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The Effect Of The Inquiry Learning Model With The Scaffolding Strategy On Students' Mathematical Literacy

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Abstract. One way to improve the quality of learning is by increasing the relevance of the teaching model. The teaching model is said to be relevant if in the process it can deliver students achieve educational goals. Therefore, efforts are needed to be able to convey the subject matter to students with models that are relevant to student needs. One alternative is to use a scaffolding-based inquiry learning model. The purpose of this study was to determine the effect of the use of a scaffolding-based inquiry learning model on the mathematics learning outcomes of the tenth graders of SMA Kyai Ageng Basyariyah. The samples in this study were two classes, namely, class XA and XB which were selected using the cluster random sampling technique. This study uses a Quasi-Experimental Design research design. The form of quasi-experimental design used in this study is the Nonequivalent Control Group Design. The data obtained were analyzed by descriptive statistics. The data collection technique used in this study is a measurement technique. The results showed that the data were analyzed using the t-test at a significant level of 5%, namely the results of >, namely 1,932 > 1,701. Based on the results of the study, it can be concluded that the use of the scaffolding-based inquiry learning model influences the mathematics learning outcomes of the tenth graders of SMA Kyai Ageng Basyariyah.

Key words: Inquiry Learning; Scaffolding Strategy; Mathematical Literacy

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INTRODUCTION

Mathematics plays an important role in directing the human mind to think logically. Students are required to master mathematics because, in addition to being a basic lesson in logical thinking, it also supports their learning success in pursuing higher education. Many students think of mathematics as a boring and scary subject. This will result in low student achievement in mathematics. Lack of student motivation in learning, an unsupportive family environment, and inadequate learning facilities are also factors that greatly influence student achievement. In addition, the limited ability of teachers and the very low welfare of teachers, which affect performance in carrying out basic tasks can also indirectly affect student learning outcomes. Another thing that can affect student achievement is precisely the way the teacher delivers teaching material so that learning can be meaningful for students. For the teaching and learning process to take place effectively and efficiently, what needs to be considered is the learning material, as well as how to convey it to students or models in delivering teaching materials.

Several models are often used in learning such as lectures, discussions, group work, etc. One of the learning models that are considered to be able to help students in learning is the inquiry learning model. Inquiry-based learning is one approach that has a higher level of effectiveness in science-based teaching and is recommended as an important element in pedagogy (Cairns & Areepattamannil, 2019; Deák et al., 2021). Collaborative inquiry-based learning is recommended for study in groups through messages as knowledge sharing (Zhu et al., 2019). These are some of the innovative methods found in exploratory inquiry-based learning. Similarly, motivational strategies can also be included in inquiry-based learning through learning motivation and achievement (Chang et al., 2016). Educators are highly motivated to undertake this endeavor when they are coupled with ideological clarity and knowledge of pedagogical content (Blevins et al., 2020). On the other hand, autonomy and visual reasoning are some of the other tools that significantly help improve inquiry-based learning (Thuneberg et al., 2018). Learning with this model provides opportunities for students to participate actively students will think a lot and ask questions to find their answers to a question in question. This learning will be more meaningful than students only receiving answers from the teacher. Through the inquiry process students will find new things and new knowledge so that through the development thinking with this inquiry process,

students will be equipped to become more successful people in their lives.

The reality in the field shows that the achievement of students' mathematical literacy is still relatively low. This can be seen from the test results given by the teacher which are still below the minimum completeness criteria (KKM) set by each school. In line with this, research conducted by Sumarti.S., and Rahayu.S., (2015), reveals that the achievement of SK and KD, especially in science subjects, is still relatively low, namely 61.2% of achievements are above the KKM set. A similar study was also conducted by Maria (2014), revealing that the achievement of mastery of science concepts by 60.4% of students is also still below the KKM set. The reality on the ground also shows that State Elementary Schools in Cluster VIII, Sawan District, in achieving SK and KD in science subjects are also still relatively low at 52% (78 out of 150 students). The results of more intensive interviews with fourth-grade teachers of State Elementary Schools in Cluster VIII of Sawan Sub-district who teach science subjects revealed several factors that could be suspected of causing low scientific literacy and student achievement.

The inquiry learning model with scaffolding technique in practice emphasizes the process of finding a concept and guiding students at the beginning of the learning stage, then reducing the guidance slowly, so that students find the concepts they are learning for themselves. This model is also a way of presenting lessons that allow students to find information with the guidance of the teacher who then the teacher slowly reduces the assistance and even allows students to take on greater responsibility after students can do it independently, thus encouraging students to understand facts, concepts, patterns, properties, certain formulas that are still new to students and materials are taught directly (Slavin, 2015).

METHODS

The method used in this research is the experimental method. Sukestiyarno (2013) defines experimental research methods as research methods used to find the effect of certain treatments on others under controlled conditions. The form of research used is Quasi-Experimental Design with Nonequivalent Control Group Design.

The population in this study were students of class X SMA Kyai Ageng Basyariah which consisted of 4 classes, namely XA, XB, XC, and XD. The samples in this study were two classes, namely, class XA and XB which were selected using the cluster random sampling technique. Cluster random sampling is used when the population does not consist of individuals but consists of individual groups or clusters (Budiyono, 2016). The data collection technique used in this study is a measurement technique. The measurement technique is used because the desired data is in the form of quantitative data, namely student learning outcomes on trigonometry material. The data collection tool used in this study was a test in the form of an essay test. Tests are given before and after learning is done. The test in this study amounted to 5 questions. Akbar states that before using a test, the teacher should first measure the degree of validity based on certain criteria (Akbar, 2013). So before the test is used, it is first tested the content validity and empirical validity of the question. The questions used are questions with valid criteria and high reliability. The hypothesis in this study is hypothesis testing using the Ttes formula, the population must be normally distributed and the variances of the two groups tested are the same, for that normality and homogeneity tests are carried out..

