

THE EFFECT OF THE TRI HITA KARANA-ORIENTED PROBLEM-BASED LEARNING MODEL ON ECOLOGICAL ATTITUDES AND LEARNING OUTCOMES

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Abstract. This study aims to determine the effect of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and science learning outcomes. The population in this study is 135 students, while the research sample is 61 students. The sampling technique uses cluster sampling and random sampling techniques. The data collection method in this study is the questionnaire method and the test method. Ecological attitude data are collected using a questionnaire instrument, while data on students' science learning outcomes are collected using a science learning achievement test. The data analysis technique used in this study is Manova. The results of the study are 1) there is a significant influence of the Tri Hita Karana-oriented problem based learning model on ecological attitudes; 2) there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on science learning outcomes; and 3) collectively there is a significant influence

of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and science learning outcomes.

INTRODUCTION

Learning Natural Sciences (IPA) is a very important lesson given from an early age. In science learning, students are required to be active in examining natural events that occur in the environment around students. Therefore, in learning science students do not only learn theoretically, but also through practices to apply science principles in everyday life (Sunarta, 2022). To achieve the goals of science in elementary schools, of course, education is needed to optimise the potential of students and is also in accordance with the demands of the times. This education is in accordance with the demands of the needs of the 21st century, known as the century of knowledge as the main foundation for various aspects of life. Education in the 21st century is expected to be able to equip students with competence and character (Sudiarta & Widana, 2019). The 21st century learning paradigm emphasises that education is in the knowledge age with an accelerated increase in rich knowledge (Sumaka, 2022).

One of the efforts that teachers can make in maximising the learning process and making learning more innovative and meaningful for students is to apply the problem-based learning model. The problem-based learning model is a learning model that provides opportunities for students to learn through the problems given by the teacher (Yuafian & Astuti, 2020). In this situation, students are required to be active, creative, and develop their reasoning to master the material provided by the teacher. This kind of learning process will certainly make students more enthusiastic and feel challenged in learning. To further maximise the problem-based learning model, it can be combined with Tri Hita Karana local wisdom so that students can also later become individuals who are cultured to apply their knowledge to benefit the surrounding environment.

Learning in the 21st century is expected not to leave the values of local wisdom around students. This is because education also aims to make students human beings who are cultured. One of the local wisdoms that exists in the environment around students, especially in Bali, is the local wisdom of Tri Hita Karana, which is a holistic Balinese local wisdom. Kusumayani et al. (2019) states that the holistic environmental image in Balinese society is crystallised in the Tri Hita Karana philosophy. This philosophy is not only the result of an empirical abstraction of human relations with the environment inspired by spiritual values but also implies human awareness of their existence which is highly dependent on God, others and the universe. Basically, according to Wiana (2020), the essence of the teachings of Tri Hita Karana emphasises three human relationships in life in this world. These three relationships include relationships with fellow humans, relationships with the natural surroundings, and relationships with God which are interrelated with one another (Widana et al., 2020). Several studies on the local wisdom of Tri Hita Karana have been carried out before, namely research by Dikta (2020), Putu Gede (2020), & Putra (2019). In their research it is found that the Tri Hita Karana local wisdom is effectively combined with learning models that can be applied in the world of education. Subsequently, this research is an appropriate step to combine the problem-based learning model with the local wisdom of Tri Hita Karana.

Based on observations made at SD in Cluster 1, Pupuan District, Tabanan Regency, especially in class V, the learning process carried out by teachers tends to pay less attention to or integrate local wisdom that is around students. In addition, the learning process carried out by the teacher seems less innovative and does not provide opportunities for students to solve the problems they face in the learning process. Apart from having an impact on learning outcomes, learning during the pandemic in class V at SD Cluster 1 Pupuan District, Tabanan Regency also has an impact on students' low ecological attitudes. The problem of the low ecological attitude of students occurs due to the lack of development of student interaction in their daily lives, both interactions with fellow friends and with the surrounding environment. Whereas the surrounding environment is a very important thing that must be preserved.

