the concept.

In the same way, when students will just memorize the steps of solving without clear comprehension of the concept and how it is done, they will eventually be unable to remember it, bodily to panic. Experts also argue that because students have math anxiety which leads to discomfort towards the subject, fewer students who want to pursue careers in connection to math. Students who are experiencing math anxiety already have undesirable emotions when engaging in any undertaking that requires mathematical skill and possibly the transfer of this generation problem from parents to children.

The second indicator is assessment factor. Math anxiety normally starts in student's early age even before formal schooling (Beilock & Maloney, 2012). In a study, result shows that adults who are math anxious are identified as less skilled, especially in spatial processing; compared to lower math anxious persons, they indeed performed worse in any form of assessment or multiple tests on spatial ability (Risko, 2015). It is also observed that those with higher math anxiety are already dealing with difficulty and struggling with different tasks

like counting and presenting numbers (Beilock & Maloney, 2012) which are normally the foundations of solving math problems.

Additionally, result shows that there is a great difference in brain activation between a person with a high math anxiety and a person with lower math anxiety. While performing math task, when a person is math anxious there will be a disruption on the working memory resource that is very significant in the success of math task (Beilock & Maloney, 2012). The examination shows that when someone is engaged in math activity, the person with higher level of math anxiety will have the greater disturbance on the working memory that is why less activation in the region of the brain is created.

The last indicator of math anxiety is social factor. It is a common problem for teachers that students perceive mathematics as a challenging endeavor (Ashcraft, Krause & Hopko, 2007). Unfortunately, the aversive reaction of students towards the subject is often reinforced by social contract or approval (Beilock, Gunderson, Ramirez & Levine, 2010). It has also observed that the social factors can be a great part in the acquisition of math anxiety; comparing mathematical performance of different individuals leads to frustration and disappointment. Attitudes, stereotypes, teaching style of the child's teachers are considered as critical in acquiring mathematics anxiety.

In addition, a study shows that even the attitude of the teacher greatly affects the onset of math anxiety since it affects the attitude, motivation and learning activities of the student. When the teacher is not supportive, unapproachable and cannot easily address the queries of the students, this leads

to avoidance, discouragement and anxiety on the part of the student. It is assumed that the negative attitude of teachers and classroom styles have a ripple effect on the attitude of the students (Beilock & Lyons, 2010). Further, the mathematical anxiety of students can be blamed for the student's negative experiences inside the classroom or at home.

In connection, many researchers tend to agree with another important factor that can influence math anxiety of the students is the household quality (Rosnan, 2006; Shaikh, 2013). Math anxiety is significantly influenced by the age, income and education of parents and the math anxiety can be reduced by using of more educated parents (Mahigir, Venkatesh & Karimi, 2012). In addition, parent's status and student's marital status were also found to have significant predictors to math anxiety. Students who were not parents and who were single were more confident in doing mathematics. Also, respondents expressed that shameful experiences really made them anxious in all aspect of their life.

Correlation between Measures

Based on the research conducted, students attributed the feeling of math anxiety to different contributors: this might be their previous teachers, their ability in doing math, the teaching styles used by their teacher, previous courses taken, and their family experiences (Varsho & Harrison, 2009). This section focuses primarily on the teacher's role specifically the pedagogical competence in the cause.

A number of researches have revealed the relationship between pedagogical competence of teachers and math anxiety of the students (Barnes & McCoy, 2006; Blazer, 2011; Allen & Allen, 2011). The problem faced by teachers in handling students who have math anxiety can be a result of their students unwanted past experiences inside the classroom or because of the undesirable attitudes of teachers in dealing with these students.

Furthermore, in relation to student's math anxiety, a mixed method study was conducted and it was found out that even society emphasized the importance of learning mathematics with students' future; students are still influence by their teachers resulting in math anxiety (Shields, 2006). In connection with this finding, a study reveals that the character of the teacher is one of the factors that can contribute to math anxiety of the students during their basic education (Balbutin, 2012). Repeatedly, it has been shown that mostly, those students who are math anxious are the product of teachers who cannot explain the concept thoroughly and who lack patience in allowing the students to clearly comprehend the subject matter (Blazer, 2011). In more than 50% of the students, participants generally ascribed their math anxiety to their experiences with terror teachers both in elementary and high school as one of the reasons of the dilemma which happened in college life. It is also shown in the research that the math anxiety experienced by the teacher could be possibly transferred to the students. The characteristics and math anxiety of the teacher is prospectively transmitted to their students.

Similarly, a teacher should guide students to construct their own meaning and understanding that contributes to learning process and high learning motivation of students to eliminate math anxiety (Maryani, 2015). Pedagogical competent teachers are creative in choosing and employing strategies in implementing the instruction to facilitate the learning of the students (Rahman, 2014). Pedagogical competence of teachers enables them to design and develop techniques based on the needs of the students; and creative teachers implement a variety of learning process to make the students feel confident to learn.

As a support to these studies, the importance of Mathematics which it is usually viewed near the top of the subject discipline hierarchy of the school was presented (Blazer, 2011). It was shown that the disproportional instructional allotted time in school curricula, even the amount of resources spent in the evaluation of student's math achievement in the international arena are the evidences of the significance of the subject. On the other hand, there is a flaw in the model. Mathematics is deemed as a very important subject, but it is frequently observed that anxiety is too provoking for students to succeed it. This commonly happens in many education systems and have a tendency to start around the fourth grade and at the middle of high school.

Because there are studies that have revealed the connection between the pedagogical competence of teachers and math anxiety of students, it was suggested to observe teachers and consider the following signals projected by teachers when they are only forced to teach mathematics (Furner & Dehass, 2011). First, the teacher presented the lesson in a somewhat strained tone of

voice; second, the teacher presented math lessons as a hazardous task for both teacher and students in which the task is to be completed in the shortest time possible; third, the teacher taught math lessons as a drill or memorization exercise for the students rather than allowing them to think, lastly; the teacher readily used math subject as a punishment for misbehaving students.

Considering the given signs, this form of instruction is definitely enough to frighten students, and it is reasonable why there are so many young students who start their first junior high math class in a very cold sweat. Based on the research conducted from scholars, the teacher has an imperative role in guiding the performance of the students. If teachers take the initiative to create harmonious relationship with the students, they are capable of motivating the students to learn the competencies in the subject (Nugent, 2009). The author also argues that there are other researches which suggest teachers to strengthen their belief in creating strong relationship with the students which contributes to motivate students towards better academic performance. Subsequently, teachers should also understand their roles and consider the perception of the students towards them. Teachers should also be aware of their teaching performance that may affect the students for a long time.

Indeed, math anxiety does not exclusively exist within students. Math anxiety within teachers can directly affect the learning of the students in mathematics. This cycle of math anxiety is passed from generation to generation (Beilock & Maloney, 2012). On the other hand, research has also shown that aside from pedagogical competence of teachers, there are environmental

aspects which can add to the math anxiety of students, such as over-demanding parents (Blazer, 2011). Math anxiety is rooted in many causes and its effect varies from student to student (Sparks, 2011). Research has found that biological and social influences can also contribute to math fears and math anxiety has become a common problem, because children can also get their math anxiety from parents who are themselves math anxious.

Also, another factor that can be a reason of math anxiety is gender differences. Math anxiety seems more evident in females than males (Hembree, 1990); it was found out that there is a difference in achievement when it comes to gender because females are performing better in language but perform poorly in math while males perform better in mathematics and sciences (Pang & Rogers, 2013). Alternatively, other research has shown that in younger grades, females experience more pronounced math anxiety than males (Beilock, Gunderson, Ramirez, & Levine, 2010). In general, the pedagogical competence of math teachers as independent variable of the study is either directly or indirectly highlighted in the aforementioned review of related literatures from different reading of books, journals, thesis, dissertations, circulars and websites written and published by several proficient authors. Furthermore, the literature reveals the importance of pedagogical competence of teachers as a contributory element in fostering the positive result of student to learn.

Finally, the foregoing researchers have provided substantial and comprehensive ideas that helped the researcher in establishing the theoretical

basis that explore the direct and indirect relationship between pedagogical competence of math teachers and math anxiety of students.

Theoretical Framework

This study was anchored on the study of Shields (2006) which presented the idea that math anxiety of the students are still influenced by their teachers; even the importance of math to their future is already emphasized by society. Furthermore, it is taken as a framework of the study since it examined the idea that pedagogical competence is a relevant negative predictor of math anxiety.

In support with the theory above, it was discovered that teachers who are not competent in different domains in mathematics, have high level of math anxiety (Rayner, Pitsolantis & Osana, 2009), and these teachers have lack of patience in dealing with situations in math (Chinn, 2012), and their math anxiety can be transferred to their students. Furthermore, in relation to students' math anxiety, there are researches which show that the pedagogical competence of teachers is a contributory factor in the development of this anxiety and can be attributed to poor instruction (Furner & Berman, 2003; Liebert & Liebert, 1998). Relatively, studies have specified that there is a stable and consistent relationship between pedagogical competence and math anxiety.

Indeed, the researcher chose to anchor this study to the study of Shields (2011) to examine deeply the relationship of pedagogical competence of math teachers and math anxiety of the students.

Conceptual Framework

Shown in Figure 1 is the conceptual framework with its variables: pedagogical competence of math teachers and math anxiety of the students. Smadi and Al-ghazo (2013) identified six indicators in assessing teachers' competence: *professional ethics*, which pertains to the dignity and moral values of the teacher; *planning*, which refers to how the teacher plans the lesson; *lesson implementation*, which signifies how the teacher realizes the plans made, including the methods used; *classroom environment and management skills*, which refers to how teachers set the classroom and manage students' behaviour; *assessment and evaluation*, which discusses the competence of the teacher in providing fair and appropriate way to collect evidences regarding students learning ; and *reflection and self-evaluation*, which refers to how competent the teacher is in identifying strengths and areas of development during teaching and learning process and also asking others suggestions, supports, and coaching.

Furthermore, Roberts (2011) also identified three indicators with themes and core ideas relating to the math anxiety of the students: *physical and emotional factors*, which pertains to students negative feeling both physical and emotional when exposed to math tasks; *assessment factors*, refers to the structure, construction and type of test used to assess student's performance; *and social factors*, which pertains to the experiences of the student with other people that become contributory to his developing math anxiety.

Independent Variable

Dependent Variable

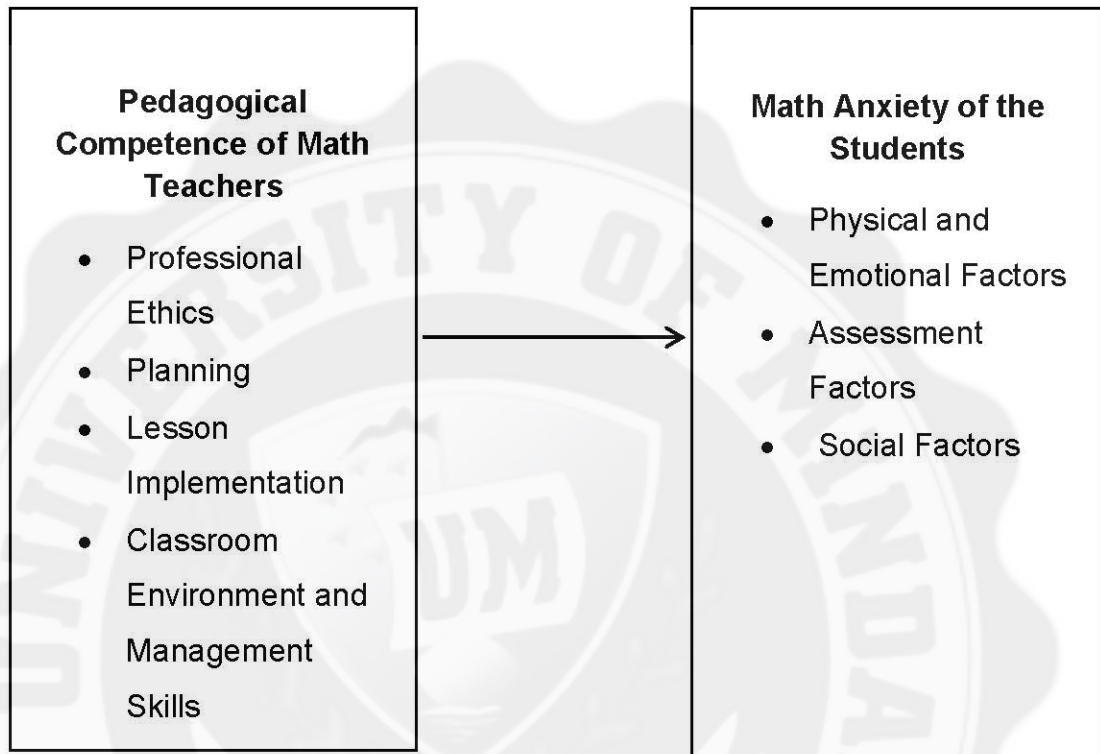


Figure 1. Conceptual Paradigm of the Study

Significance of the Study

Math anxiety is an actual problem faced by both teachers and students which hinders student's working memory (Perina, 2002). This urged educators, parents, and politicians to seek solutions to this weakness mathematics (Furner & Berman, 2003). Hence, the study on the relationship between pedagogical competence of math teachers and math anxiety of the students may address this concern as this may be helpful to mathematics teachers as it will provide ways in determining services as a means of helping them in overcoming math anxiety. This may also give insights to school heads to look into the enhancement of the teaching and learning process considering the use of variety of activities.

