

## The Relationship of Student Confidence with Mathematical Comprehension Ability

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### Abstract

The purpose of the study was to obtain empirical data on the relationship of students' confidence with mathematical comprehension ability. The study used a quantitative descriptive approach with a type of correlation research through questionnaires and tests. The sample in this study amounted to 21 people taken by cluster random sampling technique. Validity testing for student confidence using the product moment correlation formula, from 30 statements tested, there are 23 valid and reliable statement items. While ability to understand mathematics uses the point biserial correlation formula, of the 20 questions tested, only 12 questions are valid and reliable. The prerequisite test analysis using the liliefors test concludes that the data obtained are normally distributed. The results showed a positive correlation between students' confidence and the ability to understand mathematics quadratic equation material. This can be proven by the value of the correlation coefficient (0.564) with the regression equation  $\hat{Y} = -3.37 + 0.73X$ . The coefficient of determination (0.3177) means that 31.77% of mathematical comprehension ability is influenced by student confidence. In conclusion, there is a positive relationship between students' confidence and the ability to understand mathematics quadratic equation material.

Keywords: Correlation, Mathematical comprehension ability, Self-confidence.

## 1 INTRODUCTION

Education is a long process that aims to improve, improve, change the knowledge, skills and attitudes and behavior of a person or group in an effort to educate human life through teaching and training guidance activities. Education should be able to produce human resources that have complete competencies, namely attitude competence, knowledge competence and integrated skill competence (Abdul & Chaerul, 2014). Through education, humans can develop their potential, and can gain knowledge and skills to improve the ability to think and strive to become superior individuals according to their talents and skills. Education is an added value because it can raise the degree of one's life and provide opportunities to maximize one's potential. Teaching and learning activities are the process of interaction between students and teachers in the classroom or in a space and time. Teachers directly or indirectly influence, nurture and train students' intelligence and skills. The learning process that takes place passively can cause students' confidence to be low, because students are not trained or given the trust to solve math problems independently.

Mika and Anil (2020) said that mathematics is an abstract science whose reasoning is brought to the real world. Mathematics science that is intangible, formless but by using reasoning and logic and analysis can be used in solving problems in everyday life. Understanding mathematics is considered important because through good understanding and reasoning, it is expected to be able to turn ideas into mathematical symbols and patterns that can be solved through mathematical formulas. The purpose of learning mathematics is to equip students to be able to understand mathematical concepts, use

good reasoning, be able to communicate ideas with mathematical symbols, be able to solve mathematical problems and have an attitude of appreciating the usefulness of mathematics. With mathematics learning, students are expected to be able to understand concepts and reason so that they can solve mathematical problems. Learning mathematics is a series of causes and effects, which are sequential and arranged according to a pattern. Learning mathematics, starting from easy, medium to difficult. To be able to solve mathematical problems students must be able to understand mathematical concepts first, because errors in understanding mathematical concepts will cause errors in the next process. The success of the teaching and learning process can be seen from student learning outcomes and student achievement at school. However, the success of the learning process is expected to be applied in everyday life by developing learning materials obtained at school.

Self-confidence can be interpreted as a positive sense of what we can do without worrying about what we cannot do but still having the willingness to learn (Martin, 2005). Confidence in the student's ability to solve the problems he faces is a form of positive attitude in the student. This positive attitude needs to be developed so that it encourages these students to explore knowledge and be challenged to solve more complex problems. Self-confidence referred to in this study is confidence in the ability of students to form self-understanding in various aspects in the form of confidence in the ability to be independent, responsible, able to express opinions during mathematics learning. According to Parsons and Harrison (2011), a person's self-confidence towards mathematics is divided into three kinds of domains: 1. Overall confidence in mathematics 2. Topic Level Confidence, meaning a person's confidence in only certain levels of topics and 3. Application Confidence, meaning a person's confidence to apply mathematics in his life environment. A person's self-confidence can also be seen through the characteristics that exist in the person. Confident people are more focused on what can be done and the positive results that will be obtained.

