The Influence of the Discovery Learning Model on Enhancing Motivation and Learning Outcomes in Natural and Social Sciences (IPAS) Among Students

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Abstract: This research was motivated by the lack of learning motivation and low student achievement in the subject of Natural and Social Sciences (IPAS). The proposed solution to this issue is the use of the Discovery Learning model. This study aims to improve motivation and learning outcomes in IPAS through the application of the Discovery Learning model among fourth-grade students at SD Negeri 82/VI Rantau Limau Kapas. This research is a Classroom Action Research (CAR) study that employs both qualitative and quantitative methods. The study was conducted in two cycles. Data collection methods included documentation, learning outcomes, and observation. The instruments used in this study were observation records, learning outcome assessments, and documentation. The results indicate an improvement in learning outcomes by 9.79% based on the pretest and posttest in cycle I and an 11.79% increase in cycle II. Additionally, student motivation in learning IPAS reached 70% in cycle I and increased to 77% in cycle II, demonstrating that the Discovery Learning model is suitable for the subjects in this study. Based on these findings, it can be concluded that the application of Discovery Learning improves both learning outcomes and student motivation in fourth-grade students at SD Negeri 82/VI Rantau Limau Kapas.

Keywords: Discovery Learning, Classroom Action Research, IPAS

Introduction

Education is a conscious and planned effort aimed at developing the learning process of students so that they can actively cultivate their potential in terms of religious spirituality, self-control, personality based on noble character and divinity, as well as the skills they need for themselves, society, and the nation. For every individual seeking a more positive change in daily life, education is a fundamental necessity. In 2022, Mangangani et al. referred to Indonesian Law No. 20 of 2003, Chapter 1, Article 1:1. Based on data presented by Olivia and Sanoto (2023), it can be concluded that education is one of the key factors in human development as it enhances human resources, enabling society to be more productive and achieve greater accomplishments. The goal of education is to develop students' potential so that their learning outcomes can be assessed (Rutonga, 2017).

Currently, education plays a crucial pedagogical role in ensuring the welfare and development of society as a whole. One of the most essential aspects of human life is education. Over time, government policies have evolved and been refined, including those related to education. A notable educational policy is Executive Order No. 371/M/2021 on the Sekolah Penggerak (Pioneer School) Program (Aprima & Sari, 2022).

According to Fembriani (2022), the Sekolah Penggerak program is implemented through an independent curriculum, which is an extension of the

previous curriculum. According to the Minister of Education, Culture, Research, and Technology of Indonesia, the independent curriculum is designed to foster an ideal and easily comprehensible learning environment. Students are provided with resources to aid their learning and critical thinking skills, enabling them to acquire knowledge and solve problems in a clear and concise manner (Dzulhidayat, 2022). Based on the explanation above, the current curriculum in Indonesia is the independent curriculum, which replaces the previous 2013 curriculum (Lestari, 2023). In the implementation of this curriculum, the government offers three options: (1) independent learning, (2) independent sharing, and (3) independent change. The implementation of the independent curriculum significantly impacts teachers and educators, influencing educational strategies and approaches, teaching methods, educational administration, and even assessment processes (Maulida, 2022).

This curriculum also shares some similarities with the previous one, one of which is the inclusion of two learning modules, Science (IPA) and Social Studies (IPS), which are combined into a single subject known as IPAS (Ilmu Pengetahuan Alam dan Sosial) (Nuryani, Maula, & Nurmeta, 2023b). The primary goal of Social Studies education in elementary schools is to develop students' critical thinking skills. IPAS serves as a foundation for students to help them grasp more complex knowledge of social and environmental sciences (Sulhelayati et al., 2023).

Natural and Social Sciences (IPAS) is a subject that focuses on understanding people living in different parts of the world and their interactions with one another. This study also examines human life as a social construct, incorporating various logically and structurally presented concepts, such as cause-and-effect analysis. In general, when elementary school students study environmental science, they can observe and experience real-world life as well as social media interactions. Students are also encouraged to engage in discussions, explore, and study concepts and topics that are more relevant to their Science (IPA) and Social Studies (IPS) courses in junior high school (Apriliani et al., 2023). IPAS education is conducted in real-life settings. However, the independent curriculum offers less extensive and explicit teaching, and students are encouraged to work in groups (Nuryani, Maula, & Nurmeta, 2023a). In the current Merdeka Curriculum, IPAS has become a distinct subject (Rahmayati & Prastowo, 2023).

The implementation of the Independent Learning (Merdeka Belajar) program under the "Independent Change" category at SDN 82/VI Rantau Limau Kapas began in the first semester of the 2022–2023 academic year. The Merdeka Curriculum has already been implemented for first and fourth-grade students, and it is expected to continue in the following years. According to Tissa et al. (2021), a school is a formal educational institution that establishes various learning environments, including those that provide opportunities for students to engage in diverse learning activities. Schools serve as places where students engage in learning activities to acquire knowledge, particularly in the field of education. As a response to the current situation, learning is a process that leads to real and comprehensive changes (Charli, Ariani, & Asmara, 2019).