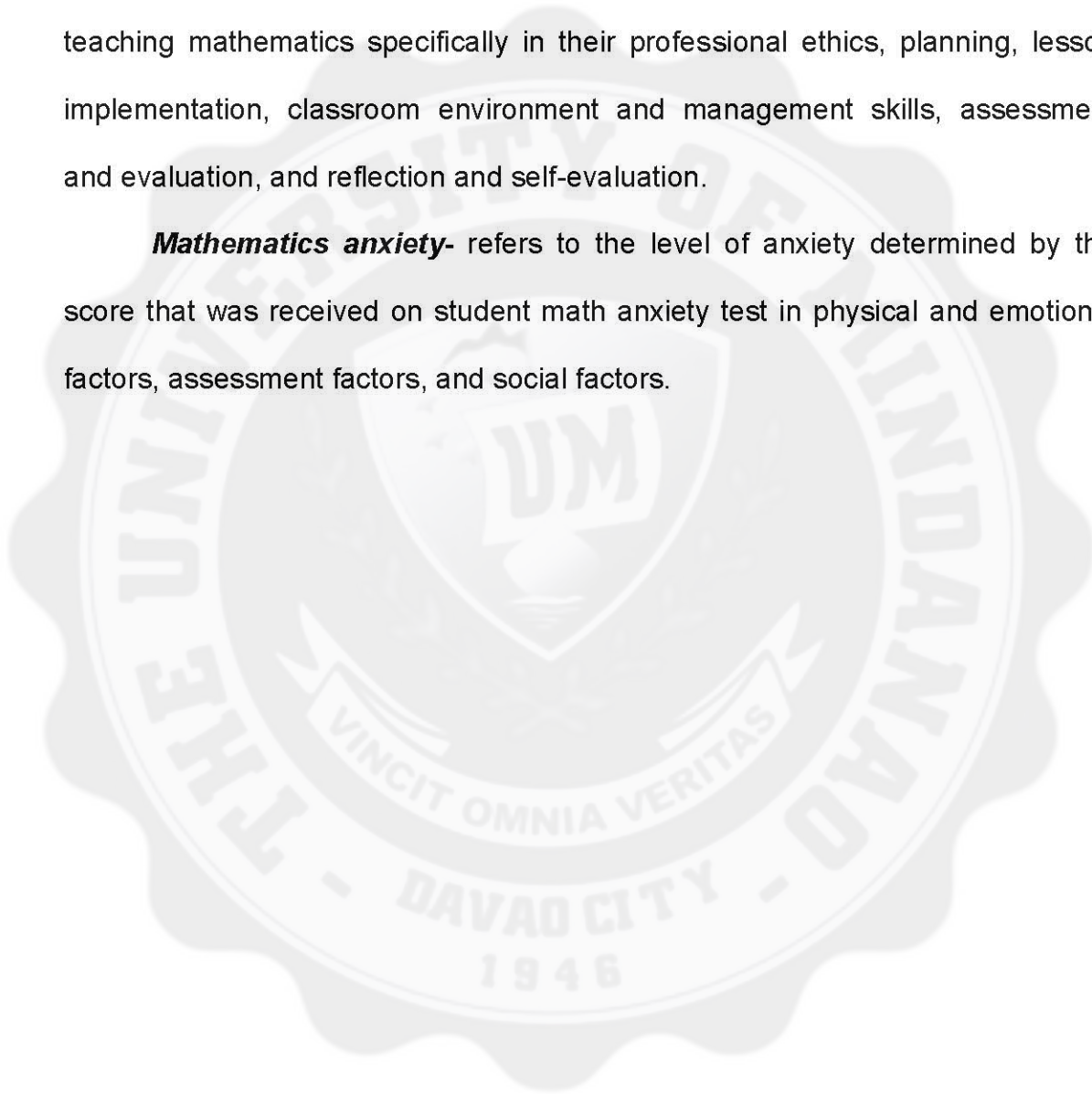
As a final result, this study may also benefit the *school administrators*, *policy-makers*, and *some government agencies* such as the Department of Education (DepEd) as it reveals result on the relationship of pedagogical competence of math teachers and math anxiety of the students which may be used as basis in providing quality education which may consequently decreased if not eliminated the math anxiety of the students. Furthermore, the output of the study may help the *students* to express their feeling regarding on the effective strategy suitable for them. Lastly, *future researchers* may find the study useful and will provide them with information that may arouse their interest to explore on the same topic to either replicate the study using other research methodologies and substantial sampling population to validate the result of the study.

Definition of Terms

For better understanding of this study, the following terms were defined operationally.

Pedagogical Competence - refers to the competence of the teachers in teaching mathematics specifically in their professional ethics, planning, lesson implementation, classroom environment and management skills, assessment and evaluation, and reflection and self-evaluation.

Mathematics anxiety- refers to the level of anxiety determined by the score that was received on student math anxiety test in physical and emotional factors, assessment factors, and social factors.



Chapter 2

METHOD

Discussed in this chapter are the research design and procedures which incorporated the following: research design, research locale, population and sample, research instrument, data collection, statistical tools, and ethical consideration.

Research Design

This study employed the quantitative non-experimental research design using correlational techniques. This research method is suitable for the study since its main objective is to ascertain the influence of pedagogical competence of math teachers on the math anxiety of the students. Moreover, in this correlational design, as a result, data is used to objectively measure reality. Quantitative research includes the variables in the study and their relationship. Generally, correlational studies have independent and dependent variables, but the influence of the independent variable is observed on the dependent variable without manipulating the independent variable (Creswell, 2009).

Research Locale

This study was conducted at the province of Cotabato, in the municipality of Arakan where only one secondary school district exists with 14 secondary schools. Among these schools, the following were selected for the conduct of this

study: Badiangon High School, Cotabato Foundation College of Science and Technology-Secondary Laboratory School, Dallag High School, F. A Andolana Memorial High School, Ganatan High School, Greenfield National High School, Malibatuan High School, Marciano Dahan High School, Meocan High School, and Notre Dame of Arakan. Also, this study was conducted from September to December, 2017.

Shown in Figure 2 is the map of the Philippines highlighting the municipality of Arakan. The Philippines is composed of many islands specifically 7, 107 and divided into three groups: Luzon, Visayas, and Mindanao. In particular, Mindanao is the second largest and southernmost major island in the Philippines. One of the provinces of Mindanao is North Cotabato. It is a province situated in Region XII, the SOCCSKSARGEN Region with total land areas of 9,008.90 square kilometres (3,478.36 sq. mi) occupying the north-eastern tip of Region XII and is centrally located in Mindanao. It has 17 municipalities and 543 barangays. It bounded on the north by provinces of Lanao del Sur and Bukidnon, on the east by Davao City and Davao del Norte, on the west by Maguindanao and on the south-east by Sultan Kudarat and Davao del Sur.

Further, one of the municipalities of North Cotabato is the municipality of Arakan. It is in the second district of Cotabato with 28 barangays and has total areas of 693.22 square kilometres (267.65 sq. mi). Arakan is a second class municipality in the province of Cotabato. It has three districts for elementary and only one district for secondary. It is known for its Dinorado Rice, Matigul Falls,



Figure 2. Map of the Philippines highlighting the Municipality of Arakan

Ganatan Lake and other beautiful views in Katipunan; being called as Little Boracay.

Population and Sample

The respondents of this study were the Grade 10 students of each selected secondary school in Arakan district who were officially enrolled for the school year 2017-2018 excluding those students under Alternative Delivery Mode (ADM) Program of the school. The respondents were determined through Slovin's Formula. Out of the desire to give everybody a chance to be included in the study, stratified random sampling procedure with proportional allocation will be done.

Name of School	Population	Percentage Distribution	Sample Respondents
A	107	10.93%	31
B	138	14.10%	40
C	109	11.14%	32
D	74	7.56%	21
F	63	6.44%	18
G	120	12.26%	35
H	75	7.66%	22
I	70	7.15%	20
J	173	17.67%	50
K	50	5.11%	15
Total	979	100%	284

Research Instrument

The questionnaire for the pedagogical competence of Math teachers was adapted from Smadi and Al-ghazo (2013). It was composed of 52 item statements, framed for each six indicators: Professional Ethics, Planning, Lesson Implementation, Classroom Environment and Management Skills, Assessment and Evaluation, and Reflection and Self-evaluation. Also, the questionnaire underwent modification and validation.

Range of Means	Descriptive Levels	Interpretations
4.20-5.00	Very High	The items in pedagogical competence are always manifested.
3.40-4.19	High	The items in pedagogical competence are often times manifested.
2.60-3.39	Moderate	The items in pedagogical competence are sometimes manifested.
1.80-2.59	Low	The items in pedagogical competence are seldom manifested.
1.00-1.79	Very Low	The items in pedagogical competence are never manifested.

The second set of survey questionnaire focused on identifying the level of math anxiety of the students; it was downloaded from a site maintained and updated by Roberts (2011). The test is composed of 30-item statement, ten framed statement for each three indicators, namely: Physical and Emotional Factors, Assessment Factors, and Social Factors. This assessment was used because it is designed specifically to measure the level of student's math anxiety.

Range of Means	Descriptive Levels	Interpretations
4.20-5.00	Very High	The items in math anxiety are always manifested.
3.40-4.19	High	The items in math anxiety are oftentimes manifested.
2.60-3.39	Moderate	The items in math anxiety are sometimes manifested.
1.80-2.59	Low	The items in math anxiety are seldom manifested.
1.00-1.79	Very Low	The items in math anxiety are never manifested.

A Likert scale is a popular instrument in measuring the attitude, preferences, images, opinions and conception of people. It is also used in educational research and was invented by Likert (1932), an educator and psychologist, who advocated an employee-centered organization. The instruments were subjected to dry run in order to determine the Cronbach Alpha values before content validation by experts with an external validator. Based on the data gathered from the pilot testing, all indicators yielded a Cronbach Alpha greater than 0.7.

Data Collection

In the collection of data, the researcher asked permission from the Schools Division Superintendent of North Cotabato Division, then to the District Cluster Head of Arakan, and to the School Heads concerned, for the conduct the study to the 284 students as the respondents.

Upon their approval, the researcher personally distributed and administered the research instruments on the pedagogical competence of Math teachers and math anxiety of the students to ensure 100 percent retrieval of the questionnaires. Then, a Certificate of Appearance was secured from the District Cluster Head and from the School Heads concerned to vouch that the researcher honestly collected the data from the research respondents of the study. Consequently, the data gathered was tallied, tabulated, analysed and interpreted statistically.

The original plan of the researcher was to conduct the study among the seventeen public barangay high schools of Arakan District but unfortunately because of the peace and order problems happened in Arakan particularly the battle between military and rebels, the researcher asked permission from her adviser to select 10 public secondary high schools which were unaffected by the said problem and one additional private high school in Arakan and one secondary laboratory high school of the Cotabato Foundation College of Science and technology.

After permission was granted by her adviser, the researcher started to distribute and administer the questionnaire starting from the farthest school through a motorcycle as a means of transportation. The data gathering procedure was really difficult especially because of different factors: first, the researcher was still scared due to the peace and order problem of the municipality which was proclaimed as in a state of calamity; second, the weather condition during the duration of the conduct of the study was inconvenient for

travellers. The researcher was also frightened because she was forced to cross through a hanging bridge because the municipality was also facing flood and landslide. Lastly, one of the main difficulties of the researcher during the data gathering collection was her health condition because she was advised to take a rest due to her motorcycle accident experience.

Fortunately, despite the struggles and obstacles faced by the researcher, her determination and perseverance as well as the support given to her made the data gathering collection successful. Then based from the findings of the study, conclusion and recommendation were formulated.

Statistical Tools

Statistical tools employed in the analysis of the data were as follow:

Mean. This tool was utilized to determine the respondents' level of anxiety in mathematics and pedagogical competence of math teachers.

Pearson Product Moment Correlation of Coefficient. This tool was used to determine the significant relationship between pedagogical competence of math teachers and math anxiety of the students.

Regression. This statistical tool was used to determine the domain of pedagogical competence of math teachers that significantly influences the math anxiety of the students.

Ethical Consideration

In the conduct of the study, the researcher made sure that appropriate research guidelines were followed and research ethics was considered. Before the distribution and administration of the survey questionnaire, the researcher made sure that her paper was already checked and approved by the UM Research Ethics Committee.

Voluntary Participations

The participants of the study were adolescents specifically, Grade 10 students. Voluntary participation was asked by the researcher from the students. Enough time was given to the participants of the study to allow them think on their true view on the research questions.

Privacy and Confidentiality

Information given by the participants' responses was made confidential; thus, ensuring privacy of their data. In addition, participants' identities were not exposed. Therefore, the ethical aspect of research was strictly followed all throughout the conduct of the study.

Informed Consent Process

The researcher informed the respondents about the purpose and significance of conducting the study. The permit to conduct the study was also

shown to them but still they were informed that their participation was not forced but only voluntary.

Recruitment

Consent from the participants and appropriate permission from the Department of Education and School Heads was taken. Student's participation to the study was voluntary and any physical and/or emotional discomfort of the participants towards certain topics was considered

Risks

Participants were informed that they may choose not to answer questions which made them feel uncomfortable or they could withdraw as participants of the study, without penalty, if they felt they not discuss the information that was asked from them.

Chapter 3

RESULTS

Presented in this chapter are the findings and analysis of data from the respondents of the study on the pedagogical competence of math teachers and math anxiety of students among the Grade 10 students in selected Secondary Schools of Arakan District, North Cotabato. The discussion follows the order of the problem stated in Chapter 1.

The answers in every problem were presented and discussed using the data gathered through the survey questionnaire presented in tables. The following tables represent the result of the study.

Level of Pedagogical Competence of Math Teachers

Shown in Table 1 is the summary of the pedagogical competence of math teachers. Overall, it obtained a standard deviation of 0.69 and a weighted mean of 3.71 or *high*. This meant that the pedagogical competence of math teachers was often manifested.

