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The effect of discovery learning model on learning outcomes of IPAS class IV elementary school

Maria Antonia Oke Maran[1], Desi Maria El Puang[2], Hermus Hero[3]
[1,2,3]PGSD, FKIP, Universitas Nusa Nipa, Maumere, Indonesia

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ABSTRACT

A recent study of fourth grade students at SDK Nita 1 revealed that a subset of students exhibited challenges in comprehending and applying the material, resulting in diminished student learning outcomes. This phenomenon can be attributed to the instructional approach employed by the teacher, who primarily relied on the textbook as a primary source of instruction and assessment, with minimal engagement in discussion activities. The efficacy of this instructional method was further underscored by the findings of a daily test, which indicated that 19 out of 27 students demonstrated inadequate mastery of the material. Of these 19 students, some were able to answer questions from the teacher, but only after reading the material in the book. Others demonstrated an inability to answer even though they had read the material in the book. To address this issue, the discovery learning model was employed. The research design utilized a one-group pretest-posttest design, with a sample size of 27. The collection of data was achieved through the administration of tests and observations, with research instruments in the form of test questions and observation sheets. The analysis of data involved the implementation of normality tests using the Kolmogorov-Smirnov test and hypothesis testing through the utilization of t-tests. The findings of the study yielded a significant value (2 tailed) > 0.05, thereby supporting the acceptance of the null hypothesis (Ha) and rejecting the alternative hypothesis (Ho). The conclusion of the study asserts the presence of an effect on learning outcomes of fourth grade students of SDK Nita 1 due to the implementation of the discovery learning model.

Corresponding Author:

Maria Antonia Oke Maran,
Pendidikan Guru Sekolah Dasar,
Universitas Nusa Nipa,
Jalan Kesehatan Nomor 3, Maumere, 86111, Indonesia,
Email: antoniamaran128@gmail.com

INTRODUCTION

Learning is an interactive process between teachers and students that is carried out in a directed manner to achieve predetermined goals (Panggabean et al., 2021). (Gleko et al., 2023), further explained that learning is a process of teacher and student interaction to achieve changes in behavior, knowledge and skills. Learning is also defined as a process of interaction between students and learning resources that results in better behavior (El Puang & Weka, 2021; Sareng et

al., 2023). Therefore, it can be concluded that learning is a process of interaction or teaching and learning carried out jointly by teachers and students to achieve the set goals so as to improve behavior in a better direction. Learning carried out by teachers and students must be carried out properly. Teachers are the main key in managing learning. Good learning management can be done with various approaches. Teachers need to know clearly the character and learning needs of students so that the learning carried out can be right as targeted. This good learning management must be seen in all subjects including one of them in the learning of Natural and Social Sciences (IPAS).

IPAS itself is a combination of science and social studies subjects. The basis for combining these two subjects is because both science and social studies subjects both study nature and its relationship with humans (Lewar et al., 2023). Because of this study, IPAS teaching must be designed and implemented according to context. According to Afifah et al. (2023), the IPAS subject is a form of study that combines two points of view in understanding different sciences but will form a unified whole when combined. Nadhifah et al. (2022) also argued that the relationship between science and social studies is an important foundation in the development of more contextualized materials because these two materials are adapted to the real conditions of society in everyday life. Furthermore, Repe et al. (2024) explained, IPAS is the study of living things, the environment, interactions and social relationships. Based on this study, IPAS can be concluded as a science or subject that studies living things, nature and the environment and social relationships that are adapted to the real conditions of society in everyday life. The material in the IPAS subject is very broad, so it is very necessary for teachers to have a good understanding so that they can manage learning creatively so that they can train students' curiosity about the material being taught. Jaekel et al. (2023) also stated that, at the teaching level, an important aspect is that teachers implement and conduct lessons in various ways. Based on this opinion, teachers who are able to carry out learning well are needed in learning. But in reality, it is still found that learning occurs normally, so that students are less active in participating in learning. This also happens in learning in class 4 SDK Nita 1.