Kesumawati (2008), said concept understanding is one of the mathematical skills or proficiency that is expected to be achieved in learning mathematics, namely by showing understanding the concepts learned, explaining the relationship between concepts and applying concepts flexibly, accurately, efficiently and precisely. Understanding mathematical concepts is closely related to mathematical logic. Logical Mathematical Knowledge is knowledge obtained from thinking about objects and events (Isrok, 2021). Mathematical logic can only develop if students are able to manipulate objects. In the process, students will not be able to manipulate objects if they do not understand the concept of the material to be manipulated. Understanding mathematical concepts in the form of symbolic cannot be obtained through reading or listening activities alone, but must be done through object manipulation. Understanding mathematics can also be interpreted as a series of learning materials that students must master in order to enter the next learning and ultimately can be used to solve more difficult and diverse problems. Understanding mathematics represents how students' knowledge of a concept, principle, and their ability to use strategies to solve given problems. If students feel confident that they are able to solve mathematical problems because they have mastered the basic material, they will quickly understand and understand the material provided by the teacher, and are challenged to find and try to solve problems from various sources.

Quadratic equations were first discovered by Al-Khawarizmi in the 9<sup>th</sup> century, also known as the father of algebra. He is the inventor of the ABC formula used in solving quadratic equations. The formula first appeared in his famous book, *Kitab Al Mukhtasar fi Hisab Al Jabr wal Muqabbala*. A quadratic equation is defined as a second-order equation that contains one type of variable and the highest degree of variable is two. The general form of quadratic equations is with constants  $a$  and  $b$  in the equation referred to as coefficients. The roots of the quadratic equation are substitutes for the value of  $x$  which causes the quadratic equation to be true (Priyanto, 2022). In general, the material of quadratic equations is presented in Figure 1.

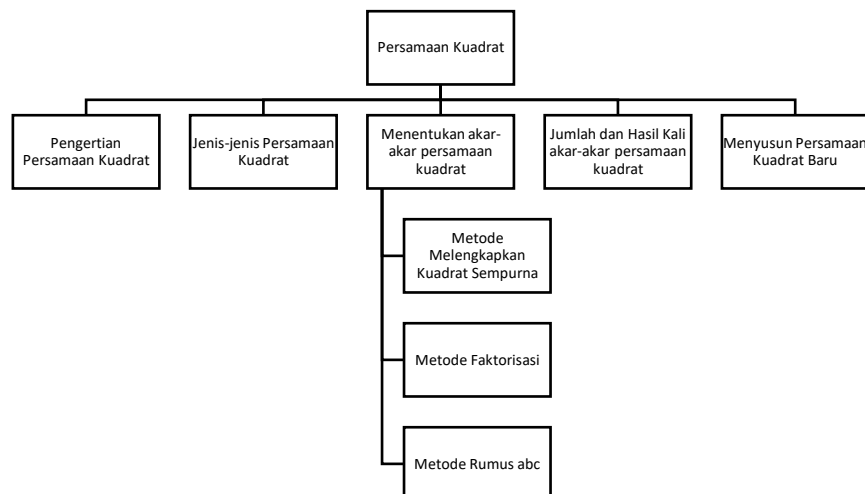


Figure 1. Concept Map of Quadratic Equations

Based on the description above, students' ability to understand mathematics is thought to be influenced by students' confidence in working on problems related to mathematics. Student confidence is also needed so that students are trained to solve difficult problems, have critical, systematic, logical, creative and effective thinking so that they can overcome various challenges and problems that exist. Based on the description above, the researcher is interested in conducting research on "The relationship between student confidence and mathematical comprehension ability".

## 2 RESEARCH METHODS

The goal to be achieved in this study is to know empirically about the Relationship of Student Confidence with the Ability to Understand Mathematics. The research method used is a quantitative descriptive method with a correlational type of research.