The highest among all indicators was *professional ethics* with a mean value of 3.90, followed by *lesson implementation* with the mean value of 3.80; *planning* with the mean value of 3.74; *classroom environment and management skills* with the mean value of 3.70 as well as *assessment and evaluation* with the mean value of 3.70 and lastly the *reflection and self-evaluation* with the mean value of 3.60. All of these were described as *high*. The domain of pedagogical

Table 1
Level of Pedagogical Competence of Math teachers

Indicators	SD	Mean	Descriptive Level
Professional Ethics	0.84	3.90	High
Lesson Implementation	0.82	3.80	High
Planning	0.77	3.74	High
Classroom Environment and Management Skills	0.80	3.70	High
Assessment and Evaluation	0.79	3.70	High
Reflection and Self-evaluation	0.84	3.60	High
Overall	0.69	3.71	High

competence of math teachers that showed the highest mean of 3.90 or *high* was the *professional ethics* as shown in appendix Table 1.1 with the following items arranged from highest to lowest means: *follow the professional dress code* with the mean value of 4.03 or *high*; *treat students with respect, fairness, and justice* with a mean value of 3.94 or *high*; *communicate with students positively* with a mean value of 3.89 or *high*; *show wisdom to the information resources morally* with the mean value of 3.87 or *high*; *show wisdom and patience while presenting the instruction* with the mean value of 3.79 or *high*.

The indicator of pedagogical competence of math teachers that achieved the second high mean of 3.80 or *high* was *lesson implementation* described in appendix Table 1. 3 with the following items: 3.98 or *high* on *connect the previous learning with the new topic*; 3.86 or *high* on *present and explain topics*

in an easy, understandable and interesting way; 3.76 or high on use a wide range of learning strategies to facilitate teaching; 3.71 or high on use appropriate activities to facilitate student's learning; and 3.69 or high on vary techniques according to students' level and the teaching learning situations.

The indicator of the pedagogical competence of math teachers that obtained the mean value of 3.74 or *high* was *planning* as shown in appendix Table 1.2. All items of planning with the descriptive level of *high* were as follows: *plan taking into consideration the previous learning of the students* with the mean value of 3.86; *plan clearly by stating precise, measurable, observable and relevant outcomes* with a mean value of 3.77; *demonstrate knowledge of instructional strategies and choose those that match the needs and learning styles of students* with a mean value of 3.76; *prepare materials, resources and aids in advance and check them on time* with the mean value of 3.76; and *plan taking into considerations individual differences among students* with the mean value of 3.56.

Two indicators of pedagogical competence of math teachers attained the same mean value of 3.70 or *high*; these were *classroom environment and management skills* and *assessment and evaluation*. All items of classroom environment and management skills with the description of *high* as shown in appendix Table 1.4 were as follows: 3.84 on *encourage and support students to learn by providing positive expectations of success*; 3.77 on *care about the appearance and the layout of the class*; 3.73 on *monitor, control and direct students' behaviors carefully and positively*; 3.59 on *establish purposeful, task-*

oriented and relaxed classroom climate by using meaningful; 3.56 on foster students' confidence and self-esteem.

Also, all items on assessment and evaluation with the descriptive level of *high* as presented in appendix Table 1. 5 were as follows: *reinforce correct responses immediately* with the mean value of 3.80; *give enough wait time after the question to give the students a chance to think about it* with the mean value of 3.77; *use assessment as a tool to identify the areas of difficulties of instruction* with a mean value of 3.72; *vary and use different types of questions* with the mean value of 3.65.; and *mark students' assignments thoroughly and return them regularly* with a mean value of 3.54.

Lastly, the domain of pedagogical competence of math teachers which obtained the lowest mean value of 3.60 or *high* was the *reflection and self-evaluation*. The four items of *reflection and self-evaluation* with the descriptive level of *high* as reflected in appendix Table 1.6 were as follows: *correct mistakes when found in the textbooks* with the mean value of 3.80; *keep records of students' progress* with a mean value of 3.76; *encourage peer assessment use* with the mean value of 3.67; and *encourage self-assessment use* with a mean value of 3.61. The only item which was rated as moderate was item one; *ask for help from others like supervisor and peer teachers* with the mean value of 3.18.

Level of Math Anxiety of the Students

Shown in Table 2 is the summary of the level of math anxiety of the students with an overall standard deviation of 0.70 and the mean value of 3.22 or

Table 2
Level of Math Anxiety of Students

Indicators	SD	Mean	Descriptive Level
Physical and Emotional Factor	0.81	3.15	Moderate
Assessment Factor	0.66	3.34	Moderate
Social Factors	0.70	3.22	Moderate
Overall	0.70	3.22	Moderate

moderate. The result signified that the math anxiety was experienced by the students sometimes. Also, it is shown in the data that the highest level of the math anxiety of the students was on the *assessment factor* with a mean value of 3.34; followed by the *social factor* with a mean value of 3.22; and finally the *physical or emotional factor* with a mean value of 3.15. These three indicators obtained a descriptive level of *moderate*. The indicator of math anxiety of students with the highest mean value was the *assessment factor* as shown in appendix Table 2.2. The item on this factor with highest mean was: *I feel like I need to prepare much for math tests than for other subjects* with the mean value of 3.56 or *high*.

Among the items of *assessment factor*, the items with a *moderate* descriptive level were: *math tests are much more stressful to me than other tests* with the mean value of 3.49; *I feel I understand certain math concepts in class but do poorly on tests* with the mean value of 3.35; *I feel that I can't trust my intuition and often second guess myself during math tests* with the mean value of 3.32; *I do not feel confident when taking math tests no matter how much I study*

with the mean value of 3.25; and *during math tests, I find myself comparing my progress to those around me* with the mean value of 3.25; and *I tend to do very poorly on math tests* with the mean value of 3.19. The data simply signifies that students are often experiencing math anxiety especially during assessment time.

The indicator with the second highest mean was the *social factors*. The data presented in appendix Table 2.3 reflects the level of math anxiety of the students in terms of social factor ranging from 3.00 to 3.43 with an overall standard deviation of 0.95 and mean rating of 3.22 or *moderate*. This showed that the students are experiencing math anxiety in terms of their social interaction with others sometimes. All items in *social factor* were rated as *moderate* and these are as follows: *I feel that others have a more “mathematical” or “logical” mind than I do* with the mean value of 3.43; *my parents and/or friends tell me about their own struggles and frustrations with math* with the mean value of 3.37; *I find myself worrying about other people’s math abilities and comparing them to my own* with the mean value of 3.22; *I feel that although I am quite talented at some things, none of them help me with math* with the mean value of 3.21; *I have been punished or embarrassed in math class for not understanding something* with the mean value of 3.18. *I feel that I will never be able to learn math no matter how hard I try* with the mean of 3.15; and *I have math teachers that I really disliked for one reason or another* with mean value of 3.00.

Among the three factors of math anxiety of the students, *physical and emotional factor* obtained the lowest mean value of 3.15. Based on the items presented in appendix Table 2.1, the level of math anxiety of the students in

terms of *physical and emotional factor* was revealed as *moderate* with means ranging from 3.02 to 3.26 and with an overall standard deviation of 0.81. This showed that the students were moderately experiencing math anxiety physically and emotionally. Based on the result, all items which were rated as *moderate* are as follows: 3.26 for *I feel like I have no control over my grades in math*; 3.23 for *I get emotionally upset when doing or thinking about math (anger, crying, extreme frustration, etc.)*; 3.19 for *I get sweaty or clammy hands when doing or thinking about math*; 3.17 for *I get headaches or neck stiffness when doing or thinking about math*; 3.13 for *I feel my heart race when doing or thinking about math*; 3.05 for *I feel like I have to urinate more frequently when in math class or working on a math assignment or test*; and 3.02 for *I have trouble sleeping after working on math or the night before math class or a math test*.

Significance on the relationship between Pedagogical Competence of Math Teachers and Math Anxiety of students

Presented in Table 3 are the results of the relationship between variables involved in the study. The overall r-value of 0.131 with a p-value 0.027 which was less than 0.05 level of significance signified the rejection of the first null hypothesis of study. This meant that the important association between the pedagogical competence of math teachers and math anxiety of students had significance. Based on the data presented, it was observed that three indicators of pedagogical competence of math teachers appeared to have no significant relationship on the three factors of math anxiety with an overall p-value which is

Table 3
Significance on the Relationship between the Pedagogical Competence of Math Teachers and Math Anxiety of Students

Pedagogical Competence Of Math Teachers	Math Anxiety of Students			
	Physical & Assessment Factor	Social Factor	Emotional Factor	Overall
Professional Ethics	0.094 (0.116)	0.230** (0.000)	0.047 (0.426)	0.131* (0.027)
Planning	0.150* (0.012)	0.196** (0.001)	0.051 (0.395)	0.152* (0.011)
Lesson Implementation	0.083 (0.161)	0.173** (0.003)	0.008 (0.527)	0.103 (0.082)
Classroom Environment and Management Skills	0.079 (0.186)	0.181** (0.002)	0.034 (0.570)	0.078 (0.190)
Assessment and Evaluation	0.074 (0.215)	0.192** (0.001)	0.027 (0.647)	0.100 (0.093)
Reflection and Self-evaluation	0.123* (0.038)	0.190** (0.001)	0.099 (0.097)	0.131* (0.027)
Overall	0.118* (0.046)	0.217** (0.000)	0.058 (0.327)	0.131* (0.027)

Significance at 0.05 significance level

less than 0.05 level of significance. These were the following: lesson implementation with an overall r-value of 0.103 and p-value of 0.082; classroom environment and management skills with an overall r-value of 0.078 and p-value of 0.190; and assessment and evaluation with an overall r-value of 0.100 and p-value of 0.093.

On the other hand, three domains of the pedagogical competence of math teachers were observed to have a significant relationship on the math anxiety of students. These were as follows: *professional ethics* with r-value of 0.131 and p-

value of 0.027; *planning* with an overall r-value of 0.152 and p-value of 0.011; and *reflection and self-evaluation* with an overall r-value of 0.131 and p-value of 0.027. The p-value of these domains is less than 0.05 level of significance which signified important correlation between the indicators mentioned.

Significance on the influence of Pedagogical Competence of Math Teachers on Math Anxiety of students

Shown in Table 4 is the acceptance of the second null hypothesis of the study since the multiple regression analysis showed an F-value of 1.512 and a p-value of 0.174. Furthermore, the R-square value of 0.032 suggested that 3.2% of the math anxiety of the students was attributed to the indicators of pedagogical competence specified in this study. This further implied that 96.8% of their math anxiety could be influenced by other things that are already beyond the focus of this study, thus it resulted to no significance of all the domains of pedagogical competence of math teachers on math anxiety of students.

However, the main concern of this section was to find out the best predictor of math anxiety of the students and based on the result, there is no domain in the pedagogical competence of math teachers that significantly influenced math anxiety of the students.

Table 4
Significance on the influence of Pedagogical Competence of Math Teachers on Math Anxiety of Students

Pedagogical Competence (Indicators)		Math Anxiety			
		B (Standardized Coefficients)	β (Unstandardized Coefficients)	T	Sig.
Professional Ethics		0.038	0.045	0.492	0.623
Planning		0.148	0.162	1.440	0.151
Lesson Implementation		-0.051	-0.058	-0.538	0.591
Classroom Environment and Management Skills		-0.095	-0.107	-1.000	0.318
Assessment and Evaluation		0.033	0.036	0.354	0.716
Reflection and Self-evaluation		0.078	0.092	1.088	0.278
R	.178				
R ²	.032				
F	1.512				
P	.174				

Chapter 4

DISCUSSION

Presented in this chapter are the summary, conclusion and recommendations of the study pertaining to the result of this study.

Pedagogical Competence of Math Teachers

The high manifestation of pedagogical competence of math teachers in terms of professional ethics, planning, lesson implementation, classroom environment and management skills, assessment and evaluation, reflection and self-evaluation as rated by the Grade 10 students of selected secondary schools of Arakan District, North Cotabato appeared to be essential in the provision of quality output of the teaching-learning process.

Such finding conforms with the study of Madhavaram and Laverie (2010) which states that basing on the teaching career; it is universal that pedagogical competence is a great part of professional competence. It also supports the idea given by Ryegard (2010) that pedagogical competence represents the ability of promoting learning to the students in the most effective way; and teachers, having the pedagogical competence are observed to have effective teaching plans which aim to address the learning need of the students despite the individual differences. The result also agrees with Koehler (2011) that pedagogically competent teachers are observed to be good in designing,

assessing and evaluating learning programs in order to draw clear and concrete evidences to attain the intended outcomes as the main objective in teaching.

Math Anxiety of the Students

Grade 10 students are moderately experiencing math anxiety especially in terms of assessment factor. The finding also supports the study of Hembree (1990) that girls exhibit more math anxiety than boys because 65% of the total numbers of respondents are female students. Students' success in mathematics often influences their confidence in overall academic achievement which has a relationship with their self-esteem. Furthermore, it is very troubling that many of the students have math anxiety because it could be the cause of a low math success, and worse many students continue to believe that their lack of success is due to their incompetence.

In addition, it also follows the study conducted by Blazer (2011) that math anxiety and math test scores are found to have a strong correlation; as math anxiety continues to increase, test scores decrease. The seriousness of math anxiety of the students can hinder the successful performance and achievement goals in education. Also, students negative emotions related to math subject can frighten students to enter in any situation that may involve math because the result revealed that the indicators under math anxiety which had the highest mean was the assessment factor.

Significance on the Relationship between the Pedagogical Competence of Math Teachers and Math Anxiety of the Students

The results of the study which presented that there is a relationship between pedagogical competence of math teachers and math anxiety of the students serves as an additional support to the study conducted by Barnes and McCoy (2006), Blazer (2011), and Allen and Allen (2011). In connection with this finding, a similar study to the study conducted by Balbutin (2012) revealed that the character of the teacher plays a vital role for the development of math anxiety of the students in the course of their academic life in the basic education. In addition, more than 50% of the students generally ascribed their math anxiety to their experiences with terror teachers both in elementary and high school as one of the reasons of the dilemma happened in college life. It was also shown in the research that the teacher's own mathematics anxiety could possibly cause the anxiety of the students. The characteristics and math anxiety of the teacher is prospectively transmitted to their students.