Based on observations made during IPAS learning in grade 4 SDK Nita, it was found that during the learning process, the teacher explained the material in the textbook and asked students to take notes. There were no discussion activities carried out by students. The learning methods used by the teacher were lectures, assignments. Occasionally the teacher and students ask questions but the questions are given according to what is in the book. The teacher does not develop questions. When the teacher asks questions, students generally do not respond to his questions so that the material must be explained again by the teacher. Sometimes students are asked to re-read the material in the book without any explanation of the material from the teacher. The explanation of the material is never related to students' real life. The learning model that is the basis for implementing learning is not used by the teacher, so learning is carried out in general without the syntax of the learning model. Starting from the initial activities to the final activities, the teacher mostly lectures, so students seem less active in participating in learning. This is a major factor in low student learning outcomes. It is known that out of 27 students, only students who are quite good at mastering the material. This can be seen from the daily test results, where there are 8 (30%) students who are complete and 19 (70%) others are not complete. One solution that can be given to overcome this learning problem is to apply the discovery learning model.

Discovery learning is a learning model that involves students in various mental processes to help find and understand a material through understanding, classifying, formulating hypotheses, explaining, measuring, and drawing conclusions so that they can understand a material (Muazzim et al., 2023). The discovery learning model is also defined as a learning model that encourages active and creative ways of learning, with an emphasis on the ability to observe, discover and solve problems independently (Rahmayani, 2019; Suraeda et al., 2023). Based on this understanding, it can be concluded that the discovery learning model is a learning model that

involves student activities to make discoveries through observing, formulating hypotheses, finding, solving problems and making conclusions. The discovery learning model is very beneficial for students because it can help students to develop critical thinking and problem solving skills. The discovery learning model is also very suitable to be applied in learning IPAS in elementary schools. This is because in addition to IPAS subjects that study about humans and their environment, it also involves students directly in learning to make discoveries. This was also expressed by Idham et al. (2024) that the discovery learning model is very suitable in learning science in elementary schools because students are directly involved in learning. Students also use their cognitive abilities to explore the concepts learned. Compared to conventional learning, when applying the discovery learning model, students make discoveries independently or in groups on a problem presented so that they can find a solution to the problem. Students will actively participate in learning while the teacher is only a facilitator.

The steps of the discovery learning model include 1) stimulation, 2) problem statement, 3) data collection, 4) data processing, 5) verification and 6) generalization Muazzim et al. (2023). According to Bastian & Reswita (2022), the steps of (the discovery learning model are 1) identification of student learning needs, 2) preliminary selection of the principles of understanding concepts and generating knowledge, 3) selection of materials, tasks, 4) helping and clarifying tasks, 5) preparing the class and the tools needed, 6) checking students' problems against the problem to be solved, 7) providing opportunities for students to make discoveries, 8) helping students with information if students really need it, 9) leading their own analysis, 10) stimulating interaction between students, 11) helping students formulate principles and generalizations of their discoveries. These systematic and directed steps, it is believed that the application of the discovery learning model can improve student learning outcomes.

Learning outcomes are a result of learning by using measurement tools, namely in the form of tests, namely written, oral and action tests that are prepared in a planned manner (Sutrisno, 2020). Learning outcomes according to Suciati et al. (2022) is an indicator of the success achieved by students in their learning efforts. Meanwhile, according to Kulsum (2023), learning outcomes are a value that students achieve after completing all the material that can be used to identify what students know. From some of these opinions, it can be concluded that learning outcomes are a change in attitude, knowledge and skills in a better direction for student achievement after carrying out the learning process which is measured using clear instruments in the form of tests and non-tests. Learning outcomes can improve well if the teacher manages learning well. The application of the discovery learning model is one of the most appropriate solutions to be implemented in IPAS learning in elementary schools. Several studies have also proven that the application of the discovery learning model can improve student learning outcomes.