This research is conducted in class V SD in Cluster 1, Pupuan District, because in class V SD in Cluster 1, Pupuan District, Tabanan Regency a problem has been identified that the learning process has not been carried out optimally and students' science learning outcomes has not reached the standard score, which is 70. Thus, the title taken in this study is about the Influence of the Tri Hita Karana-Oriented Problem-Based Learning Model on Ecological Attitudes and Science Learning Outcomes.

METHOD

This study uses a quasi-experimental research type. Quasi-experimental is a study that requires an experimental class and a control class, but does not allow random research subjects to be taken from the existing population. This is because the subject (student) has naturally been formed in one group (one class). This is in accordance with the opinion of Dantes (2012) which states that in this form of research, intact groups are often used, such as classes that cause randomisation to be impossible. In addition, this type of research is used because not all experimental variables and conditions can be controlled strictly. This research is conducted in class V SD in Pupuan Village, Pupuan District, Tabanan Regency. The quasi-experimental design used is the non-equivalent posttest only control group design.

The population in this study is all fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency in the academic year 2021/2022. There are eight elementary schools in Pupuan Village, namely SDN 1 Pupuan, SDN 2 Pupuan, SDN 1 Bantiran, SDN 2 Bantiran, SDN 3 Bantiran, SDN 1 Sai, SDN 2 Pajahan and SDN 3 Pajahan. The population distribution is as follows.

Table 1. Research Population Data

No	School	The number of students
1	SDN 1 Pupuan	28
2	SDN 2 Pupuan	12
3	SDN 1 Bantiran	21
4	SDN 2 Bantiran	13
5	SDN 3 Bantiran	13
6	SDN 1 Sai	18
7	SDN 2 Pajahan	13
8	SDN 3 Pajahan	17
Total		135

Considering that randomisation will be carried out, before determining the control class and experimental class randomly, a class equivalence test is carried out. Based on the results of the class equivalence test, only equivalent classes will be randomly selected using a lottery technique. The class equivalence test uses the t-test using SPSS 20.0 for windows software. The test criterion is if the count significance is less than 0.05, the class is not equivalent, whereas if the count significance is greater than 0.05, the class is declared equivalent. If the class is stated to be equivalent, then the class can be selected as the class used in the research

In this study, four classes are selected as the research sample and the results of this study really provide a complete picture of the effect of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and learning outcomes of science class V students in Cluster 1 Pupuan District, Tabanan Regency. The experimental class in this study is the fifth grade students at SDN 3 Bantiran and fifth grade students at SD N 1 Sai, while the control class is the fifth grade students at SDN 2 Pajahan and fifth grade students at SDN 3 Pajahan. In this research, the activities are conducted in 8 meetings.

The data collected in this study is data on student learning outcomes in science subjects in grade V SD in Cluster 1 Pupuan, Pupuan District, Tabanan Regency. The data collection

method used in this research is the test method and the questionnaire. Prior to data analysis, a requirements analysis test is first carried out. Data that has met the analysis requirements are then analysed using Manova.

RESULTS AND DISCUSSION

The data collected in this study are data on ecological attitudes and science learning outcomes from groups of students who follow the Tri Hita Karana-oriented problem-based learning model and groups that take part in conventional learning.

Data on science learning outcomes following conventional learning have range = 8, n = 30, minimum score = 16, maximum score = 24, mean = 20.03, median = 20, mode = 19, standard deviation = 2.16 , and variance = 4.65. The frequency distribution of conventional learning data is presented in the table.

Table 2. Frequency Distribution of Data on Science Learning Outcomes of Students who Follow the Conventional Learning Model

No	Interval	Mean (Xi)	Frequency (fi)	Relative Frequency (%)
1	16-17	16.5	4	13.33
2	18-19	18.5	9	30.00
3	20-21	20.5	9	30.00
4	22-23	22.5	6	20.00
5	24-25	24.5	2	6.67
Total			31	100

Data on science learning outcomes following the Tri Hita Karana-oriented problem-based learning model has range = 10, n = 31, minimum score = 18, maximum score = 28, mean = 24, median = 24, mode = 26, standard deviation = 2.48, and variance = 6.13. The frequency distribution of science learning outcomes data is presented in table below.

