The Influence of A Guided Inquiry Learning Model Using Traditional Learning Media Based Local Wisdom on Student Learning Outcomes on Vibration and Wave Materials

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Abstract. The aim of this research is to determine the effects of traditional learning materials based on local wisdom on student learning outcomes in the field of guided inquiry learning. study is classified as quasi-experimental. Two VIII science classes were involved in this study; one class served as the experimental class and the other as the control class in the even semester of 2022–2023. This study employs an experimental design with a Non equivalent Control Group Design. Several tests are used in the data collection process, including normality, effect size, and hypothesis testing. The data is normally distributed, according to the findings of the normality test, which were obtained in the experimental class (0.478) and in the control class (0.259) and (0.477) respectively. Results from the effect size test indicate that theit can be concluded that the data is normally distributed. The effect size test results show that the value is interpreted as a strong effect. The results of hypothesis testing in the posttest test were 1.089 and 0.0191 and in the pretest test they were 1.898 and 0.0191, it can be concluded that it was accepted. Thus, the guided inquiry learning model using traditional learning media based on local wisdom has an effect on student learning outcomes in vibration and wave material.

Keywords: traditional learning materials, local wisdom, guided inquiry learning

1 Introduction

Education is something that is the key to the success of an individual, group or nation in realizing the welfare and prosperity of its society. A good country is a country that can build an excellent education system. A country is able to develop a good education system, of course it will also achieve good prosperity, something that can be seen in countries that are already at the level of intelligent, prosperous and prosperous countries [1].

In general, education in Indonesia has developed over time. Starting from before the introduction of letters until now, with the rapid development of technology, education is

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also very good and developing. Education is a process of cultural transfer, where there is a system of knowledge, language, religion, and livelihoods [2].

National standards for higher education have the aim of ensuring that higher education plays a strategic role in educating the life of the nation, as well as advancing science and technology by implementing cultural values and developing the Indonesian nation sustainably, concerning national standards for higher education [3].

When students are able to comprehend the subject they are studying, it is evident that the learning process has been successful. Achieving good learning outcomes is of course influenced by various factors between the teacher, learning media and learning models and the students themselves as learners. These things must be related to each other in order to achieve completeness in students' learning and maximize the learning process.

The teacher includes the students in the learning process and fosters an environment where students feel comfortable watching and making their own conceptual discoveries, then the learning process is considered to be going well. Creating educational media that supports efficient learning and is supported by the use of appropriate teaching models and approaches is the greatest way to give students interesting learning content.

Science learning cannot run in an orderly and structured manner if its use is not supported by good models, strategies or methods. The learning model used in this research is a guided inquiry learning model with the aim of providing opportunities for students to find their own problems and solutions in each concept of learning material [4][5]. The next matter that the guided inquiry learning model is designed to be used so that students in learning can discover a concept for themselves and can guide students in scientific behavior and intellectual development.

For overcoming problems that occur in learning, both caused by teachers and students, namely the use of learning media that can help in the learning process [6]. Science learning in elementary schools and junior high schools is expected to give students the freedom to design and determine their own way of learning so that science learning can be understood well and learning is more meaningful [4]. It can be easier for students to understand the subject matter and can encourage students' love of local culture to incorporate traditional media based on local wisdom in the science learning process. Learning will become relevant when education and traditional culture are combined. Local wisdom-based traditional education is predicated on the understanding that culture is an essential component. However, it also restores traditional cultures that have been lost as a result of globalisation and instills social values in students, in addition to helping them understand the concept of science.

Combining education and traditional culture is a learning process that will create meaningful learning. Traditional learning based on local wisdom is based on the recognition of culture as a fundamental part. On the other hand, this not only provides an understanding of the concept of science, but also brings back traditional cultures that have been lost with the development of globalization and provides social values among students.

In accordance with the characteristics of science learning, a scientific attitude naturally emerges in learning that applies the learning model of discovering a concept and

students obtain excellent learning results. This learning can develop students' abilities to think critically and systematically [7].

According to [8] local culture-based education can help students understand the concepts they are studying in a way that can be connected to the concrete environment and can improve students' activities and learning outcomes. According to [9] Science learning always applies Bloom's Taxonomy as a reference in planning learning objectives and various learning activities. Bloom's formulation includes two learning domains, namely the cognitive domain: mental skills (knowledge), and the affective domain: the growth of feelings or emotional fields (attitudes).