Research by Gulo (2022) which shows that the application of the discovery learning model to student learning outcomes in the ecosystem material of class X SMK Negeri 1 Lolowau for the 2021/2022 academic year is acceptable or in other words can improve student learning outcomes. The next research by Indriani et al. (2023) which shows that the application of the discovery learning model can improve the learning outcomes of fourth grade students of Madrasah Ibtidaiyah Al Mukhlisin Alam Barajo Jambi City. This is because the results of this study have increased in achieving success indicators in each cycle. The next research by Yulianti & Andrijati (2024) showed a consistent increase in the average score from pre-cycle to cycle 2. Based on the problems found and the review of several previous studies, the researcher felt the need to conduct research on IPAS learning in grade 4 SDK Nita 1 through the application of the discovery learning model. The final expectation of this research is that by applying the discovery learning model can affect student learning outcomes specifically in the 4th grade IPAS subject of SDK Nita 1.

RESEARCH METHODOLOGY

This research method uses quantitative research methods. Marzuki (2023) argues that quantitative research is defined as a research method based on the philosophy of positivism, which is used to research on certain populations or samples, data collection using research instruments, quantitative data analysis, with the aim of testing predetermined hypotheses. The type of research used in this study is experimental research. Salim & Haidir (2019) argue that experimental research is research that investigates the possibility of causal relationships by controlling / controlling. Experimental research aims to examine possible causal relationships in circumstances that do not allow control/control, but can obtain substitute information for situations with control. Meanwhile, according to Elsani et al. (2020), experimental research is research that is intended to determine whether or not there is an influence or impact of a certain treatment on changes in a certain condition or situation. According to Kusumastuti et al. in Sareng et al. (2023), experimental research is conducted to test certain theories by examining the relationship between variables. Based on some of these definitions, it can be concluded that experimental research is research to determine the relationship between variables whether it has an effect or not. The research design used a one group pretest posttest design. This is because, researchers want to find out the initial learning outcomes of students before learning using the discovery model and after.

The research design used a one group pretest posttest design with the model described as follows

O_1 X O_2

(Asri et al., 2023; Tokan et al., 2022)

Description:

O_1 : Pretest score (untreated group)
X : Treatment using picture letter card media
O_2 : Posttest score (group that has not been treated)

The population in the study were all 4th grade students of SDK Nita 1, totaling 27 people consisting of 13 male students and 14 female students. From this population, the researchers used nonprobability sampling techniques with saturated sampling techniques because the population was relatively small, namely less than 30 people (Payadnya & Jayantika dalam Gleko et al., 2023). Based on this, the sample used in this study amounted to 27 people. Data collection techniques using tests and observations with research instruments in the form of test questions and observation sheets. The data analysis technique used is the normality test using the Kolmogorov smirnov test and hypothesis testing using the t-test. Other variables that can be controlled to ensure that the learning improvement results come purely from the application of the discovery learning model are the teacher, the use of media and teaching aids. This is because, when using the discovery learning model, the syntax or flow of learning activities can be structured clearly and well, so that the use of media or teaching aids by the teacher automatically follows the flow.

RESULTS AND DISCUSSIONS

Research Results

Pretest and Posttest Values

This study begins with giving a pretest in the form of a written test and then students are given a posttest. The pretest value was obtained from the results of student work before being given treatment using the discovery learning model. The results of the calculation of students' pretests and posttests can be seen in table 1 below.

Table 1. Pretest and posttest values

	N	Minimum	Maximum	Mean	Std. Deviation
Pretest	27	40	80	61.30	12.679
Posttest	27	75	100	89.63	7.957
Valid N (listwise)	27				

From table 1 above, it is known that the pretest results of 27 students obtained the minimum value is 40, the maximum value is 80, the mean value is 61.30 with std. deviation is 12.679. While in the acquisition of posttest scores, it is known that out of 27 students, the minimum value is 75, the maximum value is 100, the mean value is 89.63 with a std. deviation is 7.957. These results indicate that there is a difference in value between the pretest and posttest, where the acquisition of the posttest value is higher than the pretest value.

