

**THE RELATIONSHIP BETWEEN ATTITUDE AND ANXIETY TOWARDS
PERFORMANCE IN MATHEMATICS PROBLEM SOLVING AMONG
PRIMARY SCHOOL STUDENTS**

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A project report submitted in partial fulfilment of the
requirements for the award of the degree of
Master of Education (Educational Psychology)

School of Education
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AUGUST 2021

DEDICATION

This project report is dedicated to my wife, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my parents, who taught me that even the largest task can be accomplished if it is done one step at a time.

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to several individuals for supporting and encouraging me throughout accomplishing this project paper. They have contributed towards my understanding and thoughts. In particular, I wish to express my sincere appreciation to my project report supervisor Dr Mohd Rustam Mohd Rameli, for encouragement, guidance, critics, patience, insightful comments and unceasing ideas which have helped me tremendously at all time in my research and writing of this project report. His immense knowledge, profound experience and professional expertise in the field of psychology has enabled me to complete this research successfully. I am thankful to him for his precious time in guiding me, answering my queries, correcting and improving my progress throughout the project report. Without his guidance and relentless help, this project report would not have been possible.

In addition to that, I would like to thank my pillar of strength, my wife, Ms Ravathi for encouraging and motivating me throughout the journey of completing this paper. Apart from that, I also wish to express my deepest thanks to my parents, siblings and friends. Their unwavering support and encouragement are my source of strength. Last but not least, I am grateful to the Almighty God for the abundant blessings and unfailing love for me. This research was only possible with God's amazing grace and steadfast love.

ABSTRACT

Mathematics is an essential component of human reasoning and cognition. Mathematics is a great technique to develop mental discipline while also encouraging logical thinking and mental discipline. Although this subject helps students in many ways, but not all students have a good mathematics problem-solving ability. There are several potential contributing factors of the students' low mathematic problem-solving skills includes students' attitude and anxiety. This study was conducted to identify the relationship between attitudes and anxiety towards mathematics problem-solving achievement. A quantitative approach was used to conduct this study whereby a total of 664 respondents of Year 5 pupils primary school students were chosen to be the respondents of the study. Three types of instruments which is Instrument Measuring Attitude (Mathematic Attitude Scale), Instrument Measuring Anxiety (Mathematic Anxiety Scale), and Instrument Measuring Performance (Mathematics Problem Solving Test) were used in this study. The data obtained were analyzed using descriptive and inferential analysis, The analysis of the level of attitude and anxiety had resulted with students agreeing with both part which explains that the primary school students are well aware on their attitude and anxiety towards mathematics problem solving. The performance in mathematics problem solving among primary school students are recorded at high level. The results also show that attitude and anxiety are the significant predictor of mathematics problem solving performance among primary school students. Thus, both the attitude and anxiety among primary students will has great influence in students' performance in mathematics problem solving.

ABSTRAK

Matematik adalah komponen penting dalam penaklukan dan kognisi manusia. Matematik adalah teknik yang baik untuk mengembangkan disiplin mental di samping mendorong pemikiran logik dan disiplin mental. Walaupun subjek ini menolong pelajar dalam pelbagai cara, tetapi tidak semua pelajar mempunyai kemahiran penyelesaian masalah Matematik yang baik. Terdapat beberapa faktor yang menyumbang kepada rendahnya kemahiran penyelesaian masalah Matematik termasuklah sikap dan keresahan pelajar. Kajian ini dijalankan untuk menentukan hubungan antara sikap dan keresahan terhadap pencapaian penyelesaian masalah Matematik. Pendekatan kuantitatif digunakan untuk menjalankan kajian ini di mana seramai 664 responden murid Tahun 5 dari sekolah rendah dipilih untuk menjadi responden kajian. Tiga jenis instrumen iaitu Instrumen Mengukur Sikap (Skala Sikap Matematik), Instrumen Mengukur Keresahan (Skala Keresahan Matematik), dan Instrumen Mengukur Prestasi (Ujian Penyelesaian Masalah Matematik) digunakan dalam kajian ini. Data yang diperolehi dianalisis menggunakan analisis deskriptif dan inferensi. Analisis tahap sikap dan keresahan berlaku dengan pelajar bersetuju dengan kedua-dua bahagian tersebut yang menjelaskan bahawa pelajar sekolah rendah sangat mengetahui sikap dan keresahan mereka terhadap penyelesaian masalah dalam matematik. Prestasi dalam penyelesaian masalah matematik dalam kalangan pelajar sekolah rendah dicatatkan pada tahap tinggi. Hasil kajian juga menunjukkan bahawa sikap dan keresahan merupakan peramal signifikan terhadap prestasi penyelesaian masalah matematik dalam kalangan pelajar sekolah rendah. Oleh itu, kedua-dua sikap dan keresahan dalam kalangan pelajar sekolah rendah akan mempengaruhi prestasi pelajar dalam penyelesaian masalah Matematik.