The research data was collected using student confidence questionnaires and math problem-solving ability tests. The research variables are students' confidence as an independent variable and the ability to understand mathematics of quadratic equation material as a bound variable. The sampling technique used in the study was Cluster random sampling. Using 2 research classes, namely trial class and research class.

The research instrument used to collect an objective test with 5 answer choices a, b, c, d or e with a total of 20 questions. Of the 20 questions, there are 12 valid and reliable questions. The formula used is biserial point correlation. The hypothesis submission used to measure is in the form of a questionnaire totaling 30 statements. Of the 30 statements, there are 23 valid and reliable statements. Filling out the questionnaire using a likert scale with 5 types of alternative answers, namely TP (never), JR (rare), KD (sometimes), SR (often) and SL (always). The formula used to measure the validity of the questionnaire is the Product moment correlation coefficient. Measurement of instrument reliability using Kuder Richardson (KR-20). Research Data Analysis Techniques are carried out with the following steps: Normality Test, Linearity Test and Research Hypothesis Test. Statistical Hypothesis Testing is used to determine whether there is a relationship between students' confidence and mathematical understanding of quadratic equation material.

## 3 RESULTS AND DISCUSSION

Based on data collected from the results of self-confidence questionnaires and objective test results with a sample of 21 students taken by cluster random sampling technique.

From the questionnaire data of 30 statements, there are 23 valid and reliable statement items. Of the 23 valid statement items, the highest value was 111 and the lowest value was 62 with a mean value of 82.8, a median of 86.25, a mode of 93, a variance of 195.78 and a standard deviation of 13.99.

Table 1. Frequency distribution confidence questionnaire

| Interval  | Frequency | Midpoint | Real boundaries |
|-----------|-----------|----------|-----------------|
| 62 - 70   | 6         | 66       | 61,5 - 70,5     |
| 71 - 79   | 3         | 75       | 70,5 - 79,5     |
| 80 - 88   | 2         | 84       | 79,5 - 88,5     |
| 89 - 97   | 7         | 93       | 88,5 - 97,5     |
| 98 - 106  | 2         | 102      | 97,5 - 106,5    |
| 107 - 115 | 1         | 111      | 106,5 - 115,5   |
| Total     | 21        |          |                 |

From the objective test data of 20 statements, there are 12 valid and reliable statement items and from 12 valid question items, the highest value is 83, the lowest value is 25 with a mean value of 57.12, the median (middle value) is 53.66, the mode (value that often appears) is 68.79, the variance is 192.46 and the standard deviation is 13.87.

Table 2. Frequency distribution objective tes

| Interval | Frequency | Midpoint | Real boundaries |
|----------|-----------|----------|-----------------|
| 25 - 34  | 4         | 29,5     | 25,5 - 34,5     |
| 35 - 44  | 3         | 39,5     | 34,5 - 44,5     |
| 45 - 54  | 1         | 49,5     | 44,5 - 54,5     |
| 55 - 64  | 3         | 59,5     | 54,5 - 64,5     |
| 65 - 74  | 6         | 69,5     | 64,5 - 74,5     |
| 75 - 84  | 4         | 79,5     | 74,5 - 84,5     |
| Total    | 21        |          |                 |

The calculation of the hypothesis test in this study using the product moment correlation from Pearson obtained a value of  $r_{xy}=0.564$  by looking at the interpretation of the correlation coefficient which is quite strong and the contribution of 31.77% it can be concluded that there is a positive relationship between student confidence and mathematical understanding, so it can be interpreted that students who have self-confidence will be followed by increased understanding of mathematics.

## 4 CONCLUSION

Based on the results of the study, a coefficient  $r_{xy}=0.564$  was obtained. Then to find out whether or not the correlation is significant, the correlation coefficient is compared with the correlation coefficient interpretation table. The contribution student confidence and math comprehension can be seen from the large number of coefficient of determination (KD), which is 31.77%. This shows that there is a relationship between students' self-confidence and understanding of mathematics, while the remaining 68.22% is influenced by other factors.

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