The Influence of mathematics learning interest on the conceptual understanding of eighth-grade middle school students

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Abstract: This study aims to determine the effect of interest in learning mathematics on the understanding of mathematical concepts in grade VIII junior high school students in the matter of number patterns. Number pattern material is one of the materials contained in the 2013 curriculum for class VIII which is expected to be mastered by students and students because it is closely related to everyday life. In this study the population was all class VIII students of SMP Negeri 28 Tangerang for the Academic Year 2022/2023. The sample selection was carried out in this study by means of probability random sampling, namely class VIII-D students as many as 36 students. The approach used in this research is quantitative and analyzed by simple linear regression. The technique of collecting data by providing non-test instruments in the form of questionnaires on students’ interest in learning mathematics and test instruments on the subject of number patterns to measure understanding of mathematical concepts that are closely related to everyday life. Hypothesis testing is done by simple regression with prerequisite analysis, namely testing the normality of the data and the linearity of the data. The results showed that there is no significant effect of interest in learning on understanding mathematical concepts with the regression equation: \( Y = 72.583 + 0.198X \). So it can be concluded that interest in learning affects students’ ability to understand mathematical concepts in an insignificant way.

Keywords: Interest in learning mathematics, Understanding of mathematical concepts, Pattern of number.


INTRODUCTION

Mathematics is the universal science that underlies the growing sophistication of technologies, plays a prominent role in various fields, and stirs human thinking (Chairani, 2016). Mathematics is a subject in every education. Mathematics is a scientific basis for the study of other sciences. Learning this math is so that learners can think critically, reason, understand a concept, represent, and so on. Mathematics itself is closely linked with daily life and applications ranging from the basics to the complex. Learning this mathematics thus plays an important role so that learners can think critically and analytically.

Math study is an activity aimed at gaining the knowledge that learners build and should give learners the opportunity to discover concepts in mathematics. Mathematical learning is required to be presented to all students from a basic education onward to provide students with logical thinking skills, creative, critical, systematic, analytical, and collaborative skills.
Math study itself is connected to daily life, thus enabling students to understand the problems of mathematical problems. However, realities in the field, the mathematical performance of students is also underrated. The question can be seen from the national exam average score of the junior high student math test from 2016-2018. The statement is evidenced by data obtained from the ministry of education and culture of the republic of Indonesia shown at Table 1.

Table 1. Average score of the national exam of mathematics

<table>
<thead>
<tr>
<th></th>
<th>In 2017</th>
<th>In 2018</th>
<th>In 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50.31</td>
<td>43.34</td>
<td>45.52</td>
</tr>
</tbody>
</table>

Students often perceive math as a complex subject that is difficult to comprehend. Moreover, they may also experience anxiety when dealing with math. Despite having access to school-provided textbooks, some students lack effective study habits and interest in math, resulting in inadequate understanding of the material presented by their teachers. As a consequence, some students struggle with problem-solving and lose interest in math, especially in topics related to numerical patterns.

Monotonous learning approaches have a negative impact on students' interest in mathematics. This is because such learning processes discourage students from being active participants, which can lead to disinterest in learning (Sunita et al., 2019). Hence, educators need to adopt appropriate teaching strategies that promote interactive learning and motivate students to participate actively. Additionally, acquiring mathematical abilities is crucial for students to excel in math subjects (Mulyaningsih et al., 2020). One of the essential mathematical abilities that students must develop is conceptual comprehension.

Mathematics is a subject that comprises numerous concepts, and each concept is an abstract idea associated with objects that can be classified as examples or exceptions. Mathematical terms are interconnected, and the relationship between concepts underscores the significance of grasping a mathematical idea. Hence, it is not possible to comprehend a subject without understanding the preceding topic or lesson learned earlier (Novitasari, 2016).

According to Hamdani (2011), interest is an enduring inclination towards a particular field or object, which can influence learning activities and students’ ability to comprehend mathematical concepts. Using this approach, students who have an interest in learning mathematics tend to have a better understanding of mathematical concepts compared to those who do not. Consequently, it is essential to nurture students’ interest in math to enhance their performance and understanding of the subject.