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LIST OF ABBREVIATIONS

ABC	-	A (Affective), B (Behavior), C (Cognition)
ATM	-	Attitude Toward Mathematics
ATMI	-	Attitude Toward Mathematics Inventory
CI	-	Cognitive Interference
DOTS	-	Detect, Organize, transform and Solve
MAS	-	Mathematic Attitude Scale
MTAQ	-	Mathematics Teacher Approaches Questionnaire

LIST OF SYMBOLS

SD	-	Standard Deviation
<i>M</i>	-	Median
f	-	Frequency
%	-	Percentage

CHAPTER 1

INTRODUCTION

1.1 Introduction

In each curriculum, education helps students think and be accountable for their decisions (Jumaita, 2017). Through the process of learning mathematics, mindset and way of thinking can be established because mathematics is a means of thinking, methods of rational thinking, structure, and relations between the strong and simple conception (Jumaita, 2017; Hoon& Singh, 2013; Reiss &Renkl, 2002). Therefore, educator's no longer question that mathematics can educate everyone's ability to think appropriately so that it can be an effective problem solver, as mathematics functions as a method for problem solving (Alan, 2016).

Mathematics is the core subject in secondary school which is also an important subject in Malaysia primary school. Mathematics is a subject which believes helps in developing critical and analytical thinking (Anderson, 2009). Previous researchers have raised their opinions in several studies saying that problem solving in Mathematics is an important factor which plays important role in students' development. For example, Mustafa Aydogdu (2009) has stated on his result, problem solving in Mathematics is very important because it develops logical thinking as well enables the students to construct their own idea to solve mathematics questions. Besides that, it is also building the confidence to solve their life issues by developing life skills (Mustafa Aydogdu, 2009; Ajisuksmo&Saputri, 2017).

Problem solving skills is very important in developing one's self-confidence as well as practices someone to take risks in life (Zan& Di Martino 2007). In such circumstances, problem solving in Mathematics develops numerical power or

mathematical power. Real problem solving allows students to develop their mathematics skills or learn as well adapt with new technique by using mathematics formula as a tool of identify or address problem (Mustafa Aydogdu & Mehmet Fatih Ayaz, 2008). Students use mathematics skills to identify how it help to solve other issues in our daily life (Noor Azina, 2009). Thus, problem solving not only guides students to solve mathematical issues but the techniques can be used to solve other serious issues in life. Each step of this problem-solving process uses abilities and strategies that contribute to overall efficiency. This affects change and evaluates the difficulty level of the problem that can be solved (Mehmet, 2015).

In recent times, problem solving in Mathematics has one of a conflict and challenge face by primary school students. This is because students remarkably hard to solve obstacles there is lack of interest in mathematics, unable to think and fear the subject of mathematics (Norhatta, 2011). They seem being struggling in problem solving due to several factors as mentioned. Lack of Mathematics skills induced difficulties in problem solving (Tarzimah&Thamby, 2010). Problem solving brings difficulties to students due to lack of understanding and lack skills they have on answering the questions. This may relate to they do not understand with the right and simplified technique to answer their problem solving in Mathematics (Abdul Gafoor, 2015).

Effandi, Normalizan, NurAmalina and Ayu, (2012) claimed that, it can be said as the anxiety which is feeling of fear made them unable to understand to answer problem solving in Mathematics. Secondly, some students when a subject is decided difficult before trying, then it will always be difficult, and they will not try even if the way is easy and convenient. So, state of student's negative attitude towards Mathematics also one of the factors they fail to perform well on their problem-solving Judy Anderson (2009).

Students' attitude towards Mathematics can be related with their problem solving in Mathematics. Many students have negative attitude towards Mathematics which creates lack of interest in problem solving (Marchis, 2013). Earlier studies have shown that attitude could affect students' learning and achievement. For

example, Jeremy Burrus and Raeal Moore, (2017) found that there was a significant relationship among high school students between attitudes towards mathematics and problem-solving achievement. Meanwhile, Cigdem Arslan, Gunes Yavuz, Yasemin Deringol-Karatas, (2014) found that results show that there was a statically difference as the average number of students liking the mathematics was higher than disliking. This is because, the students are not disliking mathematics but the burden of exam has made them have low attitude towards problem solving.

Besides that, anxiety has a potential in determining problem solving ability in Mathematics. Analysis has shown that environmental factors such as mathematical anxiety impair the achievement of mathematics in students (Massoma Ali, 2015). Effandi and Normah (2009) noticed that the attitude of students towards mathematics is very much related to their problem-solving ability in general. They added that it is necessary to overcome negative perceptions, so that students will not suffer from inadequate problem-solving skills later in life. According to Mazlini Adnan (2010), pessimistic views will affect students` future, and this period will be repeated. Studies reveal that students do not like problem solving, assume that they would struggle, and even consider that only few students will comprehend mathematics (Mazlini Adnan, 2010). Psychological factors such as fear and low confidence breaks their motivation to perform well in problem solving (Sokorn, 2009).

According to Jacob Klerlein and Sheena Hervey (2019), problem solving is more than a medium to teach and improve mathematical skills and to help overcome daily challenges. It is also an ability that can boost rational reasoning. In community, individuals can no longer function optimally by only knowing the rules to obey in order to achieve a correct response (Akinsola, 2008). IrfanSupriatna (2019), described that student also need to be able to determine what technique, if any, a situation needs, through a logical deduction process, and sometimes need to be able to create their own rules in a situation. Apart from all this, attitude and anxiety have become big factors that threaten students to do problem solving in mathematics. Therefore, this study will discuss on the attitude and anxiety which affect their mathematics problem-solving achievement.

1.2 Background of the Study

Mathematics is a process of organizing our knowledge of the world and allows us to express our thoughts and make logical sense of them. We can solve a range of practical tasks and real problems by doing mathematics (SiskaApulina, 2016). Students can easily identify facts and skills when they use them to solve real problems. Students can also be taught about the various parts of mathematics, and how they combine together, in contrast to using mathematics to solve real-life problems (Effandi & Normah, 2009).