RESULTS AND DISCUSSION

Learning outcomes data in this study include two kinds, namely data obtained from pretest results and posttest results. The pretest data was given before the students received treatment (treatment) using a scaffolding-based inquiry learning model and the posttest results data were given after the students received treatment (treatment) using a scaffolding-based inquiry learning model to determine mathematical literacy.

Normality test data obtained from the pretest results, namely = 65.271 and = 6.129, then the value of = S is the largest, which is 0.1414. Meanwhile, from the Lilliefors normality table at a significance level of 5% with a sample size of = 28 is 0.1641. Therefore, < then 0 is accepted, which means that the frequency distribution of the tested data is normal. While the normality test data obtained from the posttest results = 82.134 and = 8.772, the value of = is the largest, which is 0.1300. Meanwhile, from the Lilliefors normality table at a significance level of 5% with a sample size of = 28 is 0.1641. Therefore, < then 0 is accepted, which means that the frequency distribution of the tested data is normal. So it can be concluded that the distribution is normal.

Homogeneity test from the calculations that have been carried out, obtained = 0.901 and a significance level of 5% with = 1.9048. Because < then the test decision is 0 is accepted. Based on the test decision, it can be concluded that the data for each sample comes from a population with a homogeneous variance.

Hypothesis testing was carried out after the normality test and the homogeneity test was carried out. then continued hypothesis testing to find out whether there is an effect of X (scaffolding-based inquiry learning model) on Y (learning literacy). Based on the calculation, it is known that the simple linear regression equation = 50.6522 + 0.5826 . Then to test whether there is an effect of using the scaffolding-based inquiry learning model on the mathematics learning outcomes of class X students of SMA Kyai Ageng Basyariyah, it is proven by using a formula using the t statistical test. With the analysis of the calculation of the value of count and table, it is known that tcount> table is 1,932> 1,701. So it can be concluded that there is a positive influence of the use of a scaffolding-based inquiry learning model on the mathematical literacy of the tenth graders of SMA Kyai Ageng Basyariyah. The use of the scaffolding-based inquiry learning model in this study used worksheets given to students. Before research students are directed. This was the first time the researcher delivered the material using a scaffolding-based inquiry learning model. In the scaffolding-based inquiry learning model, researchers condition students and convey learning objectives to students. The researcher directs the students to the learning model that will be used. The class is divided into several groups whose members consist of 4-6 students heterogeneously and is referred to as the home group. At the next meeting, each student in each home group is given one part of the material to be discussed. Group members who get the same material share gather into one group and are called expert groups whose members consist of 4-6 students. Students in the expert group discuss the part of the material that is their responsibility. Students who are in the expert group return to the home group to teach other members about the material that has been studied in the expert group. After discussion in the home group, all students are evaluated individually regarding all the material that has been studied. At the end of the study, the researcher gave a post-test to determine the mathematical literacy of the students. The results of the hypothesis test are = 1.932 and 1.701 at a significance level of 5% resulting in >. Thus, it can be concluded that there is a positive influence between scaffolding-based inquiry learning models on mathematical literacy in class X SMA Kyai Ageng Basyariah. The values of mathematical literacy from the pre-test and post-test, after being given treatment using a scaffolding-based inquiry learning model can be seen in the following table:

Table 1. The percentage of student learning outcomes of SMA Kyai Ageng Basyariyah

No	Score	Criteria	Pre-Test		Post-test	
			Student	Percent (%)	Student	Percent (%)
1	≥ 70	success	6	21.4	26	92.86
2	≤ 70	unsuccess	22	78.6	2	7.14

Based on the table above, it can be seen in the pre-test, that only 21,4% of students who achieved complete learning were, while 78,6% of students who had not achieved complete learning. The table above can show that in the post-test after the students received treatment using the scaffolding-based inquiry learning model, those who achieved complete learning were 92.86% or 26 students, while those who had not yet completed learning were 7.14% or 2 students out of a total of 28 students. After students received treatment using a scaffolding-based inquiry learning model, there was an increase in learning outcomes which can be seen from the results of the pre-test and post-test results, namely students who achieved the minimum completeness criteria 70. In the post-test students who completed as many as 92, 86%, while those that have not completed are 7.14%. And can be seen from the pre-test results obtained an average value of 62.98 and the post-test results obtained an average value of 82.13.

In the learning process, the teacher plays an important role in facilitating students. The teaching used by the teacher is inseparable from the learning model he uses. The learning model is a plan that is used to form a curriculum, create learning materials, and become a learning guide (Seraphin & Philippoff, 2012). learning theory with pedagogical methods (Zaenal Abidin, 2016).

So the learning model is a conceptual framework used in learning.

CONCLUSION

Based on the results of the research and data analysis that has been described, it can be concluded that the learning outcomes test obtained an average pretest of 62.98 and a post-test average value of 82.13. These results prove that the average result of student learning who is taught by using a scaffolding-based inquiry learning model is higher than students who are taught using a scaffolding-based inquiry learning model. The results of the calculation of the post-test hypothesis by going through the t-test at a significance level of 0.05, namely the results obtained count > ttab (1,932 > 1,701). From these results, it can be concluded that the hypothesis test rejects the null hypothesis H0 and accepts the alternative hypothesis H1. Furthermore, the results of this calculation prove that learning using a scaffolding-based inquiry learning model has a positive effect on mathematical literacy.

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