In the learning process, students must be actively involved. However, based on initial observations conducted by the author on April 23 in the fourth-grade class of SD Negeri 82/VI Rantau Limau, several students were identified as not fully meeting the indicators of student learning activity. These include: some students who were unable to clearly express their ideas, some students who struggled to understand the teacher's explanations, and some students who were hesitant to ask questions. Additionally, some students had difficulty understanding the lessons explained by the teacher because they did not pay enough attention to the lesson. As previously mentioned, students who fail to understand the material are also unable to learn it effectively. Moreover, limited facilities and infrastructure were observed as one of the barriers to student learning, according to a fourth-grade teacher at SD Negeri 82/VI Rantau Limau Kapas. Since the implementation of the new curriculum, many students have struggled to grasp the material explained by the teacher.

Some students were less engaged in class discussions because they did not fully understand the material, choosing instead to engage in side conversations or debates about various lesson topics. On the other hand, students with a strong desire to learn paid close attention to all the information presented. The teacher assigned tasks to students, encouraging them to be enthusiastic and motivated to complete them without hesitation, even though some assignments posed challenges. Students who struggled with the material were encouraged to seek help. Additionally, when given assignments to complete, many students worked on them quietly because they learned Natural and Social Sciences (IPAS) at the start of the school day. The majority of students viewed IPAS as an interesting learning program, while a smaller group considered it boring because they were not fully engaged with the available materials. In response, teachers are encouraged to boost student enthusiasm for learning by connecting lessons to real-life experiences.

Based on initial observations, teachers should implement methods that enhance student motivation by

creating a creative, stimulating, and engaging learning environment. Teachers should teach learning skills both individually and in groups. Based on this understanding, teachers can improve student motivation and learning outcomes by applying the Discovery Learning model.

According to Fajri (2019), Discovery Learning is a learning process where concepts are not presented in their final form; instead, students are encouraged to structure their own learning methods to grasp the concept. Bahari, Darsana, & Putra (2018) state that Discovery Learning is an educational approach that adapts the curriculum so that children learn new things independently without constant reminders or direct instruction. To assess the effectiveness of this teaching model, learning outcomes must be evaluated. Therefore, Discovery Learning should be considered as an educational model that addresses these challenges. Discovery Learning encourages students to engage in active cognitive processes. Through this approach, students can understand, interpret, classify, hypothesize, explain, measure, and draw their own conclusions to solve problems. This teaching model allows students to be more attentive during lessons and develop a deeper understanding of concepts or principles. For example, a study conducted by Marcela, Idris, & Aryaningrum (2022) found that the Discovery Learning paradigm helps students engage in more complex cognitive processes that involve various active intellectual skills. This method enhances students' comprehension and ability to apply concepts or principles taught in class. The following are the main benefits of this study as explained in the study (Dita et al. 2023), namely, Improving Cognitive Abilities and Processes: The Discovery learning model helps students improve and develop their cognitive abilities.

They are happy and satisfied because they have successfully completed their assignments and actively participated in the teaching process. Reducing Skepticism and Increasing Self-Confidence: This model helps students overcome their own skepticism or doubts. Students are able to gain a deeper understanding of a particular concept through independent exploration. Strengthening Memory: Discovery learning encourages students to actively acquire concepts or seek information without teacher guidance. This can create an understanding that they are able to understand in more detail. Therefore, the purpose of this study is to understand how the Discovery learning model can be used to improve student motivation and learning outcomes.

Based on previous research conducted by Ni Komang Mariani in 2023 with the research title Implementation of the Discovery Learning Learning Model Based on Tri Hita Karana Natural Science Social

Content (IPAS) at SDN 1 Nongan. Shows that the Discovery Learning learning model in the subject of IPAS students in elementary schools creates an interactive learning experience with teachers as facilitators and is able to guide students in solving problems.

Method

This study is categorized as Classroom Action Research (CAR). CAR is a type of research conducted by teachers in schools to address issues that arise during the teaching and learning process in order to improve student learning outcomes and the quality of instruction (Jannah, 2020). In this study, the researcher applied the Kemmis-Taggart CAR model. This model is an extension of Lewin's model, incorporating both action (implementation) and observation (evaluation) (Suswati, 2021). Classroom Action Research (CAR) is a research method conducted by educators or education practitioners with the aim of enhancing the quality of the learning process within the classroom (Suciani et al., 2023).