One of the main aspects of the mathematics curriculum is problem solving, which required students to apply and integrate several mathematical concepts and skills as well as to make a decision (Abd. Ghani, 2014). Problem-solving is a valuable component of mathematics and science curriculum in all areas of the world, however the level to which it operates differently in different countries (Arsaythamby, 2006). According to Lesh and Zawojewski (2012), mathematical problem solving as the method of mathematically analyzing a problem, which usually includes several inter active processes of mathematical analysis, checking, and revising and sorting, adding, updating, revising or refining mathematical concept groups.

Vettleson (2013) described that use of problem solving has been highly complex and widely important because problem solving is the basis of all mathematical and scientific discoveries. He added that there is a very strong contingent in the areas of mathematics through problem solving skills. The root of all mathematics and the process of discovering new knowledge is problem solving. In learning mathematics, the importance of problem-solving derives from assumption that mathematics is essentially about thinking, not memorization (Nuangchalerm, 2009). Problem-solving offers the opportunity to develop insight and explain the methods used to accomplish strategies, instead of remembering and applying a set of techniques (Ismail, 2011). Mathematical problem solving is a technique that spans the whole mathematics curriculum and has aided in the development of information and concepts in context (Ibrahim 1997).

Problem solving is a difficult activity that necessitates higher-order cognitive abilities, Bloom's taxonomy classifies problem solving as the greatest degree of cognitive understanding (Dick, Carey & Carey, 2014). Problem solving is a valuable skill since it helps pupils to critically evaluate arguments and build their own supporting arguments (Bassham, Irwin, Nardone & Wallace, 2012). Problem-solving is very crucial in career because it helps to explain to employers that we have a number of other competencies, such as rationality, creativity, flexibility, imagination, analytical thinking and determination (Romli, 2010). Problem solving helps students to believe in their students' mathematical skill. They can see that the mathematics they study to find the solution to a problem (Ortiz, 2016).

The Malaysian Education Blueprint emphasize that in order to be get ready for future jobs, Malaysian students need to develop problem-solving skills (Ministry of Education (MOE), 2013; 2015). Moreover, the Ministry of Education conducted an overview on the education system in an effort to build the Malaysian Education Blueprint (2013–2025) in October 2011 to train the young generation for the needs of the 21st century. The main focus of the current Standard Secondary School Curriculum (SSSC) and Primary School Standard Curriculum (PSSC) curriculum, which began in 2012 and will be fully introduced in 2017, is to encourage higher order thought skills (HOTS) in order to generate students who could prove their own abilities through analytical and problem-solving abilities (Switala, 2013).

In addition to the importance of problem solving, there are groups of students who face difficulties in problem solving. Tarzimah (2010) study reported that, among the reason students can not complete homework is that they do not know problem solving and do not like problem solving. They appear to be having difficulties with their assignments, particularly problem-solving arithmetic. Many mathematical abilities were used in problem-solving. However, a large proportion of students lack the basic arithmetic abilities they require (Mohd Nizam & Rosaznisham, 2004; Berch & Mazzocco 2007). In conclusion, many pupils are being encountered to face mathematics challenges; especially in Mathematics problem solving (Tay, 2005; Tarzimah, 2005; Mohd Johan 2002; Zalina 2005; Lim, 1995). If the process of teaching and learning is not significantly improved for all students, the students may

face worsening difficulties in acquiring mathematical skills. They are said to have difficulties with proper perceptions and explanations, memorizing and retaining information, concentrating, and using critical reasoning, (Zahara et al. 2009; Tarzimah, 2005; Ismail, 2009; Andersson & Lyxell, 2007; Bryant 2006).

Attitude may be defined as positive or negative in the long term of emotional response of problem solving in mathematics (Maria de Lourdes Mata et al, 2012). An attitude is an organized set of ideas, sentiments, and behavioral inclinations toward socially relevant things, organizations, events, or symbols that lasts for a long time. (Hogg & Vaughan, 2005). Based on three elements, emotional and beliefs, actions and cognitive attitude, the concept of mathematical attitude was developed (Ayob& Yasin, 2017). Compared to students with negative mathematics attitudes, positive attitudes towards mathematics influence students' desire to learn mathematics, and once they feel that mathematics is important, they will try to increase their mathematics achievement.

An analysis by Faridah (2004) found that the lack of perseverance students will stop trying to get the solution and they will not continue working on a problem and they cannot fix it. Faridah claimed that the students' negative attitude will stop them to find the answer if the questions in problem-solving mathematics are difficult. The students feel that the mathematics task gets challenging or unpleasant and it reflects students a negative attitude towards mathematics problem-solving. His research shows that there is a lack of discipline in students' attitude which they do not read carefully and understand the questions given. Thus, his observations show that students face challenges in mathematics problem-solving questions and this causes them to be unable to produce good results in mathematics. In a research conducted by Tooke and Lindstrom, (2018), the result indicates that lack of trust in studying mathematics and solving problems which related to negative attitude causes students unable to achieve outstanding achievement. It may also be concluded that confidence plays the important role in the achievement in mathematics. Thus, negative attitude towards problem solving reduces confident to perform well in problem solving. Apart from that, zero preparation before exam also considered as negative attitude among students to score well in problem solving.