Table 3. Frequency Distribution of Data on Science Learning Outcomes of Students who Follow the Tri Hita Karana-oriented Problem-based Learning Model

No	Interval	Mean (Xi)	Frequency (fi)	Relative Frequency (%)
1	18-19	18.5	2	6.45
2	20-21	20.5	4	12.90
3	22-23	22.5	6	19.35
4	24-25	24.5	8	25.81
5	26-27	26.5	10	32.26
6	28-29	28.5	12	3.23
Total			31	100

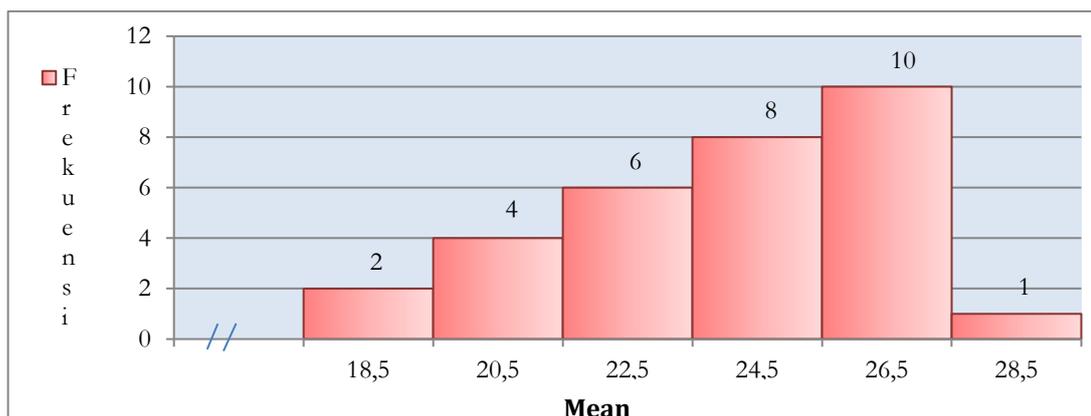


Figure 1. Histogram of Science Learning Outcomes of Students who Follow the Tri Hita Karana-oriented Problem-based Learning Model

Data on the ecological attitudes of students following conventional learning have range = 18, n = 30, minimum score = 110, maximum score = 128, mean = 117.67, median = 118.5, mode = 119, standard deviation = 4.40, and variance = 19.33.

Table 4. Frequency Distribution of Ecological Attitude Data of Students Following the Conventional Learning Model

No	Interval	Mean (Xi)	Frequency (fi)	Relative Frequency (%)
1	110-112	111	5	16.67
2	113-115	114	2	6.67
3	116-118	117	10	33.33
4	119-121	120	10	33.33
5	122-124	123	1	3.33
6	125-127	126	1	3.33
7	128-130	129	1	3.33
Total			30	100

While data on ecological attitudes following the Tri Hita Karana-oriented problem-based learning model has range = 16, n = 31, minimum score = 123, maximum score = 139, mean = 131.65, median = 132, mode = 133, standard deviation = 4.74, and variance = 22.44.

Table 5. Frequency Distribution of Ecological Attitudes Data of Students Following the Tri Hita Karana-oriented Problem-based Learning Model

No	Interval	Mean (Xi)	Frequency (fi)	Relative Frequency (%)
1	123-125	124	4	12.90
2	126-128	127	5	16.13
3	129-131	130	5	16.13
4	132-134	133	7	22.58

No	Interval	Mean (Xi)	Frequency (fi)	Relative Frequency (%)
5	135-137	136	6	19.35
6	138-140	139	4	12.90
Total			31	100

