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The Effectiveness of Inquiry Learning Method with Ethnomathematics Approach on Students' Mathematical Understanding Grade VII SMPN 1 Bringin

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Abstract: This research aims to determine the effectiveness of the inquiry learning method with an ethnomathematics approach on the mathematical understanding of class VII students at SMPN 1 Bringin for the 2023/2024 academic year. The method used in this research is a quantitative method with a quasi-experimental research design. With research subjects from class VII, 56 students were taken from the experimental class and 56 students from the control class. Data collection was carried out by means of a post-test carried out at the end of the lesson which was used to determine students' mathematical understanding. In analyzing the data, this research uses statistical data analysis with a formula (t test). The research results show a significant difference with a calculated t value = 2.199 and t table = 2.056 with a significance level of 0.05. The average score of students after being taught using the inquiry learning method with an ethnomathematics approach was 93,50, while the average score of students using the direct learning model was 87,93. Thus, the use of the inquiry learning method with an ethnomathematics approach is effective in the mathematical understanding of class VII students at SMPN 1 Bringin for the 2024/2025 academic year.
Keywords: *Inquiry Learning Method; Ethnomathematics; Mathematical Understanding.*

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1. INTRODUCTION

Education can be said as a conscious effort to realize a cultural heritage for the next generation. Based on Law No. 20 of 2003, planned education is used to create an atmosphere and learning process for students to be more active in developing students' potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation, and state. Educational institutions are a place to pour out knowledge and oversee educational achievements in the learning process, an educator is needed, this requires educators to act as facilitators who help the learning process for students with the aim of creating interesting learning and active students.

The subject that is definitely taught at every level of education is mathematics, and until now there are still many difficulties experienced by students in learning mathematics. These difficulties can be seen from the relatively low average score of students when compared to the average score of other subjects. This can happen because of the low mathematical understanding of students, Mathematical understanding is related to students' ability to understand a concept. The ability to understand is a foundation in the learning process, mathematical understanding is a basic competency in mathematics that is applied in simple problems or in the same problem. Based on the results of observations conducted by researchers with mathematics teachers in class VII of SMPN 1 Bringin, students still have difficulty in solving mathematical problems.

The difficulty of mathematical understanding can be seen from the results of student exams that have not reached the Minimum Completion Criteria (KKM), which is 75, from the average final semester exam results, students' scores only reached 68, with 46% of students being able to meet the minimum completion criteria (KKM) and 54% of students who were unable to meet the completion criteria. As a tool to help students' mathematical understanding, researchers want to combine the inquiry method with ethnomathematics, it is hoped that through cultural activities that are juxtaposed in mathematics learning, students will find it easier to understand mathematics lessons. The inquiry method is still difficult to use because it is hampered by students' learning habits, it is hoped that Ethnomathematics can provide a solution to this through cultural activities that can be involved in the learning process. The application of ethnomathematics is an effort or means to motivate, stimulate students in overcoming boredom and difficulties in learning mathematics, the formulation of the problem in this study is whether the inquiry learning method with an ethnomathematics approach is more effective than the conventional learning model for the mathematical understanding of class VII students at SMPN 1 Bringin?

2. METHOD

This research was conducted at SMPN 1 Bringin, located in Krompol Village, Bringin District, Ngawi Regency, from the end of the odd semester to the beginning of the even semester of the 2023/2024 academic year, with a period of 8 months, namely from October 2023 to May 2024. This research is a quantitative study with a quasi-experimental design, in which there are two groups formed: the experimental group that is given treatment and the control group that is not given treatment. The design used is a posttest-only control group, where the posttest is given to both groups, but only the experimental group receives treatment in the form of an inquiry learning method

with an ethnomathematics approach.

The population of this study was all students of grade VII at SMPN 1 Bringin, which consists of 6 classes with a total of 172 students. The research sample was taken from classes VII A and VII E using a cluster random sampling technique, where samples are taken randomly in groups, not individually. Research data were collected through tests designed to measure students' mathematical understanding after being given learning with the inquiry learning method with an ethnomathematics approach. This test is a posttest consisting of 10 descriptive questions covering 4 indicators of mathematical understanding.

Data collection was carried out to support the preparation of this research. The statistical test used was the t-test to determine the effectiveness of the learning method used on students' mathematical understanding. Before conducting the t-test, a prerequisite test was carried out in the form of a normality and homogeneity test to ensure that the data used met the assumptions required in the statistical analysis.

3. RESULTS AND DISCUSSION

This study took place from March 15, 2024 to March 22, 2024 and used a quasi-experimental method to assess students' mathematical understanding through learning with the inquiry learning method combined with the ethnomathematics approach. The study population consisted of all students of class VII of SMPN 1 Bringin in the 2024/2025 academic year, totaling 172 students and divided into 6 classes. The sample was taken using the cluster random sampling technique, where class VII A was selected as the experimental class with 28 students taught using the inquiry learning method with the ethnomathematics approach, while class VII E became the control class with 28 students who received direct learning. This study involved 6 meetings, where the first four meetings were used for the application of the method in the experimental class and direct learning in the control class. The last two meetings were used to provide posttest questions to both classes.