Referring to PERMENDIKBUD Number 58 of 2014 math subjects have a purpose for learners at each level of education: to bring students into line with logical thinking, critical, creative, innovative analytical, systematic, and understanding of mathematical concepts, and to work together well. Furthermore, as outlined Depdiknas (2006) regarding the purpose of learning that learners have the following abilities.

Learning mathematics is intended to equip learners with various skills, including: (a) comprehending mathematical concepts, identifying relationships between concepts, and applying concepts accurately and flexibly to solve problems; (b) reasoning with patterns and properties, performing mathematical operations for generalization, compiling evidence, or explaining mathematical ideas and statements; (c) problem-solving, which involves understanding a problem, modeling it, interpreting the model, and interpreting the resulting solutions; (d) communicating mathematical ideas using symbols, charts, or other means to explain the situation and the problem; (e) recognizing the role of mathematics in everyday life; and developing a sense of independence, interest, aversion, and confidence in studying math and solving problems diligently.

Based on this, learners who understand mathematical concepts should be the primary focus for those who are learning mathematics. When learners understand mathematical concepts, they can apply them in their daily lives, leading to better learning outcomes and the development of other math skills. Understanding concepts is a basic skill that learners must
master to improve their learning in math. Effendi (2017) states that understanding concepts shows that learners can describe the knowledge of the materials they have learned in their own language, both in part and as a whole. The success of mathematical learning should not only be measured by how well learners can calculate and memorize formulas, but also by their ability to understand concepts, master the material, solve problems, and learn effectively.

The ability to understand a student's mathematical concepts is something that needs improvement, as stated by Tona et al., (2019). The ability to discern mathematical concepts is a skill that students need to understand ideas or ideas in studying mathematics through proper procedures. Concept comprehension is also closely related to the ability to reason, communicate, and solve problems. If students have good concept comprehension, it will help them achieve the purpose of learning. Whether students' concept comprehension is good or not is an indicator of their understanding. Students need to understand concepts so they can apply them properly and effectively when learning math, as noted by Mawaddah and Maryanti (2016). Students are considered to understand concepts when they can properly define them, identify them, provide examples or non-examples of concepts, develop skills of mathematical connections, study what mathematical ideas are associated with building deep understanding, and apply mathematics beyond its mathematical context (Arifah & Saefudin, 2017).

The lack of learning achievements by learners can be attributed to a lack of understanding of concepts. According to research by Rais and Ferinaldi (2019), there is a strong and significant correlation between interest in learning and understanding concepts, with a percentage of 90.630%. Additionally, research by Effendi (2017) indicates that learners' understanding of concepts has not been fully met in each indicator of concept understanding. Learners who are able to respond to questions correctly are likely to have a positive effect, allowing them to develop a deeper understanding of the concepts being taught by the teacher (Warmi, 2019).

Ideally, understanding a concept requires an activity that can spark interest in learning and direct learners to understand that concept. Social, emotional, and environmental factors can be used to increase student interest in learning (Rais & Ferinaldi, 2019). In developing student interest in learning, teachers and parents should encourage and motivate learners, particularly in math lessons (Kholisyoh et al., 2020). Slameto (2010) confirms that interest is the feeling of attraction and liking for something or an activity, without coercion. If students have an interest in a subject, they will focus on learning it, and they will not be bored or unmotivated.

Mathematics is an exact and concrete field of knowledge that can lead one towards their goals and instill discipline in their mind. Therefore, if taught correctly, math can enhance thinking and reasoning skills. A strong interest in learning enables students to study and practice mathematics well, making it easier to develop critical, creative, careful, and logical thinking. Through math, students can learn to apply science in a useful manner (Sirait, 2016).

Keen interest in learning activities has a profound effect on learning outcomes. Whether a student's interest in a lesson can be seen from how engaged they are in learning, and whether they complete assignments or not. Additionally, interest in learning can influence students' ability to focus during learning activities (Nuraeni, 2021). This is consistent with a study conducted by Sembiring and Mukhtar (2013) which found that learners with high interest in learning had better results compared to students with low interest in learning.

Interest can influence the quality of a learner's learning in a particular field. This is because with high interest in learning, if the lesson materials are not consistent with the learners' interests, they may not learn well because the materials are less attractive. On the other hand, learning materials that involve learners are easier to remember and communicate with, because interest strengthens the learning activity (Prastika, 2020).