Traditional games are actually very rarely played, but there are still some people in remote areas, especially in Gorontalo Province, where several traditional games have begun to be replaced by modern games [10].

The result showed 60 percent of students' learning outcomes in vibration and wave material in classes VIII A and B had not reached the minimum completeness criteria (KKM), as for the limit of completeness criteria, according to observations and interviews done at SMPN 1 Kabila Bone. 75 is the bare minimum. The minimum completeness has not been met since the lecture method is still frequently used in the classroom, which makes pupils passive and causes them to become disinterested in the teacher's style of instruction. Additionally, teachers hardly ever provide their pupils the chance to participate actively in class activities by having them conduct experiments or trials. Similarly, despite the fact that learning media play a critical role in learning success, media is rarely used to support activities in the context of learning. Learning materials have the power to pique students' emotions, intellect, and focus in order to promote the best possible learning environment. Aside from that, the learning exercise does not make use of actual circumstances in the students' surroundings, which implies that learning connected to traditional media itself is not directly integrated, maintaining the classification of understanding the concepts of vibrations and waves as challenging to learn. Because traditional educational games like nok-nok and jump rope which include using rubber ropes from Goro are still played by students, this learning medium is ideal for teaching vibration and wave concepts. Additionally, according to studies conducted in the past, rubber rope learning materials are only frequently utilised in sports departments. As a result, the application of this material will expand the list of references for traditional learning materials based on local knowledge that can be utilised in science and physics courses that include wave material.

2 Method

Through the use of an experimental research methodology and a nonequivalent control group design, the impact of the guided inquiry learning model with local wisdom-based learning materials on students' learning outcomes in vibration and wave material will be ascertained. Two classes the experimental class and the control class will be the subjects of this study design. The experimental class will receive a pretest prior to treatment, and the control class will receive a posttest following treatment. The participants in this study were all students in SMP Negeri 1 Kabila Bone's class VIII, which was divided

into two classes: class VIII A, which had 27 students overall, and class VIII B, which had 26 students overall.

The method of collecting data that used is a test, which requires respondents to reply to written questions [11]. Tests are used in this study to assess students competency in scientific literacy. There were ten questions on the exam used in this investigation. Then, observation is another method for collecting information. In order to make observations for this research, student learning outcomes are observed in order to see how the learning process occurs. Statistical tests were employed to analyse data obtained from observations.

In order to determine whether or not the research data is normally distributed, a normality test is performed. Applying a statistical test, namely Kolmogorov Smirnov with the following formula, the test technique is a the suitability test:

$$F_i = |S(X_i) - F_0(X_i)| \tag{1}$$

Criteria:

$F_i \geq k$ (normally distributed data)
$F_i \leq k$ (data not normally distributed)
Statistical hypothesis:
H_0 = Data is normally distributed
H_1 = Data is not normally distributed

Normality testing criteria: Accept H_0 at the significance level $\alpha = 0.05$ if $F_i \geq k$ obtained from the Kolmogorov Smirnov table.

Then proceed with calculating the effect size test. According to [12], effect size, or learning based on locally applied wisdom, is a technique to evaluate the degree of effectiveness for an approach. In statistics, effect size analysis is used to assess a study's level of effectiveness. This test uses single group/one group analysis with the formula:

$$Effectsize = \frac{XPost - XPre}{SD} \tag{2}$$

Information :

XPre = Average Pre-test score
XPost = Average Post-test score
SD = Pooled standard deviation

Table 1. Interpretation of Effect Size

Interval *Size*	**Interpretation**
0,00 - 0.20	Weak effect
0,21 - 0,350	Modest effect
0,50 - 1,00	Moderate effect
¿1,00	Strong effect

The last thing is to calculate the hypothesis test. According to [13], to determine whether local wisdom-based learning has an impact on student learning outcomes, hypothesis testing was done. Associative statistical hypothesis testing was done using the data from the investigation. The t-test statistic is used in statistical hypothesis testing. The formula used in the research is:

$$t = \frac{\overline{x} - \mu_0}{\frac{s}{\sqrt{n}}} \tag{3}$$

Information :

t = Calculated price t
$\overline{x}$ = Average value xi
μ_0= Hypothesized value
s = Standard deviation
n = Number of research subjects his research.

Hypothesis is stated in the form of a statistical hypothesis as follows:
a.H0: $\mu > 0$, there is no influence of traditional learning media based on local wisdom on student learning outcomes.
H1: $\mu \neq 0$, there is an influence of traditional learning media based on local wisdom on student learning outcomes.