Previous studies have shown that attitudes can influence the performance and problem solving in mathematics of students. For example, Burrus and Moore (2016) found that there was a positive relation among high school pupils' attitudes towards mathematics and problem solving. Meanwhile, Mohd and Mahmood (2011) showed that the attitude towards mathematics had a significant effect on the attitude in problem solving in mathematics by university students. Students positive attitude towards problem solving in mathematics encourages them to perform well. If they show positive attitude when answering mathematics problem solving questions, their interest and confidence will develop. Positive attitude will also motivate them to compete with other students to perform well. This situation will help students to score good grades on their problem solving in mathematics (Suriati, 2019). Other studies have also demonstrated that attitude towards mathematics was significantly linked to problem solving in mathematics (Bakar, 2010). Pyzdrowski (2013) found in a university mathematics class that self-confidence, which was a mathematical attitude variable, had the highest correlation with the achievement of students. Therefore, positive attitude is a potential variable that relates to students' problem solving in mathematics which helps students to do well.

According to Raajan Dass (2013), in mathematics problem solving, anxiety has an impact on students' learning experiences and outcomes. When considering why a large percentage of pupils struggle with mathematics in comparison to other courses, it's critical to recognize the math anxiety component. Anxiety is a feeling characterized by anxious thoughts and bodily changes such as high blood pressure. (Ranjan Das & Gunendra Chandra Das, 2013). Psychologically, math anxiety reflects a pessimistic mind-set towards solving mathematical problems that influence the learning habits and results of students. When examining why a big number of pupils are failing to develop mathematics in comparison to other courses, it is relevant to examine the math fear issue (Ashcraft & Kirk, 2013).

Mathematics anxiety is an anxious feeling, according to Putehand Khalin, (2016) which may cause emotional distress. Puteh claimed that when there is fear, anxiety and uneasy passions associated with a fear of something, explains anxiety as an emotional condition. According to Mohd Rustam (2016), Malaysian students who

come from different streams like science, arts, account, religious, technical and vocational suffered math anxiety. These results are consistent with the results of the Siti Hamad and Rohani (2010) research that stated that Malaysian students perceived higher levels of mathematical anxiety than students perceived higher levels of mathematical anxiety than students from Tanzania. Mathematics anxiety can present itself in a variety of ways (Sharifah Norhuda, 2014). Due to external stresses imposed on a person, such as in a testing situation, it may appear as a dislike of mathematics or as a concern or pure fear. Wondimu et al. (2012) clarified that fear in mathematics is the real situational tension that is specific to personal stress.

Students who felt anxious about mathematics were less flexible in solving problems of mathematics (Carey et al., 2012). Studies have shown that students with mathematical anxiety seem to be less likely to solve problems in mathematics (Wei Hong, 2020). According to Wei Hong, (2020) that anxiety in mathematics correlated negatively with the ability of students to generate solution. Ramirez et al. (2016), observed that, when doing mental arithmetic, extremely math-anxious students tend to stop using more complex techniques and choose to use more basic strategies. Besides, research conducted by Nedime Karasel, OrcunAydaand Murat Tezer (2009) shows that there is a relationship between students' mathematical problem-solving abilities and mathematical anxiety. Previous studies have cleared ineffective problem solvers had developed anxiety when they fail to answer questions. This is because lack of confidence and confusions creates anxiety in problem solving among students. Therefore, anxiety is one of the potential factors that influence problem solving in Mathematics.

In the context of this study, students` attitude and anxiety in mathematics problem -solving has been identified as an obstacle towards problem-solving ability. Many studies have conducted in different variable such as Effandi Zakaria (2011) on students' problem-posing ability and its relationship to attitudes towards problem solving, Norhatta Mohd (2011) on factors that influence students in Mathematics achievement, Shamila Dewi Davadas (2017) on factors affecting students' attitude toward Mathematics and Rohani (2010) on analysis of mathematical beliefs of Malaysian secondary school students. Besides, many research has been conducted in

the context of public university (e.g., NourAdila & Norlizah, 2019), secondary school (e.g., Effandi Zakaria, 2012; Arslan, 2014) and higher institutions (Faridah Salleh et.al., 2009) on problem solving but less studies focused on primary school students.

Mathematics problems is very popular among students in primary, secondary as well as university students. For those who are having trouble with Mathematics, they will appear to ignore the course or even worse they may fail the course and eventually drop the course. They have to know their level of anxiety and attitude towards math to help the students cope with this problem. Therefore, the purpose of this study is to analysis student's attitude and anxiety extent towards math problem solving. This study will be conducted among primary school students as previous studies has conducted among secondary school students.

1.3 Problem Statement

Mathematics problem solving has become a rather important skill for every individual today. Thus, learning of basic mathematics at an early stage is the foundation for the understanding of higher-level mathematics concepts. (Siti Hamad, 2010). The importance of learning and developing knowledge in mathematics problem solving caused people who are able to think mathematically and who can efficiently and responsibly apply mathematical knowledge to problem solving and decision making (Ministry of Education Malaysia, 2010).

In reality, many students in primary schools in Malaysia are struggling in answering mathematics problem solving questions (Mardiah Hafizah Muhammad Hafizi, 2019). There are groups of students experiencing problem-solving issues. Mardiah reported that students can not complete their homework because they do not know how to fix problems and do not like problem solving questions. Students appear to be having difficulty with their schoolwork, particularly problem-solving

arithmetic issues. Because the students lack the essential mathematics skills, they will need to be tutored (Tambychik & Meerah, 2010).