Significance on the Influence of Pedagogical Competence of Math Teachers on Math Anxiety of Students

One of the important purposes of this study is the regression analysis determining which domain of the pedagogical competence of math teachers influence the math anxiety of the students. The overall result indicates that although there is a significant relationship between the pedagogical competence

of math teachers and math anxiety of the students, based on the domains used in this study, there is none which best predicts math anxiety of the students.

The result may serve as evidence that there are other factors that can influence the math anxiety of students such as biological factor and the cause of math anxiety varies from student to student as a support to the study of Sparks (2011) that presented the biological and social influences which can also contribute to math fears and math anxiety because children can also get their math anxiety from parents who are themselves math anxious.

Conclusion

Based on the findings of the study, conclusions are drawn in this section: the study concludes that the overall level of pedagogical competence of math teachers in Arakan district was high as well as its indicators, namely *professional ethics, lesson implementation, planning, classroom environment and management skills, assessment and evaluation and reflection and self-evaluation*. Furthermore, the overall level of math anxiety of Grade 10 students was moderate which was indicative of the moderate levels among all three domains of math anxiety of students namely *physical and emotional factors, assessment factor and social factors*.

Additionally, the findings opposed the theoretical assumption of no significant relationship pedagogical competence of math teachers and math anxiety of students. Contrary to the assumption, the study concludes that there is

a positive significant relationship between pedagogical competence of math teachers and math anxiety of students.

Finally, the findings of the study did affirm that no domain of pedagogical competence of math teachers significantly influence math anxiety of students. It is in contrast with the mixed method study conducted by Shields (2006) which presented the idea that even if there is an emphasis on the importance of mathematics to the future of the students, their math anxiety is still influenced by their teachers.

Recommendation

The following recommendations are made in consideration of the results and conclusions of the study. Based on the findings, the overall level of pedagogical competence of math teachers was high. However, it was revealed that among the domains of pedagogical competence, *reflection and self-evaluation* had the lowest level. Thus, the researcher recommends that the school administrators conduct trainings and seminars which will motivate the teachers to have reflection and self-evaluation with regards to their pedagogy.

Moreover, it was found out that the overall level of math anxiety of students was moderate. Also, it was revealed that among the domains of math anxiety, *assessment factor* had the highest level. Therefore, the researcher recommends that teachers always conduct item analysis of their assessment in order to evaluate its effectiveness. Findings also revealed a significant and positive relationship between pedagogical competence of math teachers and

math anxiety of students which implies that higher pedagogical competence will remove or reduce math anxiety. Hence, the researcher recommends that teachers maintain the high level of pedagogical competence.

Additionally, among the domains of pedagogical competence, it was revealed that none best influences students' math anxiety. Thus, the researcher recommends that future researchers conduct similar study on a different setting for in-depth investigation to validate the findings of this study and to add to the limited literature on teachers' pedagogical competence and students' math anxiety. Lastly, future researchers are also recommended to find out other domains on pedagogical competence of teachers that could possibly influence math anxiety of students.

REFERENCES

- Allen, A.A. & Allen, H.R. (2011). *Teachers' attitudes and pedagogy: Cause and cure of math anxiety*. New Jersey, USA: Monmouth University.
- Anangisye, W. A. L. (2010). Moral education and character development: Learning from the African indigenous education framework. *Journal of Adult Education*, 16, 1-23.
- Ashcraft, M. H., Krause, J. A. & Hopko, D. R. (2007). Is math anxiety a mathematical learning disability? In D. B. Berch & M. M. M. Mazzocco (Eds.), *Why is math so hard for some children? The nature and origins of mathematical learning difficulties and disabilities*, 329-348. Baltimore: Brookes.
- Balbutin, J. (2012). *Math phobia among college students: A qualitative inquiry* (Unpublished Doctoral Dissertation). University of Mindanao, Davao City
- Barnes, A. & McCoy, L. (2006). *Investigating the causes of math anxiety in the high school classroom*. Research project presented at Annual Research Forum, Wake Forest University, Department of Education, Winston Salem, NC.
- Beilock, S. L., Gunderson, E. A., Ramirez, G. & Levine, S. C. (2010). Female teachers' math anxiety affects girls' math achievement. *Proceedings of The National Academy of Sciences of The United States of America*, 107(5), 1860-1863. doi:10.1073/pnas.0910967107
- Beilock, S.L. & Lyons I.M. (2010, November). *Mathematics Anxiety: Separating the math from the anxiety*. Poster presented at the Annual Psychonomics Meeting in St. Louis, MO.
- Beilock, S. L. & Maloney, E. A. (2012). Math anxiety: Who has it, why it develops, and how to guard against it. *Trends in Cognitive Sciences*, 16, 404-406.
- Blazer, C. (2011). Strategies for reducing math anxiety. Information capsule. Vol.1102. *Research Services, Miami-Dade Country Public Schools*. Last accessed from <http://files.eric.ed.gov/fulltext/ED536509.pdf>
- Bucholz, J. L. & Sheffler, J. L. (2009). Creating a warm and inclusive classroom environment: Planning for all children to feel welcome". *Electronic Journal for Inclusive Education*, 2 (4).

- Cedeño, A. & Daquio, E. (2012). *Factors affecting math performance of laboratory high school senior students of CFCST* (Unpublished undergraduate thesis). Cotabato Foundation College of Science and Technoogy, Doroluman, Arakan, Cotabato
- Chinn, S. (2012). Beliefs, anxiety, and avoiding failure in Mathematics. *Child Development Research*, 1-8.
- Creswell, J. (2009). *Research design: Qualitative, quantitative and mixed methods approaches*, (3rd ed.). Thousand Oaks, CA: SAGE Publications.
- Devine, A., Fawcett, K., Szucs, D. & Dowker, A. (2012). Gender differences in mathematics anxiety and the relation to mathematics performance while controlling for test anxiety. *Behavioral and Brain Functions*, 8,33. Retrieved from <http://www.behavioralandbrainfunctions.com/content/8/11/33>.
- Diedrich, J. (2010). Motivating students using positive reinforcement. *Education and Human Development Master's Theses* 9. Retrieved from https://digitalcommons.brockport.edu/ehd_theses/9.
- Fernandes, D. (2009). Profiles of educational assessment systems worldwide: Educational assessment in Portugal. *Assessment in Education*, 16(2), 227-247.
- Furner, J. & Berman, B. (2003). Math anxiety: Overcoming a major obstacle to the improvement of student math performance. *Childhood education*, 79(3), 170-174.
- Furner, J. & Dehass, A. (2011). How do student's mastery and performance goals relate to math anxiety? *Eurasia Journal of Mathematics, Science & Technology Education*, 7 (4), 227-242.
- Gardiner, L. F. (2012). *Assessment and evaluation in higher education: Some concepts and principles*. Retrieved from <http://www.thenationalacademy.org/readings/assessandeval.html>.
- Gose, M. (2009). When socratic dialogue is flagging: Questions and strategies for engaging students. *College Students*, 57 (1), 45-50.
- Grubaugh, S. & Houston, R. (2013). Establishing a classroom environment that promotes interaction and improved student behavior". *The Clearing House*, 63, (8),375-378.

- Hembree, R. (1990). The nature, effects, and relief of mathematics anxiety. *Journal for Research in Mathematics Education*, 21(1), 33-46. Retrieved from <http://www.jstor.org.myaccess.library.utoronto.ca/stable/749455>.
- Hlalele, D. (2012). Exploring rural high school learners' experience of mathematics anxiety in academic settings. *South African Journal of Education*, 32,3.
- Hoffman, B. (2010). "I think I can, but I'm afraid to try": The role of self-efficacy beliefs and mathematics anxiety in mathematics problem-solving efficiency. *Learning and Individual Differences*, 20 (2010), 276-283.
- Kelchtermans, G. (2009). Who I am in how I teach is the message: Self-understanding, vulnerability and reflection. *Teachers and Teaching: Theory and Practice*, 15 (2), 257-272. Retrieved from <http://dx.doi.org/10.1080/13540600902875332>.
- Khatoun, T. & Mahmood, S. (2010). Mathematics anxiety among secondary school students in India and its relationship to achievement in mathematics. *European Journal of Social Sciences*, 16, 75-86.
- Knoell, M. (2012). The role of the student-teacher relationship in the lives of Fifth Graders. *A Mixed Method Analysis*, 1-122.
- Koehler, M. (2011). Relationship between pedagogical assessment evaluation knowledge and technology to learning. *Instructional Journal of Learning Technology*, 6(2), 146-163, 5-35. doi: 10.1111/j.1365-2729.2012.00487.
- Krinzinger, H., Kaufmann, L. & Willmes, K. (2009). Math anxiety and math ability in early primary school years. *Journal of Psychoeducational Assessment*, 27(3), 206-225.
- Leppavirta, J. (2011). The impact of mathematics anxiety on the performance of students of Electromagnetics. *Journal of Engineering Education*, 100:424-443.
- Liberante, C. (2012). The importance of teacher-student relationships, as explored through the lens of the NSW Quality Teaching Model. *Journal of student Engagement: Education Matters*, 2 (1): 2-9.
- Liebert, R. M. & Liebert, L. L. (1998). *Personality strategies and issues*. Pacific Grove: Brooks.
- Likert, R. (1932). *A technique for the measurement of attitudes*. NY: Archives of Psychology

- Ma, X. (1999). A meta-analysis of the relationship between anxiety toward Mathematics and achievement in Mathematics. *Journal for Research in Mathematics Education*, 30(5), 520-540.
- Macmath, S., Wallace, J. & Chi, X. (2009). Problem-based learning in Mathematics: A tool for developing students' conceptual knowledge. *What works? Research into Practice Research Monograph #2*. Toronto: The Literacy and Numeracy Secretariat, Ontario Ministry of Education, and the Ontario Association of Deans of Education.
- Madhavaram, S. & Laverie, D.A. (2010). Developing pedagogical competence: Issues and implications for marketing education. *Journal of Marketing Education*, XX, (X), 2-10.
- Mahigir, F., Venkatesh, K. & Karimi, A. (2012). Parent's socio economic background, mathematics anxiety and academic achievement. *International Journal of Education Administration and Policy Studies*, 4(8), 177-180. Retrieved from <http://www.academicjournal.org/IJEAPS>.
- Makari, G. (2008). *Revolution in mind: the creation of psychoanalysis*. New York: HarperCollins
- Maryani, I. (2015). Correlation between Teacher's PKC (Pedagogical Content Knowledge) and student's motivation in Primary School. *International Journal of Evaluation and Research in Education (IJERE)*, 4 (1), Retrieved: from <http://www.iaesjournal.com>.
- Minato, S. & Yanase, S. (1984). On the relationship between students attitude towards school mathematics and their levels of intelligence. *Educational Studies in Mathematics*, 15(3), 313-320.
- Niegas, L. (2014). *Math anxiety among college students: basis for an intervention program* (Unpublished Master's Thesis). University of Mindanao, Davao City.
- Nugent, T. (2009). *The impact of teacher-student interaction on student motivation and achievement*. Orlando, Florida, 1-129
- Organization for Economic Co-operation and Development (2009). *Creating effective teaching and learning environments*. OECD Publications. Retrieved from <http://www.oecd.org/dataoecd/17/51/43023606.pdf>.

- Pang, X. & Rogers, T.W. (2013). *Comparative examination of the influence of selected factors on achievement in Grade 9 academic and applied mathematics courses in French-Language Schools*. EQAO Research: Research report. Toronto: Ontario.
- Parson, S, Croft, T. & Harrison, M. (2009). Does students' confidence in their ability in mathematics matter? *Teaching Mathematics and its Applications*, 28, 53-68.
- Perina, K. (2002). The sum of all fears. *Psychology Today*, 35(6), 19.
- Rahman, M. (2014). Professional competence and the performance of Junior High School of Science teachers. *Journal of Education and Practice*, 5 (9), 2014. Retrieved from www.iiste.org.
- Rayner, V., Pitsolantis, N. & Osana, H. (2009). Mathematics anxiety in pre-service teachers: Its relationship to their conceptual and procedural knowledge of fractions. *Mathematics Education Research Journal*, 21(3), 60-85.
- Reed, M. & Michaud, C. (2010). *Goal-driven lesson planning for teaching English to speakers of other languages*. Boston, MI: The University of Michigan Press.
- Richards, J. C. (2011). *Competence and performance in language teaching*. New York: Cambridge University Press.
- Richard, J. (2013). *Curriculum approaches in language teaching: Forward, central and backward design*. University of Sydney Australia: SAGE Publication.
- Richardson, F. & Woolfolk, R. (1980). Mathematics anxiety. In I.G. Sarason (Ed.), *Test anxiety: Theory, research and application*, 271-288. Hillsdale, NJ: Erlbaum.
- Risko, E. (2015). On the relation between math and spatial ability: The case of math anxiety. *Learning and Individual Differences*, 39, 1-12.
- Roberts, K. (2011). *Student Math anxiety test-mathipedia*. Retrieved from <http://www.mathipedia.com/student-math-anxiety-test.html>.
- Rossnan, S. (2006). Overcoming mathematics anxiety. *Mathitudes*, 1 (1), 1-4. Retrieved from <http://www.coe.fau.edu/mathitudes/Math%20Anxiety%20Research@20Paper%202.pdf>.

