

# Attitude of middle school students toward mathematical modelling

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## Attitude of middle school students toward mathematical modelling

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**Abstract.** This research is a descriptive study that aims to determine student attitudes towards mathematical modeling in secondary schools in Palembang. . Subjects of this study involves graders VII.6 of SMP Negeri 1 7 Palembang, graders X.IPA.1 Palembang SMA 02 and SMA 10 XI.IPA.5 class Palembang. The data collection technique in this study was a written questionnaire. Questionnaire data analysis is based on a Likert Scale Questionnaire. The results of this study are students' attitudes are quite good towards problem solving in mathematical modeling. This is evidenced by the results of the data as much as 38.62 %.

### 1. Introduction

One of the goals of learning mathematics is the ability of students to solve mathematical problems. This can be seen from one of the objectives of junior high school mathematics learning so that students have the ability to solve problems that include the ability to understand problems, design mathematical models to solve models and interpret the solutions obtained [1]. Therefore, mathematical problem solving is one of the abilities that are felt to be very important, so it must be mastered by students, especially high school students, in order to solve their problems in daily life . But in reality the problem-solving ability of students in Indonesia is still lacking. This is proven by the results of the TIMSS and PISA surveys. The Trends in Mathematics and Science Study (TIMSS) 2011 study which stated that Indonesia was ranked 38th out of 44 countries with a score of 386.

This is caused by students and teachers who are not accustomed to problem solving problems, teachers still use the old method in school learning that is more emphasizing the mastery of basic skills [2]. Even if the teacher is not able to master various ways of delivery, the teacher will see the results more than the ability and readiness of students [3]. So that makes it difficult for students to understand the learning process and lead to reluctance and even despair. Whereas students who have good attitudes and study habits will affect the ability to solve mathematical problems [4]. In addition, student attitudes towards problem solving must be good and the teacher must also guide and encourage students to change good attitudes and habits. Because there is a significant influence on students' attitudes towards problem solving [5]. Attitude is considered by some researchers as an important or key factor for understanding and explaining student performance in mathematics [6 - 9]. In 2015, 15% of Malaysian students answered that they did not like mathematics and in 2016, 16% of Malaysian students answered that they did not like mathematics. This means there is an increase. [10 - 11].

The process of learning mathematics students are also trained to solve all problems in mathematics by applying mathematical modeling. Mathematical modeling is one of the stages of solving problems in mathematics. Students are required to play an active role in learning mathematics so that students do not only memorize formulas or work like robots controlled by their teacher. The application of mathematical



modeling is also believed to be able to overcome the crisis of achievement in the field of mathematics in Indonesia. Mathematical modeling is important to be applied into mathematics learning and can overcome the crisis that is happening in the process of learning mathematics [12]. when the learning process, students must be more emphasis on developing positive attitudes and thinking skills in solving mathematical problems than giving students instructions to solve problems that have become [13].

When learning mathematics, especially problem solving, the teacher in addition to helping students to be involved in understanding mathematical objects needs to also build a positive attitude towards children both in mathematics and in mathematical problem solving. Because after all there is a positive attitude in learning more motivating advantages than not having at all. It should be noted, NCTM (2000) also reminded the importance of building positive attitudes in students towards mathematics [14]. Students will be positive if the teaching process is presented attractively [15].

For this reason, it is important to remember that the greatest opportunity for teachers to do this is when learning takes place in class. Because students who are positive are more likely to maintain their business and have a desire to be actively involved in learning tasks than students who are negative. If the teacher engages students in mathematics modeling will make students learn mathematics more meaningfully [16]. In solving a mathematical problem students must understand that problem. After that students will create or form a problem into mathematical modeling, because if students do not understand a problem, they cannot model mathematics. Therefore the purpose of this study is to see how the attitudes of middle school students towards Mathematical Modeling.

