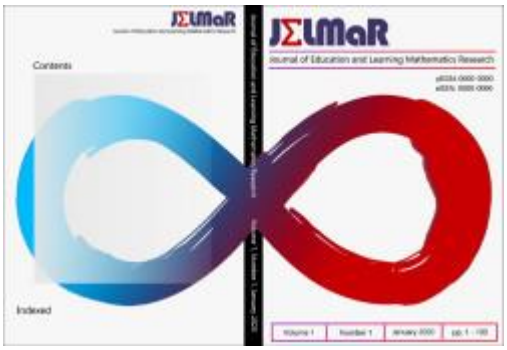

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SPADE Model to improve Mathematics Learning Outcomes in Elementary Schools

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Abstract *: This study is aimed at improving mathematics learning outcomes in geometry at SDN Prawoto 02 Pati through the SPADE model in the 2021/2022 academic year. The research design used a quantitative one-group pretest-posttest design. The research sample is 32 students. The test data for learning mathematics results in the form of multiple choice with a total of 25 questions. Data analysis using t-test. The results showed that there was an increase in student learning outcomes by applying the SPADE model which was seen from the pretest and posttest scores on the geometry material. Judging from the mean value of the pretest of students numbered 58.5 while, the average value of the posttest was 76.2. The increase in the pretest and posttest scores was 17.7. The increase is by t-test with a value of (2-tailed) < 0.05 or 0.000 < 0.005 so that H0 is rejected and Ha is accepted. The results of this analysis can be obtained that the use of camtasia media is very effective because it can improve mathematics learning outcomes optimally.*

Keywords: SPADE model, learning outcomes mathematics, geometry, elementary school

INTRODUCTION

Mathematics as an educational science must be applied at all levels of education. Mathematics subject is taught starting from elementary school in providing debriefing to students who have ability to think logically, analytically, systematically, critically and creatively, as well as the ability to work together (Rahmadita & Nur, 2021). In addition, mathematics is defined as a scientific discipline that plays an important role in the development of human thinking and the development of science and technology (Rahmawati, E., & Tandiayuk, 2015). Because according to Russefendi mathematics is formed as a result of human thinking related to ideas, processes, and reasoning (Rahayu & Kusuma, 2019). Therefore, mathematics is very important to be learned by every individual starting from the level of education in elementary schools to universities.

Mathematics learning is taught in elementary schools to equip students with the ability to think logically, analytically, systematically, critically, and creatively, as well as the ability to share (Rahmawati, 2013). In learning mathematics, different content is presented at different levels of education because it is adapted to the cognitive development of students. *The National Council for Mathematics Teachers* (NCTM) classifies mathematical content consisting of numbers and their operations, algebra, geometry, measurement, data analysis, and probability (Fatimah & Amam, 2018).

Geometry is one of the content standards found at the elementary school level which studies points, lines, airplanes and spaces as well as their properties, measurements, and relationships with one another (Nur'aeni L et al., 2020). In learning geometry, flat shapes and spatial shapes are discussed. Elementary school students should understand these concepts well because they can support other topics in them.

Many objects around that have geometric shapes such as blackboards, chalk boxes, pencil cases. According to Copeland, (1966) geometry for elementary schools is intuitive in that the concepts are developed from the child's intuitive experience, the child's spatial view, and the objects - among them. In addition, Suwito (2018) says that geometry can be understood as a material for solving problems in various real-life situations. By Geometry, students is able to foster logistical thinking skills, to develop problem-solving and reasoning skills and can support many other topics in mathematics (Nur'aeni, 2010). Therefore, it is very important for students to learn geometry in elementary school.

Based on field situations, many research results show that most students are very poorly mastered geometry (Nur'aeni L et al., 2020). Based on the results of interviews and observations made by Cahyaningsih, (2018) data were obtained that knew the mathematical material from what was being studied, but when conducting an evaluation it was difficult to learn the basic concepts of the material being studied. This is because teachers are accustomed to using conventional learning models such as lectures, questions and answers, and exercises or assignments. resulted in less active involvement of students in the learning process, and the learning outcomes obtained by students were not optimal.

