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Remediation of Students Misconception on Triangle and Rectangular Using *PowerPoint* Media Assisted Demonstration Method

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Abstract:

Remediation of misconceptions is important and is an effort to reduce student misconceptions. This study aimed to remediate or reduce student misconceptions on squares and triangles material using demonstration methods assisted by powerpoint media. The research method used was an experimental design with One Group Pretest Posttest Design with a research sample of 24 students. The test instrument used in this study was adopted from previous research in the form of the Four Tier Rectangle and Triangle Test (FTRTT). Remediation is carried out using demonstration methods assisted by powerpoint media. The data analysis result showed a decrease in the average percentage of student's misconceptions by 7 % after learning. Wilcoxon test results with the Asymp value . Sig. (2-tailed) has a value of 0,008, so it can be concluded that there is a significant effect of demonstration methods assisted by powerpoint media on reducing misconceptions in grade VIII students of SMPN 18 Batanghari.

Keywords: Remediation, misconception, demonstration method, Powerpoint media

1. Introduction

Mathematics schools are the elements or parts of mathematics were selected based on or oriented to the interests of education and the need to dominate and technology in the future (Syaiful, 2011, p. 1). In addition, according to Hudoyo, the purpose of teaching mathematics is so that the knowledge conveyed can be understood by student (Hendriana, 2017, p. 7)

Understanding the concept that is complete and in accordance with the concepts recognized by experts on mathematics learning will not hinder students' understanding of other concepts. Because if the students' understanding of the concept is complete and in accordance with the concept recognized by the experts, there will be no misconception about a learning concept. Misconception is a concept that is not in accordance with the concept recognized by experts (Suparno, 2013, p. 8). It can be said that a weak understanding of the concept will lead to misconceptions.

Geometry is seen as a difficult subject because geometry is abstract. This is also supported by the results of research by Özerem (2012, p. 727) that there are misconceptions and a lack of students' knowledge on geometry material. The concept of triangles and rectangles is one of the materials for studying geometry in school mathematics, where students still experience difficulties, especially in expressing the definition of a rectangular shape. Based on the documentation of the student exercise answer sheets, the following is obtained:

Figure 1: Answer Sheet for the Training of Even Semester Students for the Academic Year 2019/2020

Geometry is seen as a difficult subject because geometry is abstract. This is also supported by the results of research by Özerem (2012, p. 727) that there are misconceptions and a lack of students' knowledge on geometry material. The concept of triangles and rectangles is one of the materials for studying geometry in school mathematics, where students still experience difficulties, especially in expressing the definition of a rectangular shape. Based on the documentation of the student exercise answer sheets, the following is obtained:

In Figure 1, it can be seen that students have not been able to restate the concepts that have been studied, have not been able to identify the properties of operations or concepts, and have not been able to apply the concept logically, so that students have not been able to determine the set of solutions. In no answer sheets of students there is an error yes i tu learners wrong in substituting into the formula trapezoidal side circumference and area trapezoid so that learners wrong in giving an answer.

Based on the findings in Figure 1, the understanding of students' concepts regarding the area and circumference of the trapezoid is not yet complete. A sovereign, when learners' understanding of the concept is not intact and does not correspond with the concept of recognized experts, it can allow the case of his misconceptions in the learning.

Ningrum & Budiarto (2016) show that misconceptions that occur in triangular and quadrilateral include concepts related to definitions and properties. So that educators are expected to be able to provide concepts related to the definition and properties of quadrilateral so that students do not just memorize formulas and understand calculations.

Misconceptions in the material of rectangles and triangles must be resolved immediately because it will cause students to experience errors at the next level, namely in the material of space and will cause a chain of misconceptions that will not be broken because the initial concept is wrong, because it is necessary to identify the understanding of concepts that students have and their causes in order to determine actions to overcome them.

According to Hasanah (2019, p. 17) One of the causes of misconception is the students themselves. Among other things, such as the preconceptions of students who understand the concept before experiencing formal learning, the community environment where students live, close friends who are study partners, life experiences, wrong intuition from the learning process, cognitive development stages of students, and students' interest in lesson.