Test for Normality

The normality test is used to determine the distribution of data distribution for each research variable. The purpose of the normality test is to determine the distribution of the scores of each variable whether the data is normally distributed or not (Tia et al., 2023). The normality test in this study was carried out using the smirnov columnogorov test with the help of spss 21. The normality test results can be seen in table 2 below.

Table 2. Normality test results

Tests of Normality			
Value	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
Pretest	.148	27	.134
Posttest	.143	27	.169

Based on the results of data processing in table 2 above, it is known that the normality result for the pretest value is 0.134 and the posttest value is 0.169. These results indicate that the normality value with Asymp. Sig (2 tailled) > 0.05 on pretest and posttest scores meet the normal distribution.

Hypothesis Test

The effect of the application of the discovery learning model on student learning outcomes is determined through hypothesis testing, namely the t test (paired sample test). The results of the hypothesis test can be seen in table 3 below.

Table 3. Hypothesis test results

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest – Posttest	-22.222	32.025	6.163	-34.891	-9.553	-3.606	27	.000

Based on table 3 above, it is known that the significant value (2-tailed) is 0.000 ≤ 0.05, then accept Ha and reject Ho. Thus, it can be concluded that there is an effect of the application of the discovery learning model on the learning outcomes of IPAS in grade 4 students of SDK Nita 1.

Discussion

Teachers are the main key in the success of learning. Learning will go well if the teacher is able to manage it well too. Aini et al. (2021) revealed that because teachers have a very important

role, teachers are required to be creative in learning in order to attract students to learn. Apart from media, methods and learning resources, the learning model is one of the keys that can be used by teachers so that learning activities can be carried out in a directed manner according to the syntax. Baho et al. (2021) explained that the use of learning models is very important because models provide opportunities for teachers to manage the teaching and learning process in the classroom more effectively. The use of a good learning model can improve student learning outcomes. One of the learning models in question is by applying the discovery learning model. When teachers apply the discovery learning model, students' critical thinking skills will be trained to be better. With good critical thinking skills, students can do problem solving well too. The discovery learning model makes students able to learn to know new things through searching, processing, exploring and investigating following the teacher's direction (Moko et al., 2022). This has been proven by the results of this study where the application can increase student learning activities because students learn to find magnetic properties and examples of objects that can be attracted by magnets. It can be seen that students are very enthusiastic in learning. This student activeness has a positive impact on their learning outcomes. This is also shown by the results of research from Pangesti & Radia (2021) entitled Metaanalysis of the Effect of Discovery Learning Model on Science Learning Outcomes of Elementary School Students. The results showed that the discovery learning model can improve the science learning outcomes of elementary school students, from the lowest result of 17% and the highest result of 48% with an average of 28.33%. From the results of the effect size calculation, a score of 3.09 was obtained in the high category. Further research by Prasetyo & Abduh (2021) with the title Improving Cognitive Learning Outcomes through the Discovery Learning Model on the Theme of Technological Development in Elementary School Students, which shows that the use of the discovery learning model can improve cognitive learning outcomes on the theme of technological development. With the results of this study and previous research, the application of the discovery learning model can be used in learning.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that the application of the discovery learning model affects the learning outcomes of IPAS in grade 4 elementary school students. Because the application of the discovery learning model affects student learning outcomes, then in learning, teachers should be able to choose a good model and in accordance with the characteristics and learning needs of students. The application of the discovery learning model can help students to more easily understand the material because students are invited to find problems presented by the teacher and can do problem solving. Therefore, in learning, teachers need to develop the use of learning models, one of which is by applying the discovery learning model so that students can do problem solving not only in IPAS subjects but also in other subjects. The results of this study can also be the basis of policy for schools related to the application of innovative methods or models, one of which is through discovery learning which is adjusted to the learning objectives and characteristics of students.

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