In line with research conducted by Lisdiana (Lisdiana et al., 2021)obtained data that there were errors made by students when working on the area of the diamond they could not determine what was known and what emerged from the questions, besides that students were unable to understand the problems presented in the problem so that they are not able to make mathematical models in solving problems. A lack of students' understanding of the concept of the area of a rhombus makes erroneous. With the lack of students' understanding of the geometry material presented by the teacher, the learning outcomes are not optimal and do not achieve complete learning. Thus, students still do not understand the geometry material meaningfully because some teachers still carry out an abstract learning process and only memorize formulas.

Factors that influence the occurences of teaching and learning process of mathematics cause the problems of students' difficulties in understanding the concept of geometry are students, teachers, infrastructure and facilities, and assessment. It is found. The result found that geometry material which is as one of the materials in mathematics considered difficult by students because of the lack achievement of student learning outcomes (Nur'aeni, 2010). Based on the problems above, it is necessary to plan and improve learning to improve students' understanding (Nur'aeni L et al., 2020). Mathematics learning outcomes are an indicator that can be used to measure cognitive, affective, and psychomotor abilities. Syam in Cahyaningsih, (2018) revealed that ideal learning outcomes include the psychological realm that changes as a result of students' experiences and learning processes.

The learning barriers experienced by students can be overcome by the teacher through improving the learning process. In line with this, teachers create the process of effective and innovative learning, including the use of learning models that are as effective as possible in a fun and passionate and meaningful atmosphere (Ramadhani & Koryati, 2018). Therefore, one of the efforts that teachers can make is to use appropriate learning models in delivering material to students (Fauzi & Arisetyawan, 2020). In choosing a learning model, the teacher should adapt to the learning barriers experienced by students by considering the stage of students' cognitive development. According to Piaget in Bujuri, (2018) the thinking of elementary school students is called concrete operational thinking. Therefore, the learning model used by the teacher must be contextual. In addition, students will more easily absorb the material if learning can be packaged in a more pleasant form (Nurilfatihah et al., 2021). This is in line with Dienes' opinion which states that the presentation of mathematical concepts that are manipulated in the form of games will be easier for students to understand (Rahmawati, 2013). One of

the learning models that can be implemented in geometry learning is the *SPADE learning model* . This learning model is packaged in the form of learning that is fun and oriented to contextual learning.

SPADE learning model is one of the research learning models (Nur'aeni L et al., 2020). This *SPADE* learning model has five stages of learning, namely: Singing (singing), playing, analyzing, discussing, and evaluating. The *SPADE* learning model is seen as a real and fun stage of learning mathematics through playing and playing activities so that it can improve students' understanding. This study aims to determine the effect of the application of the *SPADE learning model* on student learning outcomes in geometry learning in elementary schools

METHOD

The type of research used is a quantitative research with an experimental method of type *one group pretest-posttest design* . The subjects of this study were fifth grade students. The population was all fifth grade students of SDN Prawoto 02, Sukolilo, Pati in the academic year 202 1/202 2 who held 3 2 students consisting of 18 boys and 14 girls. There are two types of variables in this study, namely the independent variable is the *SPADE* model and the dependent variable is the result of learning mathematics . Technique Data collection uses a test in the form of multiple choice questions that open 25 questions. The instrument used is in the form of *pretest* and *posttest questions* (Widiyono, 2020). The quantitative data analysis technique uses SPSS 25.0 statistics which include prerequisite tests: normality test, data linearity test, multicollinearity test and homogeneity test, while hypothesis testing uses t-test. T- test or t-test statistical data analysis techniques that can be used to determine whether there is a significant effect between the independent variables on the dependent variable . The t - test was performed with the help of IBM SPSS *Statistics* version 25 application.