Consequently, students have a pessimistic attitude towards problem solving that demotivating them to do well. This is because when answering mathematics problem solving questions, they did not show more interest or lack of confidence (Ibrahim, 2019). Their pessimistic mindset would then grow and increased. This condition will not encourage students to score high marks on in mathematics. Poor mindset will demotivate them to contend with other students (Suriati, 2019). This will cause students unable to solve any problem-solving questions in Mathematics. Other experiments have also shown that the approach towards mathematics in mathematics has been closely related to problem solving. According to Mohamed and Waheed (2011), when coping with mathematical problem-solving tasks, negative attitudes are the result of regular and repetitive errors or problems and these negative attitudes can become relatively permanent.

Nevertheless, in solving math problems, students who feel anxious about mathematics were less confident (Rohani, 2010). Studies have found that students with mathematical anxiety seem less able to solve problems in mathematics (Mohd Rustam, 2016). Anxiety in mathematics was negatively related with the capacity of students to generate solutions. According to Puteh and Khalin. (2016), strongly math-anxious students appear to avoid using more complex methods when performing mental arithmetic and opt to use more simple tactics. Previous findings have explained that unsuccessful problem solvers have created fear when they refuse to answer questions in mathematics problem solving (Lavasani, Hejazi &Varzaneh, 2011).

Anxiety and attitudes appear to play a significant influence in learning mathematics. Personal psychology, philosophy, and epistemology are all linked to these characteristics. Wigfield and Meece (1998) investigated the connections between math anxiety and other important mathematical attitudes, students' beliefs and values, and their mathematical performance as part of a larger study to evaluate the distinctness of math anxiety. Several studies (e.g., Fennema, 1977; Fennema &

Shermon, 1977; Richardson & Suinn, 1972; Tobias & Weissbrod, 1980; Pelliconi, 2015) found an indirect relationship between math anxiety and poor math performance, which was subsequently related to a negative attitude concerning mathematics. Despite the fact that research studies on the emotive domain are being conducted, it has become more important to describe an individual's attitude toward mathematics. It is important to look on the relationship between attitudes towards math performance and math problem solving is to get know the actual reason of their positive and negative attitude towards math and how it affects their performance, (Mzomwe, 2019).

Lastly, anxiety and attitude has become important variable for this study. It is belief that anxiety and attitude has important role in influencing problem-solving skill in Mathematics. Thus, this study aims to use quantitative method for data collection process. Quantitative data collection will help to get accurate result on the level of anxiety and students' attitudes towards problem solving in Mathematics. Numeric result will show clear answers for all the research questions.

1.4 Research Objectives

The research objectives of this research study are:

- i. To identify the level of attitude in mathematic problem solving among primary school students
- ii. To identify the level of anxiety in mathematic problem solving among primary school students
- iii. To identify the level of performance in mathematic problem solving among primary school students
- iv. To find out the relationship between attitude and performance in mathematics problem solving among primary school students
- v. To find out the relationship between anxiety and performance in mathematics problem solving among primary school students

- vi. To determine the prediction of attitude and anxiety towards performance in mathematics problem solving among primary school students

1.5 Research Questions:

There are six research question will be raised from this research:

- i. What is the level of the level of attitude in mathematic problem solving among primary school students?
- ii. What is the level of the level of anxiety in mathematic problem solving among primary school students?
- iii. What is the level of the performance in mathematic problem solving among primary school students?
- iv. Is there any significant relationship between attitude and performance in mathematics problem solving among primary school students?
- v. Is the any significant relationship between anxiety and performance in mathematics problem solving among primary school students?
- vi. Are attitude and anxiety significant predictors of performance in mathematics problem solving among primary school students?

1.6 Research Hypothesis:

The research hypothesis areas as follows:

- i. H_{01} : There is no significant relationship between attitude and performance in mathematic problem solving among primary school students
- ii. H_{02} : There is no significant relationship between anxiety and performance in mathematics problem solving among primary school students

- iii. H₀₃: Attitude and anxiety are not significant predictors of performance in mathematics problem solving among primary school students.

1.7 Theoretical Framework

This research study focuses on the relationship between attitude, anxiety and performance in problem solving in mathematics among primary school students. The diagram below shows the variables to be investigated in detail. ABC model of attitudes (1993), Cognitive Interference theory (1980), and Cognitive Learning Theory (1936) will be used to explain on the theoretical framework of the research variables involved.

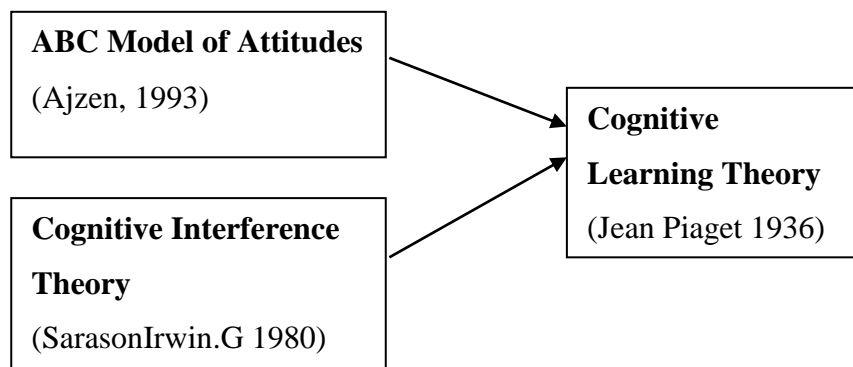


Figure 1.1 Theoretical Framework

1.7.1 ABC Model of Attitudes

ABC model of attitudes was rooted from Ajzen (1993) social psychology framework. Attitudes can be regarded of as perceptions of ideas, events, things, or people. Attitudes are usually either good or negative, although they may also be