This research aims to investigate the factors that influence the understanding of mathematical concepts among eighth-grade students at SMP Negeri 28 Tangerang, with a focus on their interest in learning. The objectives of this study are: (1) to examine the relationship between learning interest and the understanding of mathematical concepts among
the students, and (2) to determine the correlation between learning interest and the understanding of mathematical concepts among the students of SMP Negeri 28 Tangerang.

**METHOD**

The approach used is the quantitative approach, which is associated with its causal nature. Causal research aims to clarify a problem intrinsically caused by a link between two or more variables (Sugiyono, 2010). The purpose of this study is to identify the influence between two variables. In the study, there are two variables: understanding of mathematical concepts as the dependent variable and interest in studying mathematics as the independent variable that affects it.

The population for this research consisted of all students in class VIII at SMP Negeri 28 Tangerang. The sampling technique used was simple random sampling, as described by Riduwan (2013), where samples were chosen randomly from the population without considering any strata of the population members. The study included 36 students from class VIII-D as the subjects.

The instruments used in this study are test instruments and non-test instruments. The non-test instruments used are questionnaires to measure the students' interest in learning, based on the thesis by Rusdi (2017), with the following indicators: (a) interest; (b) joyfulness; (c) attention; (d) participation; (e) sense of consciousness. The test instrument used to assess the understanding of mathematical concepts is an essay-type test based on the thesis by Ainun (2019), with the following indicators: (a) reviewing a concept; (b) categorizing topics based on certain characteristics (by concepts); (c) providing examples of a concept rather than just examples; (d) presenting concepts in various forms of mathematical representation; (e) identifying the necessary conditions or requirements of a concept.

Data analysis techniques involve the careful and systematic processing of data obtained in research. In this study, hypothesis testing will be conducted using linear regression analysis. Prior to the hypothesis testing, it is necessary to perform prerequisite analyses, such as normality tests and linearity tests. The data on students' interest in learning mathematical concepts will be analyzed using inferential statistical analysis. Before analyzing the data, the ordinal data obtained from the questionnaire will be converted into interval data.

Data normality tests and linearity tests are conducted as prerequisites for analysis. The data normality test is derived from ordinal data, which is the interest in learning mathematics that has been transformed into interval data, and the data on student mathematical concepts. The normality test is conducted using the Kolmogorov-Smirnov test. Then, the linearity test is performed to measure the degree of the relationship, determine the direction of the relationship, and predict the dependencies when independent values are known.

Linearity testing aims to determine whether the relationship between an independent variable (X) and a dependent variable (Y) is linear or not significant. The linearity test used in this study has a significant level of 0.05. Data is considered linear if the deviation from linearity score is greater than 0.05. The prerequisite analysis was conducted using the SPSS 25 program. Simple linear regression analysis was used to test the hypothesis when the data distribution is normal and linear. The strength of the relationship between the X variable and Y variable was determined using the coefficient of determination (KP) formula and its significance was tested. The study uses a two-variable paradigm, where the variables examined are the interest in learning (X) and understanding of mathematical concepts (Y). The study design can be seen in Figure 1.

![Figure 1. Research design](image)
RESULTS AND DISCUSSION

Result

Based on the results of data processing, the researcher obtained a descriptive statistical picture as shown in Table 2.

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Interest in learning mathematics</th>
<th>Understanding of mathematical concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>51.97</td>
<td>82.89</td>
</tr>
<tr>
<td>Maximum</td>
<td>78</td>
<td>100</td>
</tr>
<tr>
<td>Minimum</td>
<td>32</td>
<td>50</td>
</tr>
</tbody>
</table>

Table 2, the variable score of interest in learning mathematics from 36 students of the viii-d class of 28 tangent has an average of 51.97. This indicates that interest in students' math is likely to be positive and quite good. Whereas the ability of learners to understand mathematical concepts has an average score of 82.89. This has to mean that an understanding of the student's mathematical concepts tends to be positive and is reasonably high.

Before testing a hypothesis, a prerequisite test is testing normality and linearity. The normal test is to see if there's any normal or no residual value. The data normality test used using Kolmogorov-Smirnov, with the criteria for decision making when sig value > 0.05 then the data distribution is normal instead if sig value < 0.05 then the data distribution is abnormal. Visible data normality test results on Table 3.