RESULTS AND DISCUSSION

Based on the problems discussed in the introduction. The application of the *SPADE model* has a positive effect on improving mathematics learning outcomes in fifth grade students at SDN Prawoto 02, Sukolilo, Pati . The results of the students' *pretest* and *posttest scores* after working on multiple choice questions can be seen in the following diagram :

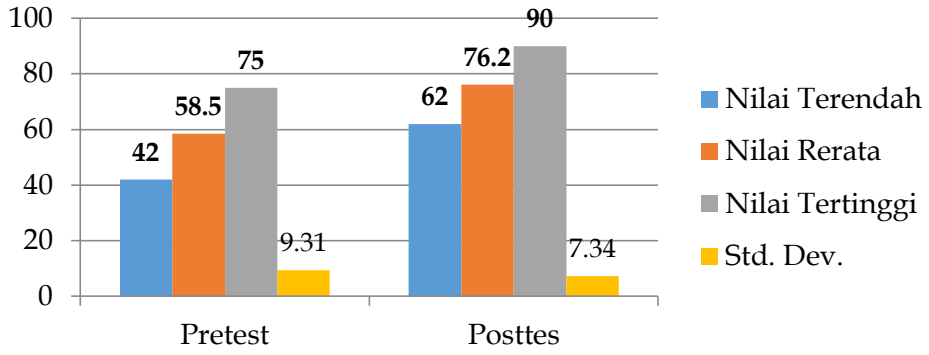

Figure 1. Learning outcomes of *pretest* and *posttest*

Based on the diagram above, it is clear the difference between learning outcomes *pretest* (learning without using the *SPADE model*) with *posttest learning outcomes* (learning using the *SPADE model* of learning). The KKM set by the school is 70. The results of the *pretest study* stated that the lowest score is 42, the highest score is 75, the mean value is 58.5, and the standard deviation is 9.31 . Students who get scores above the KKM are 8 students and those who get below the KKM are 24 students. The results of *posttest* stated that the lowest score was 62, the highest score was 90, the mean value was 76.2, and the standard deviation was 7.34. Students who get scores above the KKM are 29 students and those who get below the KKM are 4 students. Judging from the mean value of the *pretest* of students is 58.5, while the mean value of the *posttest is* 76.2. The increase in the average value of the *pretest* and *posttest* of mathematics learning outcomes was 17.7. Thus, it can be seen clearly that there is an increase in mathematics learning outcomes in geometry material for fifth grade students at SDN Prawoto 02.

The test of learning outcomes conducted by noticing the analysis results of the prerequisite tests by hypothesis testing as follows:

1. Normality test
   The normality test shows that the significance value is 0.200 while the value is 0.05, which means the significance value is > or 0.200 > 0.05. Then H0 is accepted so that it can be said that the data is normally distributed.
2. Data Linearity Test
   The linearity test of the data shows that the significance value of the *deviation from linearity* is 0.762 while the value is 0.05, which means the significance value is > or 0.762 > 0.05. So it can be said that there is a linear relationship between the *dependent variable* (learning outcomes) and *independent validity (SPADE* model) used in this study.
3. Multicollinearity Test
   The multicollinearity test shows that the VIF value is 1,000 and the *Tolerance value* is 1,000, which means that if the VIF value is < 10.0 or 1,000 < 10.0, it can be stated that the data does not have multicollinearity symptoms. While the *Tolerance value* shows that the *Tolerance value* > 0.10 or 1,000 > 0.10 then there is no multicollinearity symptom. So it can be said that the regression model used in this study does not occur multicollinearity symptoms.
4. Hypothesis testing
   The t-test or t-test is a statistical analysis technique that can be used to determine whether there are significant differences between the independent variables and the dependent variable. The t-test was performed with the help of IBM SPSS *Statistics* version 25 application.