Based on various factors that cause and result from misconceptions in students, it is appropriate for educators to make improvements or remediation of misconceptions so that the misconceptions found in students are not sustainable. This is also supported from the opinions Maison et al (2019, p. 195) that misconceptions should be avoided and if necessary remediated already occurred because it can be a factor pe ng resistor in the learning process of students. The first step that must be done is to identify the misconceptions experienced by students. There are three ways that can be used to find out the initial knowledge and misconceptions found in students, namely: (1) diagnostic tests through written tests and giving reasons, (2) clinical interviews, and (3) presentation of concept maps (Yuliati, 2017, p. 55). In conducting diagnostic tests, educators can use the *four-tier test*. The *four-tier test* is the development of a *three-tier test* combined with a *confidence rating* on the reasons for the answers, so that the level of confidence in the answers and the reasons for the answers is more accurate. Using a *four-tier test* can help reveal the level of confidence of students regarding how much confidence students have about the reasons for the answers they provide (Maison et al., 2020, p. 33).

After identifying the misconceptions, the data obtained can be used as a reference for educators to make improvements to the misconceptions that occur. The process of correcting misconceptions can be done by improving the learning process, this is because the learning and teaching process can provide opportunities for student misconceptions.

One way to help overcome misconceptions on the matter quadrilateral and the triangle is to do pe mbelajaran re-use demonstration method. This is also supported by the opinion of Ameh & Dantani (2012, p. 30) that demonstration methods can motivate students to learn and are believed to save time and avoid possible misunderstanding of concepts or misconceptions. The demonstration method is a method of presenting lessons and demonstrating to students about a certain process, situation or object, either real or just imitation (Sanjaya, 2016, p. 152). In applying the demonstration method, it is necessary to use media or props that are compatible with the material of squares and triangles so that students can observe directly the rectangular and triangular material described by the educator.

One of the media that can be used to assist the learning process with the demonstration method is the *PowerPoint* media. *PowerPoint* is a software that will help in compiling an effective, professional, and easy presentation. *PowerPoint* will help an idea to be more interesting and clearer in purpose because it is presented in the form of *slides*, presentation *outlines*, electronic presentations, dynamic *slide* displays, including interesting clip art on a computer and displayed on a screen using an LCD Projector (Y usuf E, et al., 2012: 234).

In its application, the demonstration method assisted by *PowerPoint* media will provide opportunities for students to pay attention to demonstrations conducted by educators and observe the triangles and rectangles presented on *PowerPoint* media that displays *slides* using an LCD projector. The material presented on the *PowerPoint* media is not in a long description but is presented in a simple form and presents important *points* of triangles and rectangles, such as the area of a rectangle presented with a small square or unit square arranged to form a rectangle. To determine the area of a rectangle based on the unit dimensions arranged to form the rectangle, the educator demonstrates the steps. Thus, the initial knowledge that students have (preconception) will increase and can improve the stages of cognitive development that are not in accordance with the concepts being studied and increase the interest of students to learn the concepts of squares and triangles.

The importance of identifying and remediating misconceptions in the material of squares and triangles is because this material is included in the basic material in mathematics learning, which is related to further learning, namely the material of flat-sided structures. So that with the identification and remediation of misconceptions, it is hoped that there will be no chain of conceptual misunderstandings in the next material. The results of the observations indicate that class VII SMPN 18 Batanghari is prone to misconceptions that need to be identified and remediated. From several research results and descriptions that have been put forward, the questions of this study are as follows: (1) What is the percentage of students' misconceptions before being remediated using the demonstration method assisted by *PowerPoint* media? (2) What is the percentage of students' misconceptions after being remediated using the demonstration method assisted by *PowerPoint* media? (3) Is there an effect of the *PowerPoint* assisted demonstration method on reducing misconceptions?

2. Research Methods

The method used in this research is *Poor Experimental* and the design used is *One group Pretest-Posttest Design*. The design in this study is shown in Figure 2. This research was conducted in one experimental class, beginning with giving a *pretest* to determine the students' initial abilities, then carrying out learning using demonstration methods assisted by *PowerPoint* media. After learning is complete, a *posttest* is carried out to determine the decrease in student misconceptions.