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<table>
<thead>
<tr>
<th>Table 3. Data normality test</th>
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<tbody>
<tr>
<td>One-Sample Kolmogorov-Smirnov Test</td>
</tr>
<tr>
<td>Sig(2-tailed)</td>
</tr>
<tr>
<td>0.200</td>
</tr>
</tbody>
</table>

Based on Table 3, using a significant level of 0.05 it has been found that a sig value = 0.200 which means sig. value > 0.05 which means a normal distributed data residual value. Next, the prerequisite to fulfil is the linearity test. The linear test aims to know linearity or no form of the relationship between the dependent and independent variables. The criteria for decision making when the value of sig. deviation from linearity > 0.05 then dependency and independent variables are linear. Linearity test results can be seen at Table 4.

<table>
<thead>
<tr>
<th>Table 4. Data linearity test</th>
</tr>
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<tbody>
<tr>
<td>ANOVA Table</td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

Based on the linearity test, it has a 0.05 significance value of sig deviation from linearity of 0.500 which means sig. deviation from linearity > α or 0.500 > 0.05. With the basis of decision
making if the \textit{sig. deviation from linearity} > 0.05 then it may be concluded that there is a linear relationship between the interest of learning and understanding of the student's mathematical concepts. After a prerequisite test, obtain normal distributed data and linear patterns. Next for hypothesis testing with simple linear regression analysis like Table 5.

Table 5. Linear regression analysis

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>72.583</td>
</tr>
<tr>
<td></td>
<td>Interest to Learn</td>
<td>.198</td>
</tr>
</tbody>
</table>

The significant probability value of 0.404 indicates a value greater than the value at its significance 0.05 (0.404 > 0.05). Based on the results of these hypothetical tests it may conclude that the variable interest in learning has a positive and insignificant impact on understanding students' mathematical concepts. Then for regression equations: \(Y = 72.583 + 0.198X\) which means each rise one interest in learning will increase 72,781 units. Then to determine how interest in learning affects students' concept comprehension, using the value of coefficient determinations or \(R^2\). The coefficient of the determinations is 0.021 or has the sense that the impact of interest in learning about an understanding of 2.1% mathematical concept can be seen at Table 6.

Table 6. Coefficient determinations

<table>
<thead>
<tr>
<th>Model Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>a. Predictors: (Constant), Interest to Learn</td>
</tr>
</tbody>
</table>

Therefore, based on calculations statistically using SPSS 25 and testing its hypothesis that there is a positive influence for interest in studying but not significant on the understanding of mathematical concepts in class VIII students for the 2022/2023 academic year at SMP Negeri 28 Tangerang. Or in other words there are other factors that influence students' understanding of mathematical concepts that are not reviewed in this study. This corresponds with research by Firmansyah (2015) with a \textit{sig. value} = 0.285 > 0.05 which suggests an interest in learning the results of an insignificant mathematical study. However, the study stands in stark contrast with research by Rais & Ferinaldi (2019) which suggests that there is an influence between interest in learning about a student's significant mathematical concept with a contribution of 90.630%.

According to the normal distribution data normality test with a p-value of 0.200>\(\alpha\), it was then tested for linearity in the regression equation = 72.583 + 0.198X, which produces a score of 0.500>\(\alpha\), meaning that the regression model is linear. Furthermore, to test the significance of the regression, the p-value of 0.404>0.05 means that H0 (regression is not significant) is accepted. In other words, the interest in learning does not significantly affect students' ability to understand mathematical concepts. Therefore, it can be concluded that the learning interest variable has a little contribution to the variable understanding of mathematical concepts in class VIII students of SMP Negeri 28 Tangerang.

**CONCLUSION**

Based on the results of processing and analysis of research data that has been carried out, the conclusion can be given that there is a positive influence between learning interest on
students' ability to understand mathematical concepts but not significant with a correlation of 2.1%. This shows that the involvement of students' interest in learning is only 2.1% of the understanding of mathematical concepts and the remaining 97.9% is influenced by other factors that are not modeled in this study. Further research may explore effective strategies for enhancing mathematics learning interest among middle school students.

REFERENCES


Slameto. (2010). Belajar dan Faktor-faktor yang Mempengaruhi. PT Rineka Cipta


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