3 Result and Discussion

The study provided research results in the form of student learning outcomes scores, and these were obtained through the use of essay-style learning outcomes tests with ten questions that measured student learning outcomes on vibration and wave material that had been verified by a validator. The study was conducted at SMP Negeri 1Kabila Bone. A non-equivalent control group design was employed in this investigation. This design employs two non-randomly selected classes: class VIII A, which receives counselling using the guided inquiry learning model, and class VIII B, which receives treatment using the traditional learning model. The two classes take a post-test after being treated in the experimental class. Each class, whether receiving treatments or not, attended for four sessions in accordance with the RPP, which the validator had verified. Table 2. presents the learning outcomes for both the experimental students and the control class students.

Table 2. Student Learning Outcome Scores

No	Class/Sample	Average value	
		Pre-test	Post-test
1.	Experiment	41.06	82.34
2.	Control	26.87	58.92

Since was seen from the above table, the experimental class had an average pre-test score of 41.06 and an average post-test score of 82.34, while the control class had

an average pre-test score of 26.87 and an average post-test score of 58.92. A condition that needs to be fulfilled for statistical analysis is data normality. The purpose of data normality testing is to evaluate whether or not the data derived from studies can be distributed regularly. In this study use d Microsoft Excel to calculate the Smirnov colmogrof normalcy test algorithm. Table 3 displays the outcomes of statistical tests conducted to verify the normality of the data in the control and experiment classes.

Table 3. Results of Data Normality Testing

Class	T_{count}	T_{table}	Status
Experiment	0.478	0.254	Normally distributed
Control	0.477	0.259	Normally distributed

Based on Table 3. for the two classes, namely the experimental class and the control class, both have t count and t table with a real level of $\alpha = 0.05$, so it can be concluded that the research data for the experimental class and the control class are normally distributed. To improve student learning outcomes, it can be seen by increasing the cognitive level of each question item. The following is an analysis of the effect size data for the cognitive level of each class. The cognitive level of test items for C1 based on the interpretation of the effect size can be seen in the following graph:

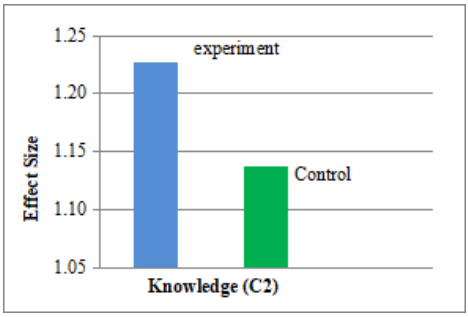

Fig. 1. Comprehension type learning outcomes

The effect size value for the experimental class is 1.43 based on the interpretation of being a strong effect, and the control class, namely 1.18, is also included in the interpretation of a strong effect. The cognitive level of the test items for C4 based on the interpretation of the effect size can be shown in the graph below:

Based on the interpretation it is in the strong effect, while the control class is 1.07 which is also included in the strong effect interpretation. The cognitive level of test items for C5 based on the interpretation of the effect size can be shown in the graph below:

Based on the interpretation it is in the strong effect, while the control class is 1.07 which is also included in the strong effect interpretation. The cognitive level of test

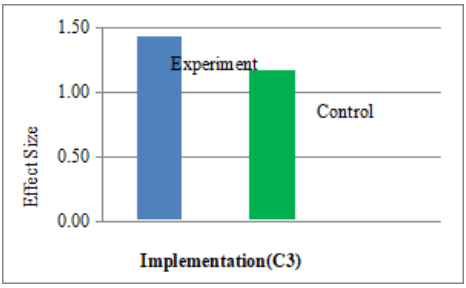

Fig. 2. Analysis type learning outcomes (Analyzing)

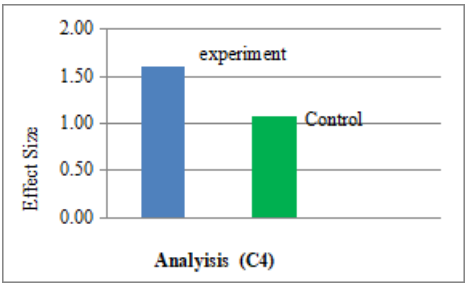

Fig. 3. Analysis type learning outcomes (Analyzing)

items for C5 based on the interpretation of the effect size can be shown in the graph below:

Based on Figure 4, the effect size value for the experimental class is 1.56 based on the interpretation of being a strong effect, while the control class is 1.26 which is also included in the strong effect interpretation. Hypothesis testing aims to find out whether there is an influence of the guided inquiry learning model using traditional learning media based on local wisdom in the experimental class and control class on student learning outcomes. For hypothesis testing in the experimental class and control class, it can be seen in table 4:

Table 4. Hypothesis Testing Results

Class	T_{count}	T_{table}	Status
Posttest	5,533	0.0191	H_0 accepted
Pretest	3,882	0,0191	H_0 accepted

The results of the posttest hypothesis test (experiment and control) were 5.533 and 0.0191 and the pretest hypothesis test were 3.882 and 0.0191, which can be concluded that tcount ¿ for the $\alpha = 0.05$ level. So H0 is accepted and H1 is rejected. The research carried out was the influence of the guided inquiry learning model using traditional

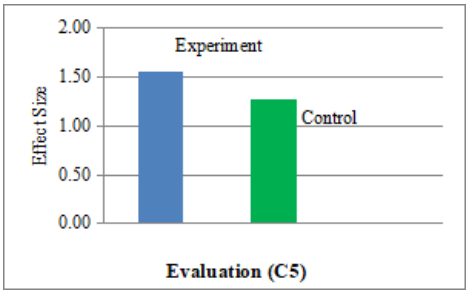

Fig. 4. Evaluate learning outcomes

learning media based on local wisdom on student learning outcomes in the subject of vibrations and waves. This research takes class VIII A as the experimental class that will be given treatment and class VIII B as the control class to see the comparison of learning outcomes.

The researcher's initial objective was to get the tool ready for data collection, which was to be a test of students' learning outcomes that had been previously validated by the lecturing instructor to determine whether or not it was appropriate for use. The experimental class, class VIII A, will now get therapy as part of the next process, which involves applying a method of guided inquiry learning based on local wisdom and traditional learning media. In order to get students involved and working together to complete LKPD, utilise basic experiments or traditional learning materials based on local wisdom, such as rubber rope and nok-nok. For control courses, only apply conventional learning models.

Furthermore, the average score obtained for the pretest student learning outcomes in the experimental class was 41.06, while for the posttest after being treated with the guided inquiry learning model using traditional learning media based on local wisdom, the average score was 82.34. Meanwhile, in the control class which only used conventional learning models, the average pretest score was 26.87 and the average posttest score was 58.92.

It was concluded from the average scores of the three classes that the average score from the post-test was higher than the average score from the pre-test. This is because mastery of the material provided, if integrated into daily life, will make it easier for students to understand the lesson material provided. Because what is encountered in everyday life is easy to understand and easy to do, it makes it easy for students to remember what they learn. This is in line with Castagno and Brayboy's research which states that local wisdom is able to connect science with everyday life, making it easier for teachers to explain information to students. Several tests were used to analyse the research data, including the effect size, hypothesis test, and normality test for each class both the experimental and control classes. To find out whether there is an influence from the use of traditional learning media based on local wisdom in the experimental class and control class given to student learning outcomes, the researcher carried out a hypothesis test, obtained namely tcount ¿ ttable for the level $\alpha = 0.05$. So H0 is accepted and H1 is rejected. Currently, traditional learning based on local wisdom is

rarely applied to students, so students do not understand the local wisdom that exists in their own area, especially the Gorontalo area. By utilizing traditional learning based on local wisdom, students can learn about their own regional traditions and can increase student motivation in learning by utilizing traditional games based on local wisdom.

The local wisdom will manifest as traditional culture, the values that apply in certain community groups reflect local wisdom. A different perspective, as stated [14], argues that education established in local wisdom is an intentional attempt carefully designed to make use of regional potential in order to create a learning environment where students actively develop the abilities, knowledge, and attitudes needed to take part in sustainable growth.

4 Conclusion

The guided inquiry learning methodology in class VIII of SMP Negeri 1 Kabila Bone, which employs traditional learning materials based on local knowledge, can enhance student learning outcomes and have a positive impact on learning, according to the research findings. This is demonstrated by the posttest hypothesis testing criteria, where =5.533 is greater than 0.0191, leading to the conclusion that testing the hypothesis for each class that is, t-test is greater than table has a positive impact on student learning outcomes when used in combination with the influenced inquiry learning model.

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