The research instrument in the form of a mathematical understanding test on the geometry of lines and angles, developed by the researcher in the form of 10 descriptive questions, has been validated and tested first to ensure validity, reliability, level of difficulty, and discriminatory power. Based on the trial in class VII B with 26 students, all questions were declared valid because they met the criteria for product moment correlation with rxy > 0.404. The reliability test using the Cronbach alpha technique showed that the instrument had a reliability index of r_{11} = 0.943422, which indicated high consistency and could be relied on to measure student understanding. The questions

were also tested for their level of difficulty and discriminatory power, where questions that were not too easy or difficult with a moderate difficulty index ($0.25 \leq p \leq 0.75$) were considered good. The discriminatory power of the questions was also tested, and questions with good to very good discriminatory power ($0.41 < D \leq 1.0$) were used in the study, while questions with poor discriminatory power were not used. From the results of the instrument test, two questions were not used (numbers 4 and 10) and the other eight questions were used in the posttest. Data on students' mathematical understanding were collected through a posttest covering four indicators of mathematical understanding, each with a score of 0-2.

The normality test using the Lilliefors test showed that the data distribution in both classes, experimental and control, was normal, with L count < L table for both groups. The homogeneity test using the F test showed that the variances of the two groups were homogeneous, with F count ≤ F table. Thus, it can be continued to the hypothesis test using the paired t-test. The hypothesis test was carried out to see whether or not there was an effect of the learning model used on students' mathematical understanding. The difference between learning with the inquiry learning method with the ethnomathematics approach and direct learning. Judging from the decision of the H_0 test is rejected and H_1 is accepted, if t count < t table, then H_0 is accepted, conversely if t count > t table, then H_0 is rejected. The results of the hypothesis test in this study are as shown in the following table

Table 1. Summary of Mathematical Understanding Hypothesis Tests

Group	n	Variance	average	t count	t table	Decision
Experiment	28	39,444	93,50	2,386	2,056	H0 is rejected
Control	28	113,254	87,93			

Based on the results of the hypothesis test in table 1 above, the results of the comparison between the experimental group and the control group were found. The experimental group consisted of 28 students with a variance of 39.444 and an average value of 93.50. While the control group also consisted of 28 students with a variance of 113.254 and an average value of 87.93. The t-test conducted to compare the averages of the two groups showed a calculated t value of 2.386, which was greater than the t table of 2.056. Thus, the decision taken was to reject H0, which means that there was a significant difference between the experimental group and the control group. This shows that the learning method used in the experimental group is more

effective in improving students' mathematical understanding compared to the method used in the control group.

Learning using the inquiry learning method with an ethnomathematics approach is one effort to improve mathematical understanding, with this method it is expected that students can more easily understand the material being taught. Based on research that has been conducted on students during the learning process, it shows differences in student activity, namely students tend to be more enthusiastic in participating in learning, because the learning given is related to students' daily lives. in the learning process students are also active in expressing their respective opinions so that students can more easily understand the material being studied.

The provision of a post-test to test students' mathematical understanding is given after learning using the inquiry learning method is carried out, the questions given for the previous post-test have been tested with an analysis of validity, reliability, level of difficulty, and discriminatory power, questions that have met these criteria can be used by researchers to be given to the experimental class and the control class.

Based on the post-test that has been carried out, data was obtained that will be used for hypothesis testing. This study uses a t-test which states that there is an average difference between the inquiry learning method and the ethnomathematics approach to students' mathematical understanding. This is proven by the data obtained from the average test of the inquiry learning method with an ethnomathematics approach of 93.50 and the direct learning model obtained an average of 87.93 according to the results of the hypothesis test calculation that t count = 2.386> t table = 2.056 so that H_0 is rejected, it can be concluded that students' mathematical understanding with the inquiry learning method with an ethnomathematics approach is better than the conventional learning model. These results are in accordance with research conducted by (Azmi, 2022) stating that the ethnomathematics-based inquiry learning model has a positive impact on the ability to understand mathematical concepts, from the results of research conducted by (Azmi, 2022) obtained t count = 4.2 and t table = 1.6794, then based on the hypothesis testing criteria H_0 is rejected, namely t count> t table and obtained 4.2> 1.6794, thus it is concluded that the increase in the ability to understand mathematical concepts of students who receive an ethnomathematics-based inquiry learning model is better than the increase in the ability to understand mathematical concepts of students who are taught with

ordinary/conventional learning models on the material of cylinders and cones at SMP Negeri 2 Meurah Mulia.

4. CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that the inquiry learning method with an ethnomathematics approach is effective for students' mathematical understanding. The conclusion is drawn based on the results of the hypothesis test using the t-test. The results of the t-test show that t count = 2.199> t table = 2.056. This indicates that H_0 is rejected, meaning that it can be concluded that the inquiry learning method with an ethnomathematics approach is effective for students' mathematical understanding. Based on the conclusions of the research that researchers have conducted in class VII A and VII E of SMPN 1 Bringin in the 2024/2025 academic year.

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