This study was conducted at SD Negeri 82/VI Rantau Limau Kapas, located on Jalan Bangko, Rantau Limau Kapas, Tiang Rumpung District, Merangin Regency, Jambi Province. The research was carried out during the odd semester of the 2023/2024 academic year with fourth-grade students as the research subjects. The total number of students involved in the IPAS subject was 15 students, consisting of 7 male students and 8 female students. This study followed the Classroom Action Research (CAR) design as its research framework.
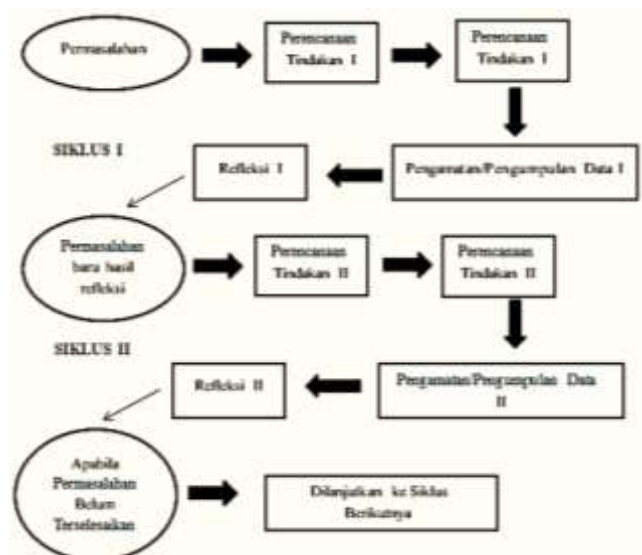

Figure 1. Classroom Action Research (CAR) Design Using the Discovery Learning Model.
Source: Arikunto 2008

The research applied a Classroom Action Research (CAR) approach, combining both quantitative and qualitative methods. The data collection methods used in this study included documentation, learning outcomes assessment, and observation. The research instruments employed were observation sheets, learning outcome records, and documentation.

Results and Discussion

The implementation of Classroom Action Research (CAR) in Cycle I began with the teacher preparing observation sheets. The teacher posed questions regarding the properties of light that students were already familiar with and related these properties to real-life examples. However, students experienced difficulties in providing answers and identifying everyday occurrences that matched the properties of light. Next, the teacher divided students into groups of three to four members, forming a total of five groups. However, since the number of groups was odd, the distribution of observation tasks for the three properties of light was uneven. One property of light was only observed by one group, while the other two properties were each observed by two groups.

Each group encountered some students who caused disruptions in class, especially when the tools and materials were distributed for conducting the experiments according to the LKPD (Student Worksheet). Even before the experiment began, some of the tools and materials were damaged by students, requiring replacements so that the LKPD experiment could proceed. Additionally, students were still confused about the experimental steps they needed to follow. The primary property of light studied in this experiment was refraction, which involved using a pencil placed in a glass of clear water as the main experimental tool and material. Although students engaged in discussions, the majority of them completed the LKPD based only on their prior knowledge, meaning they did not discover new concepts from the experiment. Therefore, researchers had to provide assistance to support the discovery process within the groups.

The next step, after conducting the experiment, was for students to present and demonstrate their experimental results to their peers who did not perform the experiment, ensuring that the knowledge gained was evenly distributed. However, when given the opportunity to ask questions and share opinions, most students remained passive. Following the presentations, the researchers and students together summarized the findings related to identifying the properties of light. The final step was administering a posttest in the form of a written exam. Once the posttest was completed, the session ended with a prayer.

Based on the pretest and posttest results, the following data were obtained:

Table 1. Pretest and Posttest Results

Students	Pretest	Posttest
E	50	80
D	50	70
G	40	70
H	70	70
Q	50	50
R	40	60
Y	40	70
V	40	80
Z	40	40
C	60	40
C	50	50
A	50	70
M	40	80
M	40	80
E		
Total	1215	1140
Percentage	52.82%	62.61%

The observation phase (observing) was carried out by analyzing the research data presented in the table. The table above shows the changes in student learning outcomes through pretest and posttest assessments. The results indicate an increase in the average learning outcomes; however, the overall class mastery level has not yet been fully achieved.
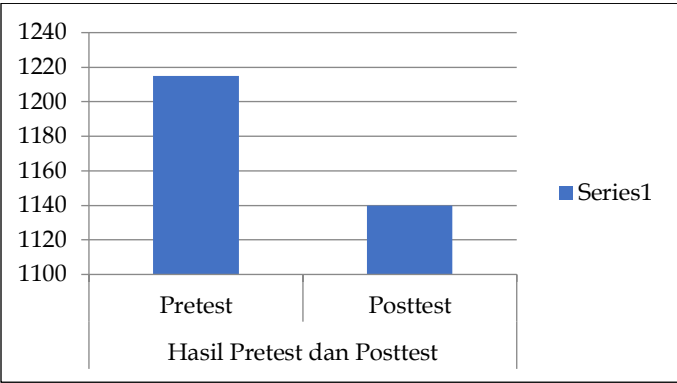

Figure 1. Comparison of Score Differences

Student motivation was measured using a student response questionnaire. The following table presents the number of respondents and their selected responses, with a total of 15 respondents. The collected data indicate that the implementation of this learning model is appropriate for the class, based on the average results in conjunction with the established criteria.