Table 1. t-test

Paired Sample Test

Pretest – Posttest	Std. Dev.	Std. Mistakes Mean	Signature (2-tail)
couple 1	6.072	,984	,000

The t-test shows that a significant (2-tailed) value is 0.000 and a value of 0.05, which means a significance value <0.05 or 0.000 <0.005. By looking at the decision criteria for testing the t-test hypothesis, the decision is obtained, namely H0 is rejected and H is accepted. Therefore, there is an effect of applying the *SPADE model* on mathematics learning outcomes in geometry material for fifth grade students at SDN Prawoto 02. This is because the *SPADE model* provides convenience for students in improving memory, reasoning, and logic in learning geometry (Nur'aeni L et al., 2020). The results of the data description show that the value of mathematics learning outcomes on geometry material before using the *SPADE* Model in improving student learning outcomes shows the students' *pretest mean value* of 58.5 while the *posttest average value* of 76.2. The increase in the value of the *pretest* and *posttest* of mathematics learning outcomes was 17.7. Therefore, there is an increase in student learning outcomes in class V SDN Prawoto 02 through the application of the *SPADE model* . This result is in line with the research of Nurfadilah et al., (2020) explaining that the implementation of the SPADE model can show learning development for students in elementary schools.

The results prove that there is an increase in learning outcomes to maximize the process and student learning outcomes ((Nurfadilah et al., 2020). Student responses to the didactic design of a square area based on the SPADE learning model made students more enthusiastic and more interested in the mathematics learning process (Rahmadita & Nur, 2021). This didactic design is designed to make learning more interesting because the *SPADE model is* able to provide uniformed material and the learning process becomes clearer and more interesting, streamlines time and energy, and improves the quality of learning outcomes (Pitria et al., 2021).

SPADE as a learning model has a support system. The support system is in the form of capabilities/skills and technical facilities (Nur'aeni L et al., 2020). The support system in the SPADE learning model is the condition of a crowded class where the class is interpreted to be more lively with the support of the teacher's role and the contribution of the students themselves as well as the facilities that have been provided. These facilities include the use of various learning media, songs, and traditional games. The SPADE learning model is seen as a learning model that is relevant to student development. In addition, the SPADE learning model makes it easier for students to improve memory, reasoning, and logic in learning geometry. This is in line with the finding that traditional games can develop reasoning skills in mathematics learning (Nur'aeni L et al., 2020). In addition, the SPADE model needs to be applied because it is able to minimize learning barriers from several other researchers who have done it (Nurhalimah et al., 2020).

The SPADE model with five stages of learning namely: singing, playing, analyzing, discussing and evaluating will help students in clarifying their understanding of a mathematical concept being taught (Lisdiana et al., 2021; Pitria et al., 2021; Tiana et al., 2021). With the discussion, two-way communication will be established between students and teachers so that they can mutually correct each other an incorrect understanding. The SPADE learning model is very helpful during the learning process to reduce the burden, especially on students because of the learning atmosphere while learning (Permadi et al., 2020).

CONCLUSION

Based on the study results, it was found that the application of the SPADE model was able to improve mathematics learning outcomes in geometry material in class V SDN Prawoto 02, Sukolilo, Pati. This can be seen from student learning outcomes at the time of the *pretest* showing an average value of 58.5, while the posttest mean value of 76.2. The increase in the pretest and posttest scores was 17.7. The increase was rejected by t-test with a value of (2-tailed) < 0.05 or 0.000 < 0.005 so that H_0 and Ha_a were accepted. Thus, it can be said that there is an effect of applying the *SPADE model* to mathematics learning outcomes in geometry material in class V SDN Prawoto 02. Implementation of learning using the SPADE learning model is carried out in several steps including singing , playing (playing), analyzing (analyzing), discussing (discuss), and Evaluate (evaluate). Through these stages the SPADE learning model is more real and fun through playing activities because it improve students' understanding to the concept of geometry learning. By playing concrete with fun are able to foster students' motivation and to attract in learning. Students' understanding of the material concept captures them to maximum learning outcomes and improvements. For this reason, hopefully through the research conducted, it can be used as a reference in the development of education, especially in improving mathematics learning outcomes through the application of the SPADE model in elementary schools.

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