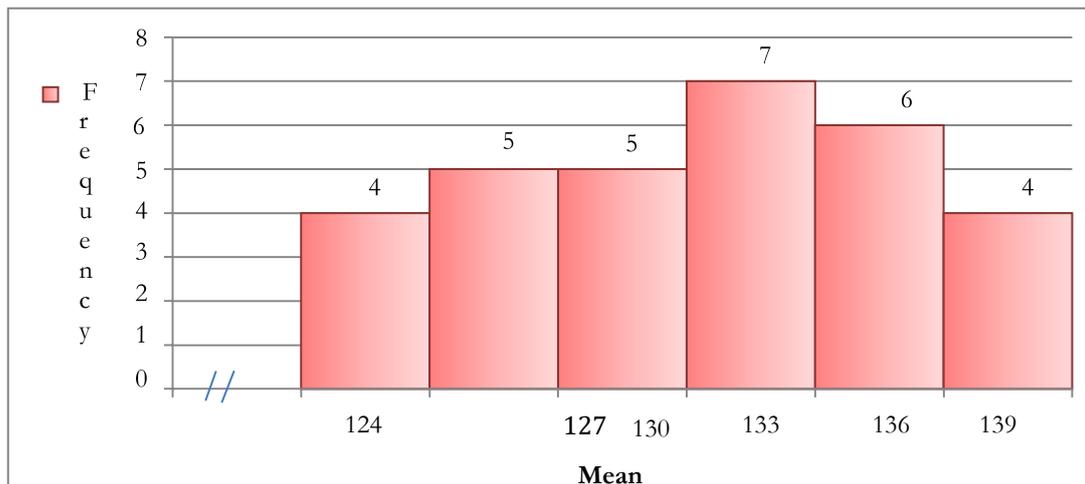


Figure 2. Histogram of Ecological Attitude Data of Students who Follow the Tri Hita Karana-oriented Problem-based Learning Model

Hypothesis Testing Prerequisites Test

a. Data Distribution Normality Test

Table 6. Summary of Normality Test Calculations

Group		Kolmogorov-Smirnov (Sig.)	Note
Ecological Attitude	Experiment	0.200	Normal
	Control	0.140	Normal
Science Learning Outcomes	Experiment	0.074	Normal
	Control	0.141	Normal

b. Variance Homogeneity Test

Table 7. Joint Variance Homogeneity Test

Box's M	0.51
F	0.273
df1	3
df2	649994.239
Sig.	0.845

Table 8. Variance Homogeneity Test Separately

Variable	F	df1	df2	Sig.
Ecological Attitude	0.988	1	59	0.324
Science Learning Outcomes	0.401	1	59	0.529

Based on the homogeneity test above, the significance values obtained together and separately above 0.05, so it can be concluded that all data groups are homogeneous.

c. Correlation Test between Dependent Variables

Table 9. Correlation Test between Dependent Variables

Group	Value r_{count} (Pearson's Correlation)	Significance (sig.)	Decision
Experiment	0.148	0.428	Not significant
Control	0.034	0.859	Not significant

The table above shows that r_{count} with a value of 0.148 and 0.034 has a significance value of 0.428 and 0.859 or greater than 0.05 (sig.> 0.05). This shows the relationship or correlation between the dependent variables is not significant or that there is no correlation between the dependent variables. Therefore, the MANOVA test is feasible.

The MANOVA test is used to test whether there are differences in the dependent variables between several different groups. To test the first and second hypotheses, it can be seen from the Test of Between-subjects Effect table from the calculation results with the help of the SPSS application.

Table 10. Summary of the First Hypothesis Test

Dependent variable	Source	JK	Df	RJK	F	Sig.
Ecological attitude	Inter	2979.023	1	2979.023	142.460	0.000
	In	1233.763	59	20.911		
	Total	953841	61			

The table shows that the dependent variable ecological attitude has an F value of 142.460 with a significance value of 0.000 or less than 0.05. This shows that the F value on the dependent variable is significant ecological attitude. Because significant means there are differences in ecological attitudes between the PBL learning model and the conventional learning model.

Table 11. Summary of the Second Hypothesis Test

Dependent variable	Sumber	JK	Df	RJK	F	Sig.
Science learning outcomes	Inter	239.886	1	239.886	44.372	0.000
	In	318.967	59	5.406		
	Total	30215	61			

From the table, it can be seen that the dependent variable of science learning outcomes has an F value of 44.372 with a significance value of 0.000 or less than 0.05. This shows that the value of F on the dependent variable is significant in science learning outcomes. This means that there are differences in science learning outcomes between the problem-based learning model and the conventional learning model.