- Rubio, M. (2009). *Effective teachers-professional and personal skills*. en ENSAYOS, Revista de la Facultad de Educacion de Albacete. Retrieved from <http://www.uclm.es/ab/education/ensayos>.
- Ryegård, Å. (2010). *A Swedish perspective on pedagogical competence*. Uppsala: Uppsala University.
- Sevey, B. C. (2012). *Mathematics anxiety, working memory, and mathematics performance: Effectiveness of a working memory intervention on reducing mathematics anxiety*, (Thesis). Miami University, Miami University, Oxford, OH.
- Shaikh, S. N. (2013). Mathematics anxiety factors and their influence on performance in mathematics in selected international schools in Bangkok. *Journal of Education and Vocational Research*, 4, 3, 77-85.
- Shields, D. (2006) *Causes of Math anxiety: The student perspective* (Doctoral dissertation). Retrieved from ProQuest. (AAT3206656).
- Slavin, R., Lake, C., Chambers, B., Cheung, A. & Davis, S. (2009). *Effective beginning reading programs: A best-evidence synthesis*. Baltimore, MD: Johns Hopkins University, Center for Research and Reform in Education.
- Smadi, O. & Al-Ghazo, A. (2013). Jordanian teachers' attitudes towards foreign language teaching and their relationship to these teachers' classroom practices. *Journal of Education and Practice*, 4 (17), 62-86.
- Sparks, S. (2011). *Math Anxiety' explored in studies*. Retrieved from <http://search.proquest.com/docview/870749279?accountid=31259>.
- Taylor, A. & Vlastos (2009). *Linking Architecture and Education: Sustainable design for learning environments*. Albuquerque: University of New Mexico Press.
- Varsho, M., & Harrison, S. M. (2009). *Why some love math. Why some hate math*. Madison: University of Wisconsin.
- Virtudazo, N. (2012). *A comparative Sstudy on teacher and student anxiety in Mathematics: Basis for Intervention Program* (Unpublished master's thesis). University of Mindanao, Davao City.
- Witt, M. (2012). The impact of Mathematics anxiety on Primary School children's working memory. *Europe's Journal of Psychology*, 8(2), 263–274. doi:10.5964/ejop.v8i2.458.

Wong, H. K. & Wong, R. T. (2009). The first days of school: How to be an effective teacher. *Harry K. Wong Publications*, 12, 81, 87.





APPENDICES



APPENDIX A

Specific Items per Indicator for Table 1

Table 1.1
Pedagogical Competence of Math Teachers in Terms of Professional Ethics

Item The Math teachers in our school...	SD	Mean	Descriptive Level
treat students with respect, fairness and justice	1.00	3.94	High
communicate with students positively	0.98	3.89	High
follow the professional dress code	0.94	4.03	High
show wisdom to the information resources morally	1.01	3.87	High
show wisdom and patience while presenting the instruction	1.03	3.79	High
Overall	0.84	3.90	High

Table 1.2
Pedagogical Competence of Math Teachers in Terms of Planning

Item The Math teachers in our school...	SD	Mean	Descriptive Level
demonstrate knowledge of instructional strategies and choose those that match the needs and learning styles of students	0.94	3.76	High
plan clearly by stating precise, measurable, observable and relevant outcomes	0.91	3.77	High
prepare materials, resources and aids in advance and check them on time	0.99	3.76	High
plan taking into considerations individual differences among students	1.05	3.56	High
plan taking into consideration the previous learning of the students	0.96	3.86	High
Overall	0.77	3.74	High

Table 1.3
Pedagogical Competence of Math Teachers in Terms of Lesson Implementation

Item	SD	Mean	Descriptive Level
The Math teachers in our school...			
connect the previous learning with the new topic	0.98	3.98	High
use a wide range of learning strategies to facilitate teaching	0.96	3.76	High
use appropriate activities to facilitate student's learning	1.00	3.71	High
present and explain topics in an easy, understandable and interesting way	1.01	3.86	High
vary techniques according to students' level and the teaching learning situations	1.02	3.69	High
Overall	0.82	3.80	High

Table 1.4
Pedagogical Competence of Math Teachers in Terms of Classroom Environment and Management Skills

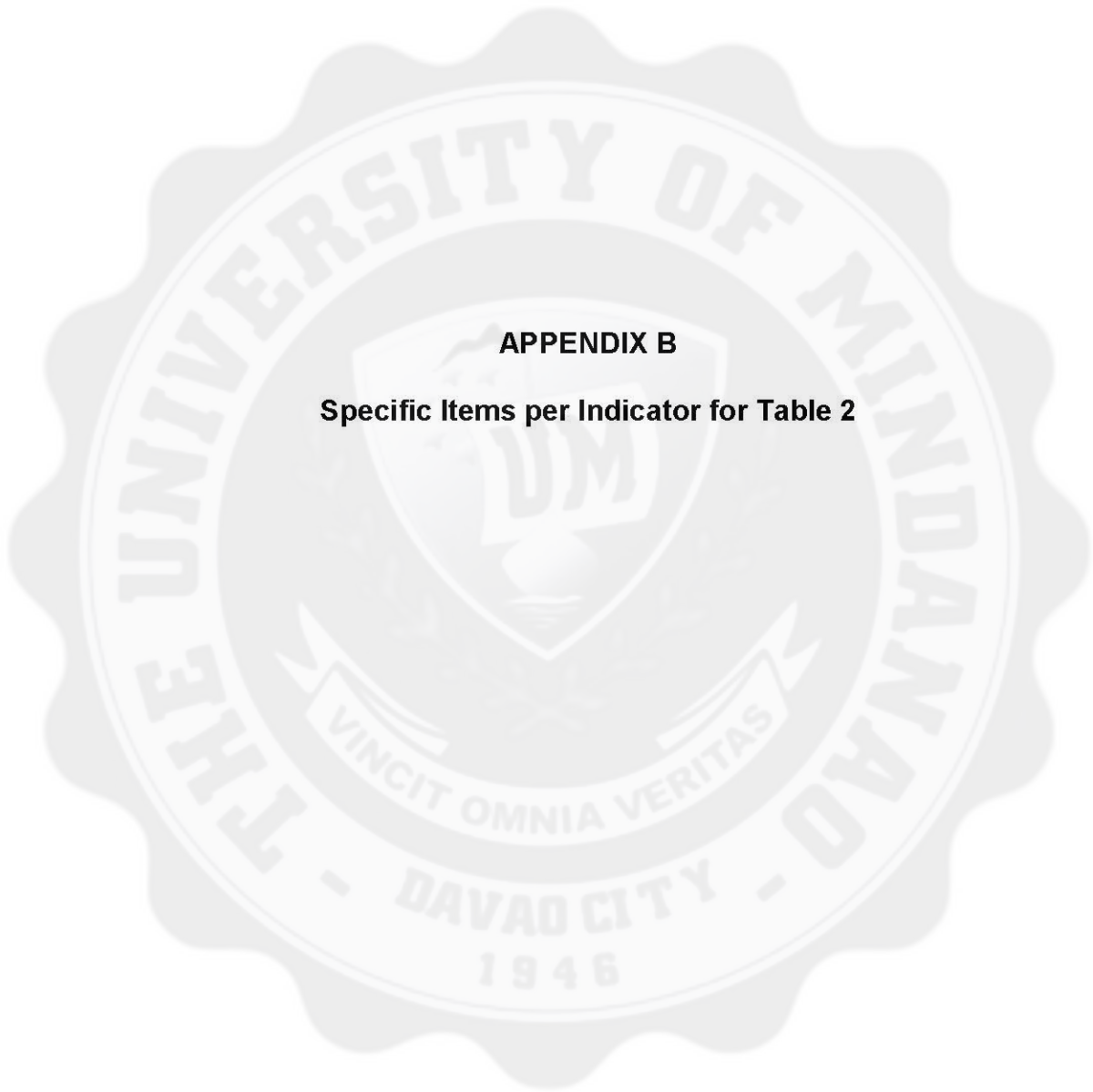
Item	SD	Mean	Descriptive Level
The Math teachers in our school...			
encourage and support students to learn by providing positive expectations of success	0.99	3.84	High
establish purposeful, task-oriented and relaxed classroom climate by using meaningful language	0.91	3.59	High
foster students' confidence and self-esteem	1.00	3.56	High
monitor, control and direct students' behaviors carefully and positively	1.01	3.73	High
care about the appearance and the layout of the class	0.96	3.77	High
Overall	0.80	3.70	High

Table 1.5
Pedagogical Competence of Math Teachers in Terms of Assessment and Evaluation

Item The Math teachers in our school...	SD	Mean	Descriptive Level
mark students' assignments thoroughly and return them regularly	1.05	3.54	High
use assessment as a tool to identify the areas of difficulties of instruction	0.98	3.72	High
reinforce correct responses immediately	0.92	3.80	High
give enough wait time after the question to give the students a chance to think about it	0.94	3.77	High
vary and use different types of questions	1.00	3.65	High
Overall	0.78	3.70	High

Table 1.6
Pedagogical Competence of Math Teachers in Terms of Reflection and Self-evaluation

Item The Math teachers in our school...	SD	Mean	Descriptive Level
ask for help from others like supervisor and peer teachers	1.26	3.18	Moderate
keep records of students' progress	1.04	3.76	High
encourage self-assessment use	1.05	3.61	High
encourage peer assessment use	0.04	3.67	High
correct mistakes when found in the textbooks	1.03	3.80	High
Overall	0.84	3.60	High



APPENDIX B

Specific Items per Indicator for Table 2

Table 2.1
Level Math Anxiety of the Students in terms of Physical and Emotional Factor

Item	SD	Mean	Descriptive Level
I get emotionally upset when doing or thinking about math (anger, crying, extreme frustration, etc.)	1.08	3.23	Moderate
I get sweaty or clammy hands when doing or thinking about math	1.02	3.19	Moderate
I have trouble sleeping after working on math or the night before math class or a math test	1.21	3.02	Moderate
I feel like I have to urinate more frequently when in math class or working on a math assignment or test	1.21	3.05	Moderate
I feel like I have no control over my grades in math	1.00	3.26	Moderate
I get headaches or neck stiffness when doing or thinking about math	1.09	3.17	Moderate
I feel my heart race when doing or thinking about math	1.15	3.13	Moderate
Overall	0.81	3.15	Moderate

Table 2.2
Level of Math Anxiety of the Students in terms of Assessment Factor

Item	SD	Mean	Descriptive Equivalent
I tend to do very poorly on math tests	0.94	3.19	Moderate
I feel like I need to prepare much for math tests than for other subjects	0.95	3.56	High
math tests are much more stressful to me than other tests	1.02	3.49	Moderate
I feel I understand certain math concepts in class but do poorly on tests	0.89	3.35	Moderate
I do not feel confident when taking math tests no matter how much I study	0.89	3.25	Moderate
I feel that I can't trust my intuition and often second guess myself during math tests	0.93	3.32	Moderate
during math tests, I find myself comparing my progress to those around me	0.99	3.25	Moderate
Overall	0.66	3.34	Moderate

Table 2.3
Level of Math Anxiety of the Students in terms of Social Factor

Item	SD	Mean	Descriptive Level
I feel that I will never be able to learn math no matter how hard I try	1.01	3.15	Moderate
I feel that others have a more “mathematical” or “logical” mind than I do	0.93	3.43	Moderate
my parents and/or friends tell me about their own struggles and frustrations with math	0.98	3.37	Moderate
I have math teachers that I really disliked for one reason or another	1.19	3.00	Moderate
I find myself worrying about other people’s math abilities and comparing them to my own	0.98	3.22	Moderate
I feel that although I am quite talented at some things, none of them help me with math	0.95	3.21	Moderate
I have been punished or embarrassed in math class for not understanding something	1.12	3.18	Moderate
Overall	0.70	3.22	Moderate



APPENDIX C
Research Instrument

**SURVEY QUESTIONNAIRE
PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY
OF STUDENTS**

Name: _____ School _____

General Instruction: Please evaluate the following variables in accordance to your personal observation and experience as a student involved in the teaching and learning process. Part I of this questionnaire deals on the Pedagogical Competence of Math Teachers while the Part II on Math Anxiety of the Students.

Please check the column that best describe your observation using the rating scale below.

5	Always	The item is manifested always.
4	Often	The item is manifested oftentimes.
3	Sometimes	The item is manifested sometimes
2	Seldom	The item is seldom manifested.
1	Never	The item is never manifested at all.

Part I. PEDAGOGICAL COMPETENCE OF MATH TEACHERS

1. Professional Ethics

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	treat students with respect, fairness and justice					
2.	communicate with students positively					
3.	follow the professional dress code					
4.	show wisdom to the information resources morally					
5.	show wisdom and patience while presenting the instruction					

2. Planning

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	demonstrate knowledge of instructional strategies and chooses those that match the needs and					

	learning styles of students					
2.	plan clearly by stating precise, measurable, observable and relevant outcomes					
3.	prepare materials, resources and aids in advance and check them on time					
4.	plan taking into considerations individual differences among students					
5.	plan taking into consideration the previous learning of the students					

3. Lesson Implementation

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	connect the previous learning with the new topic					
2.	use a wide range of learning strategies to facilitate teaching					
3.	use appropriate activities to facilitate student's learning					
4.	present and explain topics in an easy, understandable and interesting way					
5.	vary techniques according to students' level and the teaching learning situations					

4. Classroom Environment and Management Skills

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	encourage and support students to learn by providing positive expectations of success					
2.	establish purposeful, task-oriented and relaxed classroom climate by using meaningful language					
3.	foster students' confidence and self-esteem					
4.	monitor, control and direct students' behaviors carefully and positively					

5.	care about the appearance and the layout of the class					
----	---	--	--	--	--	--

5. Assessment and Evaluation

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	mark students' assignments thoroughly and return them regularly					
2.	use assessment as a tool to identify the areas of difficulties of instruction					
3.	reinforce correct responses immediately					
4.	give enough wait time after the question to give the students a chance to think about it					
5.	vary and use different types of questions					

6. Reflection and Self-evaluation

No.	The Math teachers in our school...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	ask for help from others like supervisor and peer teachers					
2.	keep records of students' progress					
3.	encourage self-assessment use					
4.	encourage peer assessment use					
5.	correct mistakes when found in the textbooks					

Adopted from: Smadi and Al-ghazo (2013)

Part II. MATH ANXIETY OF STUDENTS

5	Always	The item is experienced always.
4	Often	The item is often experienced.
3	Sometimes	The item is experienced sometimes.
2	Seldom	The item is seldom experienced.
1	Never	The item is never manifested at all.