## 2. Method

This research is a descriptive study that aims to describe the attitudes of high school students towards solving mathematical problems. The instrument used was a questionnaire. This study whose subjects are students of class VII.6 from SMP Negeri 17 Palembang, students of class X.IPA.1 of SMA Negeri 02 Palembang and class XI.IPA.5 of SMA Negeri 10 Palembang. In the implementation the researchers gave questionnaires after other researchers conducted the learning process. The instruments used to measure this research variable were using a 5-point Likert scale.

To create a grouping category, you must first determine the minimum score and maximum score from the acquisition of research scores. Next determine the mean (average) and standard deviation of the obtained scores. The results of the acquisition of mean and standard deviation are then included in the assessment score as shown in Table 1 [17, 18].

**Table 1.** Criteria for grouping

Score Interval	Criteria
$M_i + 1.5SD_i \leq \bar{M} \leq M_i + 3.0SD_i$	Very strong
$M_i + 1.5SD_i \leq \bar{M} \leq M_i + 3.0SD_i$	Good
$M_i + 1.5SD_i \leq \bar{M} \leq M_i + 3.0SD_i$	Average
$M_i + 1.5SD_i \leq \bar{M} \leq M_i + 3.0SD_i$	Weak

## 3. Result and Discussion

This student attitude questionnaire aims to determine the attitudes shown by students towards problem solving in mathematical modeling. In the questionnaire three aspects were observed, namely cognitive, affective and conative aspects. The questionnaire has been made as many as 48 statements and has been validated using SPSS. 2 statements out of 48 statements were declared invalid. Based on the results of calculations using SPSS, the values obtained for the questionnaire and are described in the table is 0.923 which means it has a very high degree of reliability because it is at 0.80-100. Previously, the questionnaire had been validated by a lecturer at the Faculty of Mathematics and Natural Sciences, Sriwijaya University. After that from this questionnaire the statement was chosen that was in accordance with the mathematical modeling of problem solving, consisting of 19 statements. Respondents numbered 101 consisting of VII.6 grade students from 17 Palembang Public Middle School, X.IPA.1 students of SMA Negeri 02 Palembang and XI.IPA.5 students of SMA Negeri 10 Palembang. From the results of filling out the questionnaire, the following results were obtained.

**Table 2.** Percentage of Results of Student Attitude Questionnaire

No	Score Interval	Category	Frequency	Relative Frequency
1	$71 < X \leq 83$	Excellent	24	23.76 %
2	$60 < X \leq 71$	Good	27	26.73 %
3	$48 < X \leq 60$	Average	39	38.62 %
4	$37 < X \leq 48$	Weak	11	10.89 %
Total			101	100%

From the data above, it can be seen that the positive attitude of students towards problem solving in modeling still needs to be improved. This is indicated by the results of a questionnaire analysis of 39 students in the quite good category. This is due to lack of knowledge and understanding of concepts. Tendency of students who are unable to retell the purpose of the problem with their own language, the lack of students' ability to transform sentences into mathematical models and the lack of understanding of the concepts applied, so students find it difficult to determine the formula used [19].

Based on the results of observations made by Respina Kartikasari [20] in VIII grade students of SMP Negeri 1 Geyer in the process of learning mathematics, most students have difficulty in presenting data and understanding concepts. Students who have difficulty finding problems and determining the strategy to be solved in the problem [20].

Mathematical modeling is related to students' understanding of these problems. In the form of knowledge that involves thinking and reasoning. That knowledge is gained through the learning process. Most teachers tend to directly explain the subject matter to be discussed without wanting to know the student's initial knowledge. Providing opportunities for students and listening to students' ideas will be the key words for achieving communication skills and mathematical modeling abilities.

#### 4. Conclusion

From the results of the data and the results of the study it can be concluded as follows: The results of research on student attitudes toward mathematical modeling show 23.76% in the excellent category, 26.73 % in the good category, 38.62 % in the average category and 10.89% in the weak category. With these results students' attitudes towards student mathematical modeling in middle school in Palembang are quite good.

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