Table 12. Third Hypothesis Testing

Statistics	Value F	Significance (sig.)	Conclusion
Pillai's Trace	85.004	0.000	Significant
Wilks' Lambda	85.004	0.000	Significant
Hotelling's Trace	85.004	0.000	Significant
Roy's Largest Root	85.004	0.000	Significant

The results of the analysis show that the F value for Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root is 85.004 and has a significance value smaller than 0.05. Therefore, the F values for Pillai's Trace, Wilks' Lambda, Hotelling's Trace, and Roy's Largest Root are significant. So, it can be concluded that there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and science learning outcomes of fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency.

Based on hypothesis testing I, it is found that there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on the ecological attitudes of fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency, with an F count of 142.460 and a significance of 0.000. The results of this study are in line with the results of research conducted by [Yuafian & Astuti \(2020\)](#) that concluded that there is a significant effect of problem-based learning on students' attitudes towards the surrounding environment. [Parwata \(2021\)](#) states that the learning model of problem-based learning is a learning approach based on real world problems as a context for students to learn about critical thinking and problem solving skills, as well as to acquire essential knowledge and concepts from or material. lesson. This opinion is also reinforced by [Hotimah \(2020\)](#) who argues that the problem-based Learning learning model is a teaching model that has the characteristics of real problems as a learning context for students which aims to hone critical thinking skills and problem solving skills in order to gain knowledge.

Based on testing hypothesis II, it is found that there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on the science learning outcomes of fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency, with an F_{count} of 44.372 and a significance of 0.000. The influence of the Tri Hita Karana-

oriented problem-based learning model on student learning outcomes was also found in previous studies. The research conducted by Rosdiana (2019) concluded that PBL has a significant effect on students' scientific attitudes with a moderate effect size of 0.470. PBL also has a significant and moderate effect on learning outcomes. The effect size is 0.331.

In learning that applies the Tri Hita Karana-oriented problem-based learning model, the learning process begins with giving problems that occur in the student's environment, both problems related to the relationship between humans, humans and nature, and humans and God. In the learning process, students not only solve problems given by the teacher, but also be equipped with local wisdom values, so that students are able to maintain and preserve this local wisdom. A learning process like this will make learning more meaningful for students so that students' science learning outcomes will be optimally improved. Referring to the description above, there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on the science learning outcomes of fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency.

Based on hypothesis testing III, it is found that collectively there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and science learning outcomes of fifth grade elementary school students in Cluster 1 Pupuan District, Tabanan Regency, with F count of 85.004 and significance of 0.000. According to Curriculum 2013, the purpose of learning science in elementary schools is to enable students to think scientifically and critically. To achieve the goals of science in elementary schools, of course, education needs to optimise the potential of students in accordance with the demands of the times. In the 21st century learning, it is also hoped that it will not leave the values of local wisdom around students. This is because education also aims to become human learners who are cultured and noble. One of the local wisdoms that exist in the environment around students, especially in Bali, is the local wisdom of Tri Hita Karana.

The Tri Hita Karana-oriented problem-based learning model is a combination of learning models that can be applied in elementary schools with local wisdom around students. The combination of learning models with local wisdom around students makes the learning process more meaningful for students. That is because, in the learning process students do not only study the material in the student book, but also learn about local wisdom values that are around them. A learning process like this, of course, will have a positive impact on developing ecological attitudes and improving students' science learning outcomes. This shows that collectively there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and science learning outcomes of fifth grade students in Cluster 1 Pupuan District, Tabanan Regency.

CONCLUSION

Based on the results of hypothesis testing and discussion, it can be concluded that: 1) there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on students' ecological attitudes with an Fcount of 142.460 and a significance of 0.0; 2) there is a significant effect of the Tri Hita Karana-oriented problem-based learning model on students' natural science learning outcomes with an Fcount of 44.372 and a significance of 0.000; 3) Collectively there is a significant influence of the Tri Hita Karana-oriented problem-based learning model on ecological attitudes and students' science learning outcomes with an F count of 85.004 and a significance of 0.000.

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