1. Physical and Emotional Factors

No.	As a student...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	I get emotionally upset when doing or thinking about math (anger, crying, extreme frustration, etc.)					
2.	I get sweaty or clammy hands when doing or thinking about math					
3.	I have trouble sleeping after working on math or the night before math class or a math test					
4.	I feel like I have to urinate more frequently when in math class or working on a math assignment or test					
5.	I feel like I have no control over my grades in math					
6.	I get headaches or neck stiffness when doing or thinking about math					
7.	I feel my heart race when doing or thinking about math					

2. Assessment Factors

No.	As a student...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	I tend to do very poorly on math tests					
2.	I feel like I need to prepare much for math tests than for other subjects					

3	math tests are much more stressful to me than other tests					
4.	I feel I understand certain math concepts in class but do poorly on tests					
5.	I do not feel confident when taking math tests no matter how much I study					
6.	I feel that I can't trust my intuition and often second guess myself during math tests					
7.	during math tests, I find myself comparing my progress to those around me					

3. Social Factors

No.	As a student...	Always 5	Often 4	Sometimes 3	Seldom 2	Never 1
1.	I feel that I will never be able to learn math no matter how hard I try					
2.	I feel that others have a more "mathematical" or "logical" mind than I do					
3.	my parents and/or friends tell me about their own struggles and frustrations with math					
4.	I have math teachers that I really disliked for one reason or another					
5.	I find myself worrying about other people's math abilities and comparing them to my own					
6.	I feel that although I am quite talented at some things, none of them help me with math					
7.	I have been punished or embarrassed in math class for not understanding something					

Source: Students math Anxiety Test-Mathipedia by Roberts (2011)

**THANK YOU AND GOD BLESS!
RECHELYN G. SALEM**



APPENDIX D

Letters to Validators



UM

The University of Mindanao

Professional School

Matina, Davao City

Phone # (082) 227 - 5456 local 120

DR. ANA RAISSA T. TRINIDAD
Faculty Member
Graduate School
Um Davao City

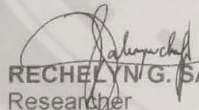
Dear Ma'am:

The undersigned is currently conducting a study entitled "**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS**" as partial fulfillment of the requirements in Educational Research (GS 200) for school year 2016-2017.


In line with this, you are chosen as one of the expert validators of my questionnaire, which will be used in my study. Your expertise is highly appreciated by rating the content. Please feel free to write your comments, suggestions and recommendations that will improve the questionnaire.

Your positive response is highly appreciated.

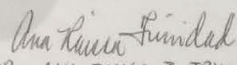
Very truly yours,


RECHELYN G. SALEM
Researcher

Approved:


ELIZABETH MALONZO, Ph.D.
Adviser

Accepted by:


DR. ANA RAISSA T. TRINIDAD
Validator

For release


UM

The University of Mindanao

Professional School

 Matina, Davao City
 Phone # (082) 227 - 5456 local 120

GLORIA P. GEMPES, Ed., D.M.

 Faculty Member
 Graduate School
 Um Davao City


Dear Ma'am:

The undersigned is currently conducting a study entitled "**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS**" as partial fulfillment of the requirements in Educational Research (GS200) for school year 2016-2017.

In line with this, you are chosen as one of the expert validators of my questionnaire, which will be used in my study. Your expertise is highly appreciated by rating the content. Please feel free to write your comments, suggestions and recommendations that will improve the questionnaire.

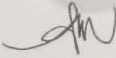
Your positive response is highly appreciated.

Very truly yours,


RECHELYN G. SALEM
 Researcher

Accepted by:

Approved:


ELIZABETH MALONZO, Ph.D.
 Adviser

GLORIA GEMPES, Ed., D.M.
 Validator



UM

The University of Mindanao

Professional School

Matina, Davao City
Phone # (082) 227 - 5456 local 120

DR. RINANTE GENUBA

Faculty Member
Graduate School
Um Davao City

Dear Sir:

The undersigned is currently conducting a study entitled "**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS**" as partial fulfillment of the requirements in Educational Research (GS 200) for school year 2016-2017.

In line with this, you are chosen as one of the expert validators of my questionnaire, which will be used in my study. Your expertise is highly appreciated by rating the content. Please feel free to write your comments, suggestions and recommendations that will improve the questionnaire.

Your positive response is highly appreciated.

Very truly yours,

RECHELYN G. SALEM
Researcher

Approved:

ELIZABETH MALONZO, Ph.D.
Adviser

Accepted by:

DR. RINANTE GENUBA
Validator



Professional School

Matina, Davao City
Phone # (082) 227 - 5456 local 120

DR. BAINORIE A. MANTAWIL
Dean
College of Education
CFCST, Doroluman, Arakan, Cotabato


Dear Ma'am:

The undersigned is currently conducting a study entitled "*PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS*" as partial fulfillment of the requirements in Thesis Writing (GS 300) for school year 2017-2018.

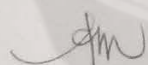
In line with this, you are chosen as one of the expert validators of my questionnaire, which will be used in my study. Your expertise is highly appreciated by rating the content. Please feel free to write your comments, suggestions and recommendations that will improve the questionnaire.

Your positive response is highly appreciated.

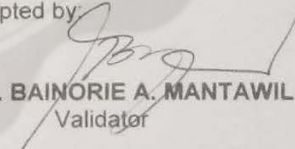
Very truly yours,


RECHELYN G. SALEM
Researcher

Approved:


ELIZABETH MALONZO, Ph.D.
Adviser

Accepted by:


DR. BAINORIE A. MANTAWIL
Validator



UM

The University of Mindanao

Professional School

Matina, Davao City
Phone # (082) 227 - 5456 local 120

EUGENIO S. GUHAO, JR. D.M.
Dean
Graduate School
Um Davao City

*Where are
you adapted
questionnaire?
E.S.G.*


Dear Sir:

The undersigned is currently conducting a study entitled "**PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS**" as partial fulfillment of the requirements in Thesis Writing (GS 300) for school year 2017-2017.


In line with this, you are chosen as one of the expert validators of my questionnaire, which will be used in my study. Your expertise is highly appreciated by rating the content. Please feel free to write your comments, suggestions and recommendations that will improve the questionnaire.

Your positive response is highly appreciated.

Very truly yours,


RECHELYN G. SALEM
Researcher

Approved:


ELIZABETH MALONZO, Ph.D.
Adviser

Accepted by:

EUGENIO S. GUHAO, JR. D.M.
Validator



APPENDIX E

Validation Sheet for Research Instrument



PROFESSIONAL SCHOOLS

[] Main [] Branch _____

VALIDATION SHEET FOR RESEARCH QUESTIONNAIRE

Name of Evaluator : Dr. Gempes
 Degree : EdD, DM
 Position : _____
 Number of Years of Teaching : _____
 To the Evaluator : _____
 Points of Equivalent : _____

Please check the appropriate box for your ratings
 5 - Excellent 2 - Fair
 4 - Very Good 1 - Poor
 3 - Good

ITEMS	1	2	3	4	5
1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.			✓		
2. Presentation and Organization of Items The items are presented and organized in logical manner.			✓		
3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.			✓		
4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.			✓		
5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.			✓		
6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.			✓		
7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.			✓		

Title of the Research Questionnaire: PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS

Name of Researcher: RECHELYN E. SALEM

Date of Evaluation of the Questionnaire: _____

Remarks of the evaluator: Reduce the no. of items per item indicator. Select the most important ones. Ask help/advice

Appropriate external validation?

Signature Above Printed Name



PROFESSIONAL SCHOOLS

[] Main [] Branch _____

VALIDATION SHEET FOR RESEARCH QUESTIONNAIRE

Name of Evaluator :
 Degree :
 Position :
 Number of Years of Teaching :
 To the Evaluator :
 Points of Equivalent :

DR. GUHAD

Please check the appropriate box for your ratings

- 5 - Excellent 2 - Fair
- 4 - Very Good 1 - Poor
- 3 - Good

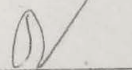
ITEMS	1	2	3	4	5
1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.			/		
2. Presentation and Organization of Items The items are presented and organized in logical manner.			/		
3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.			/		
4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.			/		
5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.			/		
6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.			/		
7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.			/		

Title of the Research Questionnaire: PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS


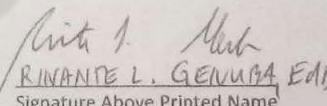
Name of Researcher: RECHELYN G. SALEM

Date of Evaluation of the Questionnaire: _____

Remarks of the evaluator: _____



 Signature Above Printed Name

 PROFESSIONAL SCHOOLS [] Main [] Branch _____																																																	
VALIDATION SHEET FOR RESEARCH QUESTIONNAIRE																																																	
Name of Evaluator :	<u>Dr. Genuba</u>																																																
Degree :	<u>Doctor of Education</u>																																																
Position :	<u>Prof II</u>																																																
Number of Years of Teaching :	<u>19</u>																																																
To the Evaluator :	Please check the appropriate box for your ratings																																																
Points of Equivalent :	5 - Excellent 2 - Fair 4 - Very Good 1 - Poor 3 - Good																																																
<table border="1"> <thead> <tr> <th>ITEMS</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td> 1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 2. Presentation and Organization of Items The items are presented and organized in logical manner. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td> 7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items. </td> <td></td> <td></td> <td></td> <td>✓</td> <td></td> </tr> </tbody> </table>		ITEMS	1	2	3	4	5	1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.				✓		2. Presentation and Organization of Items The items are presented and organized in logical manner.				✓		3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.				✓		4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.				✓		5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.				✓		6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.				✓		7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.				✓	
ITEMS	1	2	3	4	5																																												
1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.				✓																																													
2. Presentation and Organization of Items The items are presented and organized in logical manner.				✓																																													
3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.				✓																																													
4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.				✓																																													
5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.				✓																																													
6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.				✓																																													
7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.				✓																																													
Title of the Research Questionnaire :	<u>PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS</u>																																																
Name of Researcher:	<u>RECHELYN C SALEM</u>																																																
Date of Evaluation of the Questionnaire:	<u>3/25/17</u>																																																
Remarks of the evaluator:	<u>OK for administration</u>																																																
 RIVANNE L. GENUBA EdD Signature Above Printed Name																																																	



PROFESSIONAL SCHOOLS

[] Main [] Branch _____

VALIDATION SHEET FOR RESEARCH QUESTIONNAIRE

Name of Evaluator : BANORIE A. MANTAWIL, EdD
 Degree : EdD
 Position : ASST. PROF I
 Number of Years of Teaching : 13
 To the Evaluator : _____
 Points of Equivalent : _____

Please check the appropriate box for your ratings

5 - Excellent 2 - Fair
 4 - Very Good 1 - Poor
 3 - Good

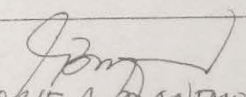
ITEMS	1	2	3	4	5
1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.				/	
2. Presentation and Organization of Items The items are presented and organized in logical manner.				/	
3. Suitability of Items The item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.				/	
4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.					/
5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.					/
6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.					/
7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.				/	

Title of the Research Questionnaire : PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS

Name of Researcher : RECHELYN G. SALEM

Date of Evaluation of the Questionnaire : 11/28/17

Remarks of the evaluator: _____


BANORIE A. MANTAWIL
 Signature Above Printed Name



PROFESSIONAL SCHOOLS

[] Main [] Branch _____

VALIDATION SHEET FOR RESEARCH QUESTIONNAIRE

Name of Evaluator : Dr. Trinidad
 Degree : _____
 Position : _____
 Number of Years of Teaching : _____
 To the Evaluator : _____
 Points of Equivalent : _____

Please check the appropriate box for your ratings

5 - Excellent 2 - Fair
 4 - Very Good 1 - Poor
 3 - Good

ITEMS	1	2	3	4	5
1. Clarity of Directions and Items The vocabulary level, language, structure and conceptual level of questions suit the level of participants. The directions and the items are written in a clear and simple language.				✓	
2. Presentation and Organization of Items The items are presented and organized in logical manner.					✓
3. Suitability of Items The Item is appropriate and represents the substance of the research. The questions are designed to determine the conditions, knowledge, perception and attitudes that are supposed to be measured.					✓
4. Adequateness of Items per Category or Indicator The items represent the coverage of research adequately. The questions per area category are adequate representations of all the questions needed for research.					✓
5. Attainment of Purpose The instrument fulfills the objectives for which it was constructed.					✓
6. Objectivity Each item questions only one specific answer or measures only one behavior and no aspect of the questionnaire is a suggestion of the researcher.					✓
7. Scale and Evaluation Rating Scale The scale adapted is appropriate for the items.					✓