Figure 2: One-Group Pretest-Posttest Design

Description: X : Treatment

- O_1 : Measurement results before being given treatment
- O_2 : Measurement results after being given treatment

The population in this study were all students of class VIII SMP N 18 Batanghari academic year 2020 / 2021 which comprises d from two different classes. Class VI II A consists of 24 students and class VIII B consists of 25 students. The research sample was class VIII A consisting of 24 students. The instrument used in this study was a four- tiered diagnostic test conducted before re-learning (pretest) and after re-learning (posttest). Research instrument is diadop the whole of research Hasanah (2019) which had previously been declared valid and la yak used in the study so p eneliti not re-validate.

After diagnosing students, the next stage is data analysis. To determine students' misconceptions, a one-level test (first level), two-level test (first and third level) and a four-level test (first to fourth level) were carried out. This was done to compare the percentages on the one-level, two-level and four-level tests, which is useful for knowing the errors that students have, whether due to misconceptions or due to understanding other concepts. Furthermore, the conception profile of students before and after being given remediation was seen based on the average percentage of misconceptions in the *pretest* and *posttest*.

Non-parametric statistical tests were performed without performing any parametric test requirements. The non-parametric *statistical* test used was the *Wilcoxon* test. Is the decision that if the significant value $> 0,05$ of the H_0 is accepted and H_a rejected. If the value is significant $< 0,05$, then H_a accepted and H_0 rejected.

3. Results and Discussion

This research is a quantitative study that aims to determine the effect of demonstration methods assisted by *PowerPoint* media on reducing misconceptions of class VIII SMP N 18 Batanghari students on triangles and rectangles. This research was conducted in one experimental class, beginning with giving a *pretest* to determine the initial abilities of students and identifying student misconceptions, then carrying out learning using demonstration methods

assisted by *PowerPoint* media. After learning is complete, a *posttest* is carried out to determine the decrease in student misconceptions. The research sample consisted of 24 students who were obtained randomly and were taken using the *simple random sampling* technique and obtained class VIII A as the research sample.

After being given learning using a demonstration method assisted by *PowerPoint* media. The final conception of students who are correct on the material of squares and triangles as a whole increase varies. This can be seen from the recapitulation of the percentage of students' misconceptions in the *pretest* and *posttest* in table 1 below:

#M	Description of Misconceptions	Pretest (%)	Posttest (%)
M1	Students understand that if there is a line that cuts a rectangle into two congruent shapes, then the axes of symmetry in the rectangle are all these lines.	29	13
M2	Students understand that if there is a line that divides the rectangle into two congruent shapes, then the axis of symmetry in the rectangle is a diagonal line that divides the rectangle.	4	0
#M	Description of Misconceptions	Pretest (%)	Posttest (%)
M3	Students understand the size of one corner of the rectangle which has a constant equal to the right angle.	38	17
M4	Students understand the size of one corner in a rectangle which has a constant equal to the sum of the right angles and constants.	17	8
M5	Students understand that the area of a rectangle cut by two congruent triangles is the area of the original rectangle.	4	0
M6	Learners understand that the sides of a rectangle are the same as the sides in a parallelogram.	25	17
M7	Learners understand the perimeter of the rectangle whose sides are cut off is not the same as the circumference of the previous rectangle.	23	15
M8	Students understand that the hypotenuse side of a right triangle is the side that is oblique.	21	10
M9	Students understand that if there are two isosceles triangles that are similar and arranged into one isosceles triangle, the magnitude of one of the angles has the same coefficient as the straightener of the angle.	4	4
M10	Students understand that if there are two isosceles triangles that are similar and arranged into one isosceles triangle, the magnitude of one of the angles has a coefficient equal to the difference between straight angles and the straightener.	13	8
M11	Students understand the concept of the area of a triangle is the base times the height.	0	0
M12	Students understand the concept of the area of a triangle is the base times the height times the vertical side.	0	0
Average Percentage		15%	8%

Table 1: Recapitulation of the Percentage of Students' Misconceptions at the Pretest and Posttest

From Table 1 it can be seen that the profile of the initial conception of learners seen from the average percentage of misconceptions learners prior to remediation (relearning) is quite high with the average 15% and after remediated (relearning) using the method of demonstration aided media *PowerPoint* become 8% means going decrease in the average percentage of students' misconceptions of 7%.