ambiguous. For example, we frequently have conflicting sentiments regarding a certain issue or person (Amitkakri, 2019). In what is known as the attitude model of ABC, there are three components to each attitude: A for emotional, B for behavioural, and C for cognitive. While all three components are present in every attitude, one component may be more prominent than the others in a given attitude. Hierarchical Model that conceptualizes an attitude as mixture of three distinct observable components: affective (A), behavior (B) and cognition (C). Affect is that the subjective element consisted of thoughts and feelings correlated with Mathematics of attitude (Jain, 2014). Meanwhile, behavior is the component of action consists of predispositions to retort directly against the mathematics of attitude, (Ajzen, 1993). Lastly, cognition could be a conceptual element composed of the conviction and expectations retained by individuals regarding the mathematics of attitude (Erin Long 2016).

This ABC model of attitudes can be related with this student's attitude in problem solving in mathematics. Affective component in ABC model explains the feelings or emotions of a person about the subject of the attitude. For example, fear of students on problem solving in mathematics is affective component. Secondly, behavioural component is the way humans have an attitude affects how they behave or act to it. For example, students avoid to study mathematics because of fear on it. The fear on mathematics creates a situation where their mind not works to think critically to do problem solving. Thirdly, the cognitive component includes the belief for knowledge of a person about a subject of attitude. For example, students think that mathematics is one of the hardest subject to score. The negative thought become as hindrance for their performance to perform well on their problem solving. This makes students not to do well or answer correctly on their problem solving in mathematics. Therefore, ABC model of attitude will used to explain the variable of attitude in this study.

1.7.2 Cognitive Interference Theory

Cognitive Interference Theory was developed by SarasonIrwin.G (1980). Cognitive interference refers to inappropriate and sometimes upsetting thoughts that interfere with the life of a human. Mounting research has shown that cognitive interference plays a major role in stress, impaired performance, sluggish learning, social maladjustment, psychopathology, and habits that contribute to injuries in a variety of areas. Sarason indicated that the Theory of cognitive interference to understand why people with anxiety show lowered working memory (1984). He indicated that worrying about personal success, described as "obsessive self-preoccupation," increases stress levels unnecessarily (Sarason& Stoops, 1978).

When relating the theory with problem solving in Mathematics, students with anxiety has the lowest memory power and show less interest in given work (Mario,1989). Thus, students with anxiety encountered reduced working memory. In this case, it is difficult for them to perform well on the problem solving in mathematics. This is because, mathematics has too many formulae to be remembered for long term, (Papantoniou, 2012). Therefore, state and trait anxiety are likely to interfere with task-related processing by the central. As suggested by Sarason's cognitive interference theory, executive and the wider working memory system with self-focused, preoccupying worry.

1.7.3 Cognitive Learning Theory

Cognitive Learning Theory was developed by Jean Piaget in 1936. This theory mainly focuses on thinking and reasoning. Cognitive Learning Theory (CLT) is about identifying how, while learners discover, the brain functions. The theory focuses on how the brain processes information, and how learning takes place through that internal information processing. There are three components in cognitive learning. They are comprehension, memory and application. In order for

cognitive learning to be successful and beneficial, we must understand why we are learning a specific subject in the first place (Berman, 1987). Then, memory is cognitive learning hinders knowledge acquisition, which is inefficient in schooling. Having a thorough understanding of a subject improves your capacity to connect new information to past knowledge. (Kevin Pauley, 2018). Next, application in life conditions, cognitive learning techniques help us apply different experience or skills. When we continue to improve problem-solving talents, they inspire (Priya Shah, 2020).

In this case, when relating this theory with the study, students can get know the capacity of their brain and how much they can learn and their brain able to absorb every day. For example, cognition allows students to "think about their learning" as a way of helping them unlock an idea or problem they are dealing with. Cognitive learning will improve the interest and enthusiasm of students by giving them a new way of thinking at themselves and their minds. The key to unlocking impactful knowledge and cognitive capacity for learners is cognition, growing their talents. Therefore, this theory will help students to clearly identify their problem in problem solving in mathematics which will guide them to find out the right way to solve their issue.

1.8 Conceptual Framework

In this section, concepts inter-related to the anxiety and attitude towards performance in problem solving in Mathematics.