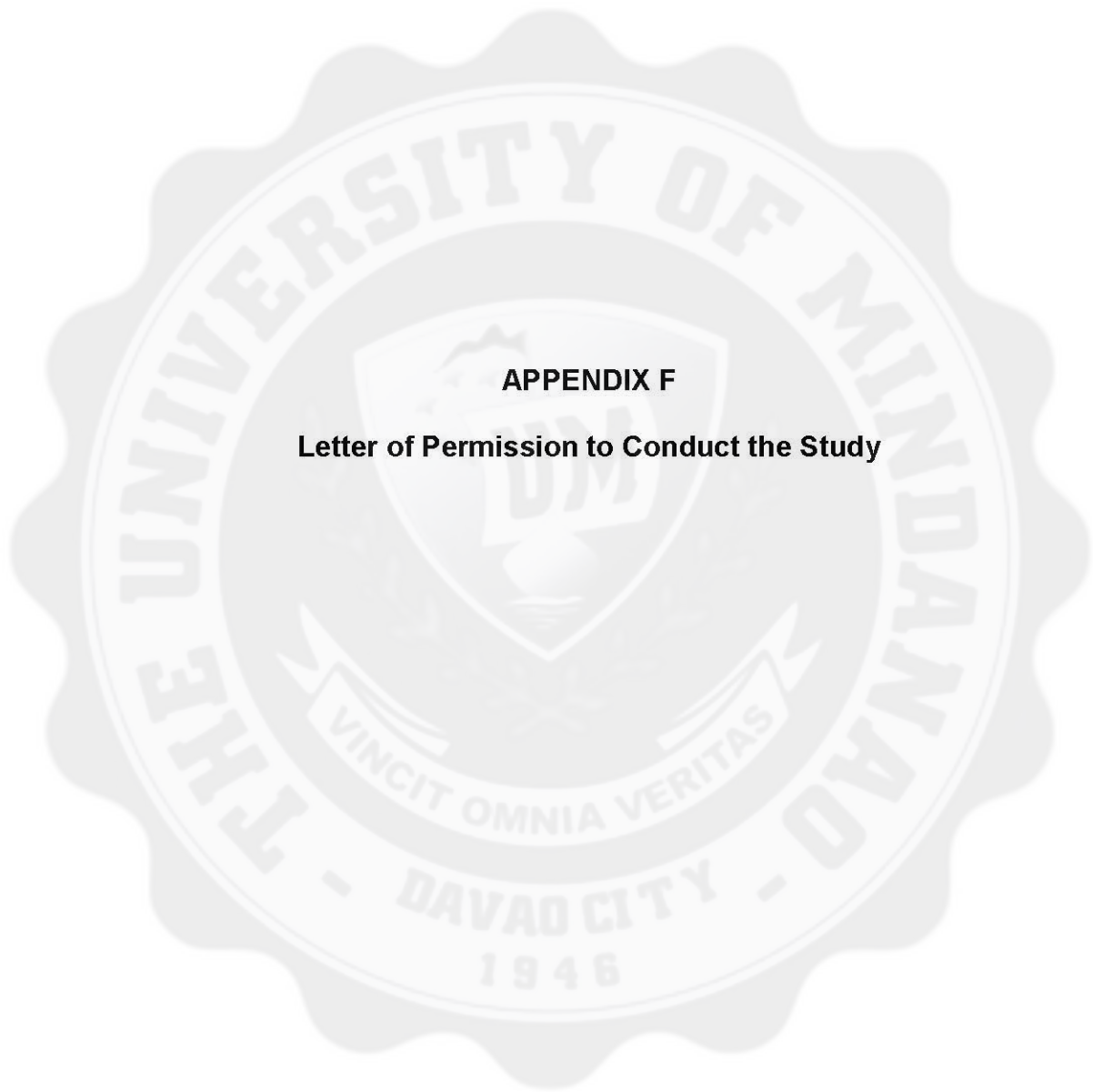
Title of the Research Questionnaire : PEPAGOGICAL COMPETENCE OF MATH TEACHERS AND
MATH ANXIETY OF STUDENTS

Name of Researcher: RECHELYN G. SALTEM

Date of Evaluation of the Questionnaire: _____

Remarks of the evaluator: _____

Ana Raissa Trinidad
 ANA RAISSA T. TRINIDAD
 Signature Above Printed Name



APPENDIX F

Letter of Permission to Conduct the Study

June 15, 2017

OMAR A. OBAS, CESO VI
 Schools Division Superintendent
 North Cotabato

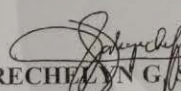
Dear **Dr. Obas**:

The undersigned is currently working on her thesis entitled "**Pedagogical Competence of Math Teachers and Math Anxiety of the Students**" as a requirement for the degree of **Master of Arts in Education major in Mathematics**.

In this regard, the researcher would like to request your approval to conduct the study in your area of responsibility. Also, the confidentiality of the data will be an utmost priority. Please find attached sample of questionnaire/interview guide to be distributed to the respondents.

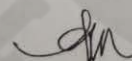
Looking forward for your favorable response on the said request.

Respectfully yours,



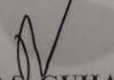
RECHELYN G. SALEM
 Researcher

Noted by:




ELIZABETH MALONZO, PhD
 Research Adviser

Approved by:



EUGENIO S. GUHAO, JR., D.M.
 Dean, Graduate School

Approved:



OMAR A. OBAS, CESO VI
 Schools Division Superintendent

APPENDIX G
Certificate of Appearance





Republic of the Philippines
DEPARTMENT OF EDUCATION
Region XII
COTABATO DIVISION
Capitol Compound, Amas, Kidapawan City
MALIBATUAN HIGH SCHOOL
Malibatuan, Arakan, Cotabato

Tayo
PARA SA
EDUKASYON

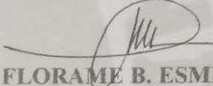
Oct. 12, 2017
Date

CERTIFICATE OF APPERANCE

TO WHOM IT MAY CONCERN:

THIS IS TO CERTIFY that RECHELYN G- SALEM s of
CFCST appeared in this school, on October 12, 2017 for the
following purpose/s:

1. To conduct study
2. _____


FLORAME B. ESMERALDA
Principal I



Republic of the Philippines
Department of Education
Region XII
Cotabato Division
MARCIANO DAHAN HIGH SCHOOL
Doroluman, Arakan, Cotabato

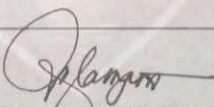


CERTIFICATE OF APPEARANCE

TO WHOM IT MAY CONCERN:

This is to certify that RECHELYN G. SALEM of CFCST appeared at Marciano Dahan High School on Nov. 14, 2017 for the following purpose/s:

1. Conduct Study
2. _____


LUCIA Q. LAMPON, Ed.D.
Principal I





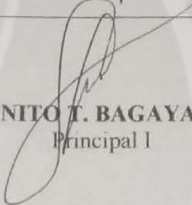
Republic of the Philippines
Department of Education
Region XII
BADIANGON HIGH SCHOOL
Arakan, Cotabato

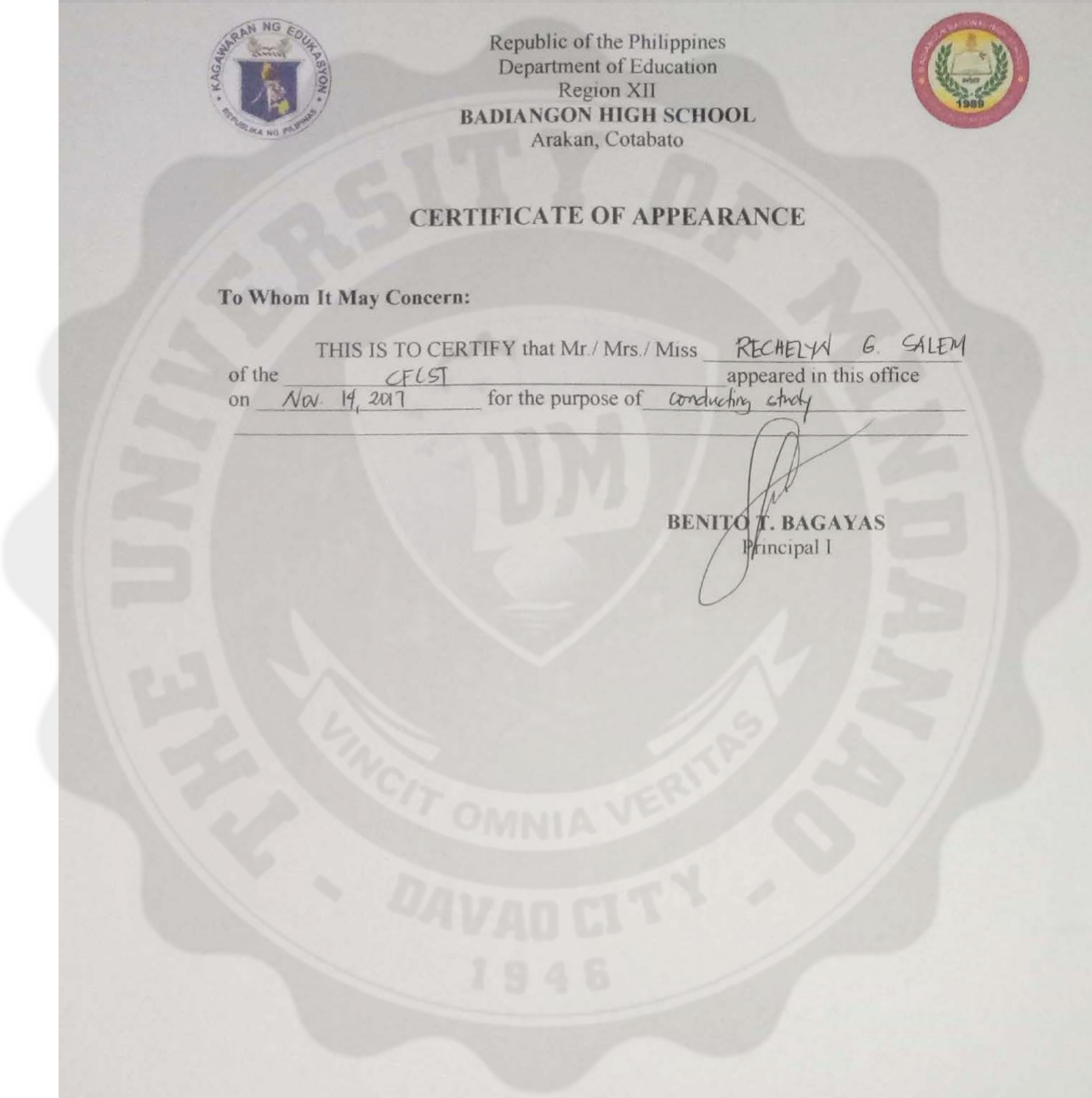


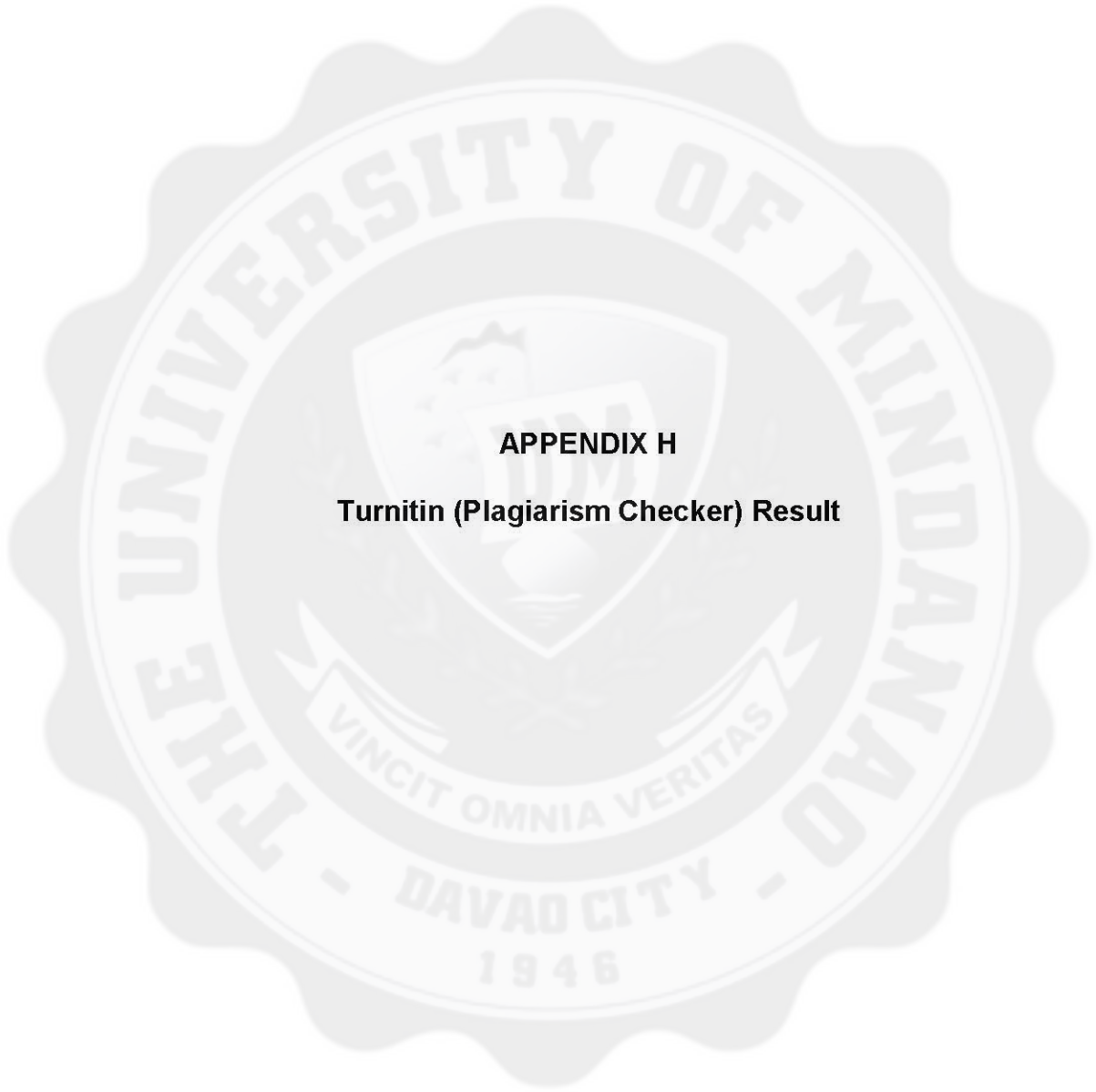
CERTIFICATE OF APPEARANCE

To Whom It May Concern:

THIS IS TO CERTIFY that Mr./ Mrs./ Miss RECHELYN G. SALEM
of the CELT appeared in this office
on Nov. 14, 2017 for the purpose of conducting study


BENITO T. BAGAYAS
Principal I





APPENDIX H

Turnitin (Plagiarism Checker) Result



Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author: Rechelyn G. Salem
 Assignment title: AY 2017-2018
 Submission title: PEDAGOGICAL COMPETENCE OF...
 File name: SALEM.docx
 File size: 492.83K
 Page count: 55
 Word count: 12,520
 Character count: 71,191
 Submission date: 04-Aug-2018 10:00AM (UTC+0800)
 Submission ID: 987393136

PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS
 RECHELYN G. SALEM

ABSTRACT

This study primarily aimed to determine which domain in the pedagogical competence of math teachers significantly influences math anxiety of students with null hypothesis. There is no significant relationship between the pedagogical competence of math teachers and math anxiety of students, and there is no domain in the pedagogical competence that significantly influences math anxiety of students. Qualitative non-experimental design was used employing the correlation technique. An adapted-modified questionnaire validated by the experts was used in gathering the data. The respondents of the study were the 284 Grade 10 students in Arakan district, North Cotabato during the school year 2017-2018 by stratified random sampling procedure through Slovin's Formula. Mean, Pearson's r and Regression were the statistical tools employed in the analysis and interpretation of the data. Results revealed that the pedagogical competence of math teachers was high while the math anxiety of the students was moderate. Also, it was found that pedagogical competence of math teachers and math anxiety of the students had a significant relationship but among the domains used in pedagogical competence of math teachers, there is no domain that best influences math anxiety of students.