The non-parametric *statistical* test used was the *Wilcoxon* test. Is the decision that if the significant value of $> 0,05$ the H_0 is accepted and H_a rejected. If the value is significant, $< 0,05$ then H_a accepted and H_0 rejected. *Wilcoxon* test results can be seen in table 2.

	Pretest Posttest
Z	-2,670 ^b
Asymp. Sig. (2-tailed)	,008

Table 2: Wilcoxon Test Results

From table 2, it is known that the *Asymp* value. *Sig. (2-tailed)* value 0,008. Because $0,008 < 0,05$, it can be concluded that H_a accepted. This means that there is a difference between the percentage of students' misconceptions for

the *pretest* and *posttest*. It can be concluded also that terdapat influence significantly between demonstration methods of *powerpoint* media-assisted to decrease misconceptions learners of class VIII SMPN 18 Batanghari

Based on data analysis, obtained by percentage of misconceptions for all levels with the average value of the percentage of misconceptions pretest for 15% while the average value of the percentage of misconceptions posttest for 8%. Overall, there is a decrease in the average percentage of student misconceptions by 7%. Then from the data the Wilcoxon test is carried out, from the Wilcoxon test the Asymp value 0,008 is obtained. Sig. (2-tailed) that is. after comparing between 0,008 with 0,05 turns $0,008 < 0,05$.

In testing the hypothesis, it was found that there was a decrease in student misconceptions after being given re-learning or remediation using demonstration methods assisted by *PowerPoint* media on triangles and rectangles. In this study, the concepts of triangles and rectangles are divided into four concepts, namely: understanding the types and properties of triangles, understanding the perimeter and area of triangles, understanding the types and properties of rectangles, and understanding the perimeter and area of rectangles.

The initial conception of students, seen from the average percentage of misconceptions at all levels, is still quite high. The initial conception of students contradicts the conception of scientists. Then there are some students who have difficulty understanding the types and properties of rectangles. Students assume that the size of one of the angles in a rectangle that has a constant equal to a right angle should be the size of one of the corners of a rectangle that has a constant equal to the difference between the right angles and the constant.

Learning using demonstration methods assisted by *PowerPoint* media can help change the initial conception of students who often have the potential to experience misconceptions so that there is a process of assimilation and accommodation in remediation activities. In learning, educators convey triangles and rectangles which are demonstrated with the help of *PowerPoint* media. *PowerPoint* media is one of the media or it can be said as an alternative learning resource that serves to demonstrate abstract triangular and quadrilateral concepts so that students are expected to more easily understand the material conveyed through *PowerPoint* media.

In its application, the demonstration method assisted by *PowerPoint* media will provide opportunities for students to pay attention to demonstrations carried out by educators and observe the triangles and rectangles material presented on *PowerPoint* media that displays slides using an LCD projector. The material presented on the *PowerPoint* media is not in a long description but is presented in a simple form and presents important points of triangles and rectangles, such as the area of a rectangle presented with a small square or unit square arranged to form a rectangle. To determine the area of a rectangle based on the unit dimensions arranged to form the rectangle, the educator demonstrates the steps. Thus, the initial knowledge that students have (preconception) will increase and can improve the stages of cognitive development that are not in accordance with the concepts being studied and increase the interest of students to learn the concepts of squares and triangles.

4. Conclusion

Based on the results of research and discussion, the conclusions of this study include: (1) the large percentage of students' misconceptions before being remediated using the demonstration method assisted by *PowerPoint* media is 15% (2) the large percentage of student misconceptions after being remediated using the demonstration method assisted by *PowerPoint* media is 8% (3) the value Asymp. Sig. (2-tailed) value 0,008. Because $0,008 < 0,05$, it can be concluded that H_0 is accepted. This means that there is a difference between the percentage of students' misconceptions for the pretest and posttest. It can be concluded also that terdapat influence significantly between Thus, demonstration methods of *powerpoint* media-assisted to decrease misconceptions learners of class VIII SMPN 18 Batanghari.

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