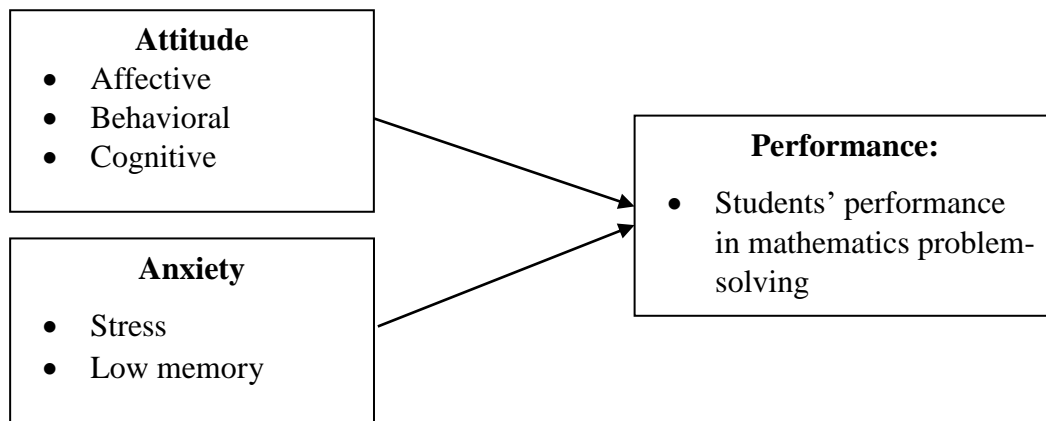


Figure 1.2 Conceptual Framework

1.8.1 Attitude towards Problem Solving in Mathematics

A basic definition of attitude toward mathematics is a good or negative emotion toward solving mathematical problems. (McLeod, 1994). Attitude toward mathematics is defined as a mix of enjoying or disliking arithmetic, a propensity to lock in or avoid mathematical pursuits, a perception that one is excellent or poor at math, and a view that mathematics is helpful or useless, according to a multidimensional definition (Ma & Kishor, 1997). Affection is defined as a student's interest in mathematics and their belief in the value of numerical knowledge in their future job or lifestyle, which influences their problem-solving behavior in a fundamental way. Their favorable attitude to arithmetic, which stems from affection, is referred to as behavior.

Belief frameworks are how you understand the world in science, the way you approach math and science. One's convictions approximately mathematics can decide how one chooses to approach an issue, which methods will be utilized or avoided, how long and how difficult one will work on it, and so on." (Schoenfeld, 1985).

Then, cognitive is mind set or opinion adapt from behavior. Many students begin their school a long time with a positive attitude towards Mathematics, but this gotten to be less positive amid school a long time (Ma & Kishor, 1997). This propensity can be clarified by the increment of task difficulties and the weight put on students to manage with these requesting errands (Philippou& Christou, 1998). Pupils' attitude towards math is affected, among other components, too by the teacher and educating teachers' substance information and identity, educating strategies and materials used by instructor, educating subjects with genuine life enhanced cases (Ubuz, 2009) and teachers' attitude towards problem solving in Mathematics (Yilmaz & Olkun, 2010). As mentioned, attitude is an independent variable in this study. Attitude as a variable will measure the relationship towards problem solving in performance.

1.8.2 Anxiety towards Problem Solving in Mathematics

According to Puteh and Khalin (2016), anxiety plays essential role in problem solving in Mathematics. (Dreger & Aiken, 1957) investigated mathematics anxiety and described it as "the presence of a syndrome of emotional reactions to arithmetic and mathematics."They coined the phrase "math anxiety" to characterise pupils' mental struggles with arithmetic. (Tobias & Weissbrod, 1980) When confronted with a mathematical problem, some people suffer panic, helplessness, immobility, and mental disorder, which is known as math anxiety. It is an emotional as well as a cognitive dread of math. While a small amount of worry may be motivating or even exciting, too much anxiety can be crippling, as "the brain's everyday processing processes begin to shift by restricting perceptions, inhibiting quick time period memory, and responding in more primal ways." (McKee, 2002).

Anxiety in problem solving in Mathematics can be defined as thinking of exam which creates stress and being an obstacle to perform well (Khalin, 2016). Anxiety in Math automatically creates stress which makes students unable to think when answering problem solving. Moreover, low memory power known as brain

inability to retrieve memories for long term. (Hopko, 1998) found that "mathematics-anxious individuals have a poor mechanism of inhibition by which sources of working reminiscence are fed via task-irrelevant distraction. "As a result, low memory performance for highly anxious individuals will weaken. Anxiety will be the independent variable in this study. Anxiety as a variable will measure the relationship towards problem solving in performance.

1.8.3 Performance towards Problem Solving in Mathematics

Attitude and anxiety are the main factors towards problem solving in Mathematics. Negative attitude and anxiety lead poor performance (Adamu, 2014). Recent research has said that the analysis of particular factors of math performance has distinct impacts on the relation between anxiety and attitude with math performance, (Ramirez, 2016). High self-motivation and confidence enables students to perform well in math problem solving while several factors create uneasy feelings which develops fear and nervous (Lee and Cho, 2018). Therefore, attitude and anxiety highly impacts performance of students in math problem solving. This study will analyze the influence of attitude and anxiety in problem solving in mathematics. In this study, performance is the dependent variable. Performance as a variable that will be measured its relationship with anxiety and attitude.

1.9 Significance of the Study

Problem solving in Mathematics are very important in Malaysia because the purpose of the mathematics curriculum in Malaysia is to develop individuals who are able to think mathematically and can effectively apply mathematical knowledge to solve problems and make decisions (Ministry of Education Malaysia, 2010). Therefore, this study will benefits students, teachers and body of knowledge on the

attitude and anxiety towards Math problem solving and its relationship with performance.

1.9.1 Primary School Students

Learning Mathematics need a high level of eagerness and a positive attitude. Students will learn whether they are more optimistic as a result of this research project, and how this relates to increasing their performance in Mathematics problem solving. The findings of this study will help pupils improve their attitude, anxiety, and math problem-solving skills. This study will let the students know to what extent attitude and anxiety could affect performance in Math problem solving. Apart from that, students able to get know their attitude towards math problem solving. Through this student able to find out the way to change their attitude towards math problem solving. Next, can reduce level of anxiety towards math problem solving and can identify how attitude and anxiety improve students' performance in math problem solving. Attitude and anxiety are two main factors which affect student's math problem solving performance. Attitude change and reducing anxiety level will improve students' performance in math problem solving.