Keywords: education, pedagogical competence, math anxiety, Philippines

PEDAGOGICAL COMPETENCE OF MATH TEACHERS AND MATH ANXIETY OF STUDENTS

ORIGINALITY REPORT

13%

SIMILARITY INDEX

9%

INTERNET SOURCES

3%

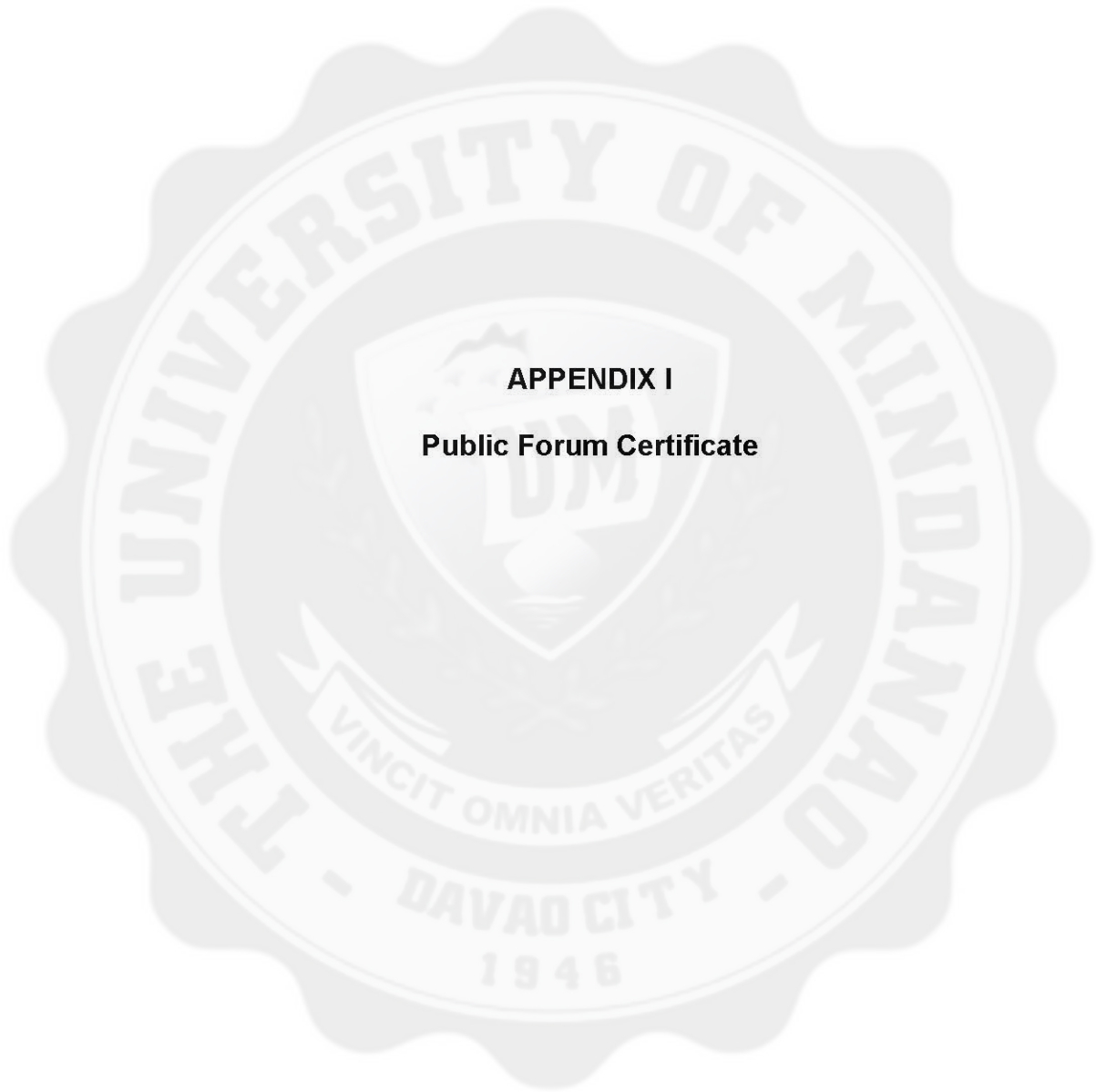
PUBLICATIONS

4%

STUDENT PAPERS

PRIMARY SOURCES

1	de.slideshare.net Internet Source	1%
2	www.ijbssnet.com Internet Source	1%
3	Submitted to Concordia University Student Paper	1%
4	Submitted to University of Perpetual Help Sytem Laguna Student Paper	1%
5	my.unisa.ac.za Internet Source	1%
6	bentonenglish.com Internet Source	<1%
7	Submitted to American University of Iraq Student Paper	<1%
8	Siti Jasmida Jamil, Shakila Saad, Wan Nurhadani Wan Jaafar, Nooraihan Abdullah. "An of investigation of mathematics anxiety	<1%



APPENDIX I

Public Forum Certificate





APPENDIX J
UMERC Certification



UMERC


University of Mindanao Ethics Review Committee

Compliance Certificate
for Study Ethics Protocol Review
Control No.: A107-0805-2017

This is to certify that the study entitled "**Pedagogical Competence of Math Teachers and Math Anxiety of Students**" by **RECHELYN G. SALEM**, a candidate of Master of Arts in Education major in Teaching Math of the University of Mindanao Graduate School, has been examined by the University of Mindanao Ethics Review Committee (UMERC) and has been evaluated to have adequately complied the requirements for the study ethics protocol and is therefore, cleared for implementation using universally accepted scientific procedures and internationally accepted ethical guidelines.

Given this 18th day of November 2017 at the UMERC Office, PS Building, Davao City, Philippines.

VICENTE SALVADOR E. MONTAÑO, DBA
Chair, Ethics Review Committee



APPENDIX K
Editor's Certification





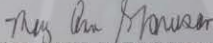
Professional Schools
Ground Floor, PS Building
Matina, Davao City
Telephone: (082) 297-6115

CERTIFICATION

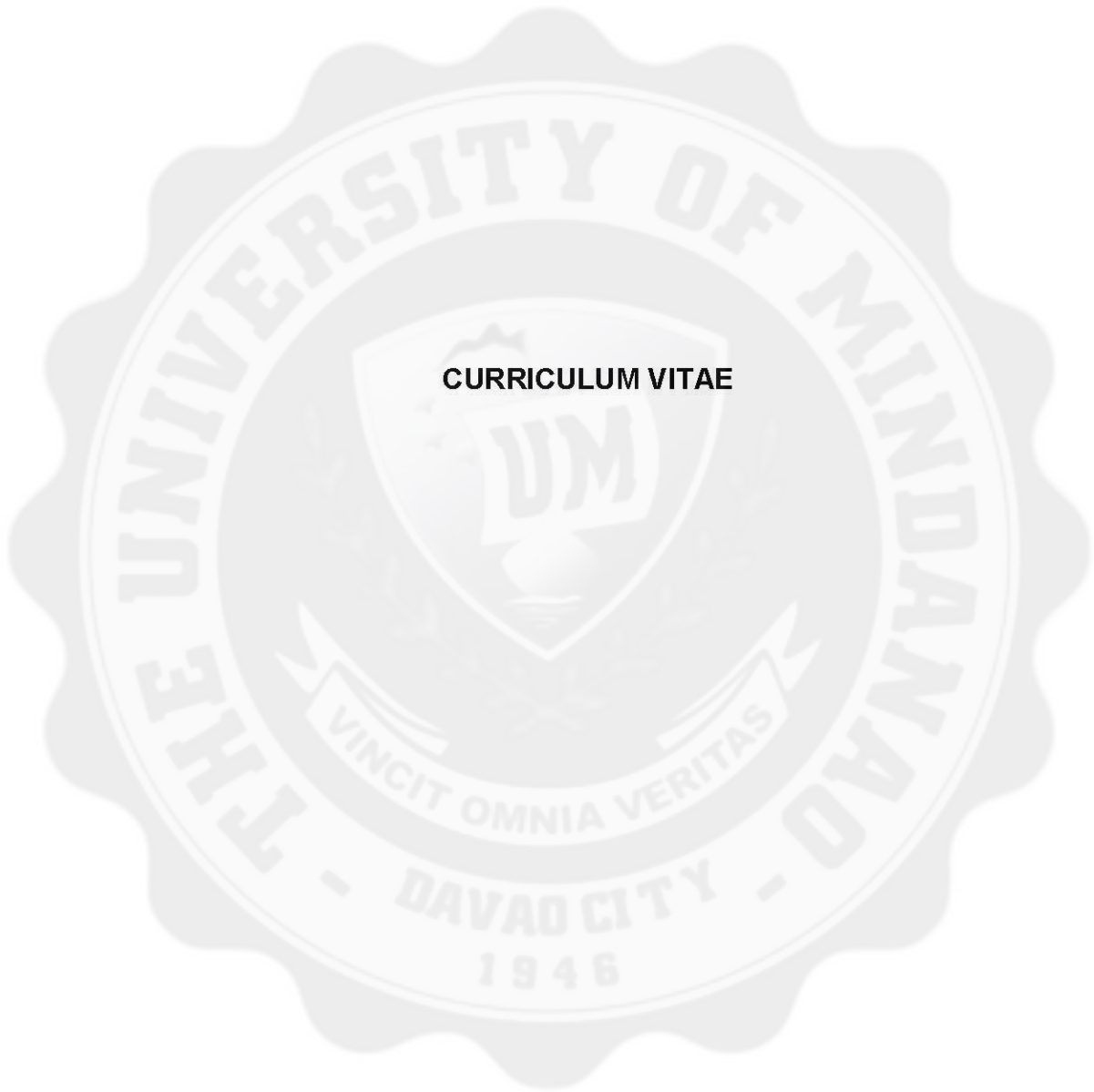
To Whom It May Concern:

This is to certify that the manuscript of **MS. RECHELYN G. SALEM**, entitled, "**Pedagogical Competence of Math Teachers and Math Anxiety of Students**" has been checked and edited by the undersigned.

This certification is issued on September 1, 2018.


MARY ANN E. TARUSAN, Ph.D.
Reader

CURRICULUM VITAE





PERSONAL INFORMATION

Name: **SALEM, RECHELYN GARINO**

Address: Naje, Arakan, Cotabato

Cellphone No.: 09099455232

Email Address: rechtsalem27@gmail.com

ORCID ID: 0000-0003-4144-4815

Date of Birth: July 27, 1993

Place of Birth: Sarmiento, Parang, Maguindanao

Age: 25

Address: Naje, Arakan, North Cotabato

Height: 5'0

Weight: 42 Kgs.

Blood Type: O

Occupation: Teaching

Civil Status: Single

Religion: Christian- Wesleyan Church of the Philippines

Father's Name: Efren Guhiling Salem

Mother's Name: Roquita Valaquio Garino-Salem

EDUCATIONAL BACKGROUND

LEVEL	SCHOOL	YEAR GRADUATED
Elementary:	Doroluman Central Elementary School	2005-2006
Secondary:	Ilustre High School	2009-2010
College:	Cotabato Foundation College of Science and Technology	2013-2014
Course:	Bachelor in Secondary Education	
Major:	Mathematics	
Master's Degree:	University of Mindanao, Davao City	2017-2018

CAREER SERVICE ELIGIBILITY

LICENSURE EXAMINATION FOR TEACHERS (LET) 83.40%

EMPLOYABILITY RECORD AND WORK EXPERIENCE

- INSTRUCTOR I, Cotabato Foundation College of Science and Technology (2017-Present)
- Mathematics Society Adviser (Present)
- Mathematics Extension Coordinator (2017-Present)

- Teacher I, DepEd-Badiangon High School (2015-2017)
- BHS Designate Disbursing Officer (2015-2017)
- BHS E-SIP Coordinator ((2015-2017)
- BHS Adopt-a-school Coordinator (2015-2017)
- BHS School Monitoring Evaluation Plan and Adjustment Coordinator (2015-2017)
- BHS School Best Management Coordinator (2015-2017)
- BHS Math Club Adviser (2015-2017)
- BHS School Paper Adviser (2015-2017)
- Contract of Service Instructor, Cotabato Foundation College of Science and Technology (2014-2015)

SEMINAR-WORKSHOP AND TRAININGS ATTENDED

- Training On General Education Courses (Mathematics)Teacher 2018
- Seminar-Workshop On Research Ethics, Project Proposal And Extension
- Mathematical Society Of The Philippines Annual Convention (MSP) 2018
- Summer Upgrading Program For College Mathematics Teachers (SUMCOM) 2018
- Division Seminar-Workshop For School Paper Advisers 2017
- International Research Fair For Graduate Education Series No.5
- Division Roll-Out On The Crafting Of Enhanced School Improvement Plan (E-SIP)

- Grade 10 Mass Training Of Teachers (MTOT) For K To 12 Basic Education Program (Mathematics)