1.9.2 Teachers

The teaching and learning of Mathematics problem-solving questions have never been easy, for Mathematics teachers. It is hoped that this study will help the school and even the teachers themselves to identify the better way to improve the teaching and learning process of Mathematics problem-solving questions in the future. This study can also help the teacher to decide whether their teaching and learning process in Mathematics in reducing students' anxiety and shape students' attitude positively.

1.9.3 Body of Knowledge

The primary goal of the researcher is to re-look at the attitude and anxiety in solving the math problem. In addition, to describe how attitude and anxiety affect the performance of students in solving math problems. Generally, the relationship between attitude and anxiety towards performance should be recognized. Most research so far have concentrated on high school students and university students. Therefore, primary school students will be the focus of the study. In this study, the researcher focuses on the issues and not especially on the individual. To analyze the difficulties, the ABC model, Cognitive Interference and Cognitive Theory were used.

1.10 Limitation of the Study

Only primary school children from the Kluang area of Johor are included in this study. The students will be chosen at random and given questionnaires to see if there is a link between their attitude, anxiousness, and performance in math problem solving. However, in this research, majority of level two primary school students will be tested, and this study will be having all races of students in Kluang, Johor. On other hand, this research study only particularly focusses on the factors like attitude, anxiety and performance towards problem solving in mathematics among primary school students. Finally, this study solely utilizes quantitative techniques to collect relevant data in line with the research aims and research questions, and it does not use any qualitative approaches.

1.11 Definition of Terms

In this part, terms used in this research like anxiety, and attitude in improving students` performance towards Mathematics Problem solving questions will be defined according to context of this study.

1.11.1 Definition of Attitude

A common description that defines attitude as the positive or negative degree of mathematics-related control (Haladyna et al., 1983"Attitude toward mathematics (ATM) is the student's structured propensity to think, feel, perceive, and act in relation to mathematics. (Jovanovic & King 1998). ATM stands for "a desire or dislike for mathematics, a proclivity to participate in or oppose mathematical practices, and a belief that one is excellent or bad in mathematics."

Attitude is a subjective or mental preparation for action. Attitude defines the external and visible postures of human towards a belief. It is related to the individual's dominant tendency to respond favorably or unfavorably to an object such as person or group of people, institutions, or events (Copper & Fishman, 1977). Attitude is affective component which has explained in ABC concept refers to emotional reactions towards attitude object. For example, Mathematics is attitude object for students when they afraid of it. So, every time when they exposed to it, students feel extreme fear.

In this research study, the level of pupils` attitude towards problem solving in Mathematics which will be evaluated by using "Attitude towards Mathematics Inventory (ATMI) by Martha Tapia (2004). The Attitudes toward Mathematics Inventory was created to look at the underlying components of attitudes toward mathematics (affective, behavioural, and cognitive). The ATMI items were created in

the domain of attitudes toward mathematics problem solving in order to address aspects that have been identified as relevant in research.

1.11.2 Definition of Anxiety

According to (Chastain,1988) and (Vitasari, Wahab, Othman, Herawan & Sinnadurai, 2010), anxiety refers to an uncomfortable sensation or feeling triggered by something aggressive that is often correlated with nervousness, involuntary emotional responses, anxiety, and loss of trust, it affects focus, and this can lead to poor performance in the subject (Field, 2004). Anxiety is a multi-dimensional concept defined by a wide range of behaviors such as discomfort when someone is asked to do math calculations or resisting math calculations. As experienced by school-age students, math anxiety has captured the interest of many researchers due to its negative effect on both mathematical performance and consequent confidence in learning mathematics.

In this study, anxiety can be defined as students discomfort feeling which mixed with nervous lead to poor performance in Math problem solving. Hence, in this research study, the level of anxiety of students will be clarified in this research study to measure the use of factor analysis as a subcategory determinant by Yusuf Feyisara Zakariya (2018) will be used in this research study to measure the level of anxiety of primary school pupils towards solving the problem of mathematics.

1.11.3 Definition of Performance

Venkatraman and Ramanujam (1986) defined performance as i the time test of any strategy. Then, performance is effectiveness of measuring output to determine if they help accomplish objectives and efficiency of measuring resources to

determine whether minimum amount is used in production. Moreover, if we analyse the grammatical form of the phrase, it is also defined as the act or process of executing a task, an activity, whereas the verb perform denotes operating or functioning properly or badly, according to the Oxford English dictionary.

In this research study, the level of students' performance towards problem solving in Mathematics will be evaluated by using Mathematics problem-solving test to measure student's performance level towards Mathematics problem solving. Therefore, Year 5 students will sit for the test to measure their performance in problem solving. The second topic of Mathematics Year 5 will be chosen by researcher to prepare test for the students. The second topic of Year 5 Mathematics is Fraction. From this topic, addition and subtraction of fraction will be given as a test for students. Students will solve problem involving addition and subtraction of mixed numbers.

1.12 Summary

This chapter explains deeply on what this research study is all about. As the attitude and anxiety plays vital role in math problem solving, some effective and relevant reasons will be discussed to find out how attitude and anxiety impacts performance in problem solving. As Mathematics is a compulsory subject in Malaysia in all levels, it is important to find out the reasons behind attitude and anxiety of students on math problem solving. From this some effective strategies can be taken by future researchers. It is good for students to get know the reasons behind their attitude and anxiety to overcome the situation and improve themselves in problem solving in Mathematics.

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