At this stage, an evaluation of the learning implementation in this cycle was conducted. The purpose of the evaluation was to improve student motivation and learning outcomes in the IPAS subject. The evaluation results showed that students were still

confused with the applied learning model, especially when working on the initial tasks in the LKPD (Student Worksheet). Some students also did not complete their group tasks according to instructions. Additionally, when the teacher assigned students the task of relating illustrated images to real-life situations, many students appeared confused and tended to reject the task. However, with the guidance and direction of the teacher, students eventually understood and accepted the assignment.

Table 2. Percentage of Learning Motivation

Stratement No	Number of Respondents with Answers		Percentage %
	Yes	No	
1	18	5	78
2	16	7	70
3	15	6	65
4	18	5	78
5	15	7	65
6	16	8	70
7	18	4	78
8	15	9	65
9	13	9	57
10	17	6	74
		Average	70

Based on Cycle I data, there was a 9.79% improvement in learning outcomes when comparing pretest and posttest results. The percentage of student motivation in IPAS learning reached 70%, which falls within the acceptable category. However, the increase in learning outcomes between the pretest and posttest was still relatively low, necessitating the implementation of Cycle II for further improvement.

The second cycle of the classroom action research began with the teacher preparing an observation sheet. The teacher then posed questions related to image formation in mirrors and its application in real life. At this stage, students had begun to adapt to the Discovery Learning model, and most were able to answer the questions provided (Asriningsih, Sujana, and Sri Darmawati, 2021). Next, the teacher organized students into small groups of three to four members, forming five groups, each studying the topic of image formation in plane mirrors. Students were then guided by the teacher to complete the LKPD, followed by group presentations. After the presentations, a posttest was conducted to assess student learning outcomes. The results of the pretest and posttest are presented in Table 3.

Natural and Social Sciences (IPAS) can certainly enhance students' learning motivation (Muzaini, 2023). Learning motivation was also assessed through a motivation questionnaire distributed to students, and the following data were obtained:

Based on Cycle II data, there was a 11.79% increase in learning outcomes, as observed from pretest and posttest comparisons. Furthermore, the percentage of student motivation in Science (IPA) learning reached 77%, which falls into the acceptable category. These findings indicate an improvement in both student learning outcomes and motivation from Cycle I to Cycle II. This aligns with research by Rismawati, Sudrajat, and Rahayu (2022), which demonstrated that the Discovery Learning model can enhance IPAS learning outcomes. Additionally, a study by Alifni, Umiyanti, and Ramdani (2022) provided similar justifications regarding its effectiveness in improving student performance in heat transfer topics within IPAS learning. Thus, it can be concluded that the Discovery Learning model contributes significantly to improving both student learning outcomes and interest in IPAS learning.

Table 3. Pretest and Posttest Results of Students

Students	Pretest	Posttest
E	55	80
D	55	80
G	30	90
H	60	70
Q	50	70
R	50	70
Y	40	80
V	55	80
Z	60	70
C	60	40
C	70	70
A	55	70
M	40	80
M	40	80
E		
Total	1270	1540
Percentage	55.21%	68%

Table 4. Percentage of Learning Motivation

Statement No	Number of Respondents with Answers		Percentage %
	Yes	No	
1	20	6	87
2	17	7	75
3	16	5	70
4	18	6	79
5	15	8	68
6	17	6	75
7	15	4	78
8	16	8	77
9	15	9	75
10	18	7	80
		Average	75

During the study, researchers implemented the Discovery Learning model to enhance student motivation and learning outcomes. Based on the student

response questionnaire regarding the use of this model in Science (IPA) learning, more than half of the students responded "yes" to each statement in the questionnaire. When calculated based on the existing evaluation criteria, the percentage results indicate that this learning model is appropriate for classroom implementation. However, in terms of overall student motivation, the model still lacks the full capacity to be the primary driving force in IPAS learning.

An analysis of the test results shows a significant increase in average scores between the pretest and posttest. This supports the theory that learning outcomes reflect changes as a result of the learning process. After Cycle II, the average scores demonstrated a notable improvement, further confirming the effectiveness of Discovery Learning in enhancing student understanding and motivation.

During the learning process, students demonstrated enthusiasm, particularly due to the use of simple, everyday materials in the experiments. However, students were not yet fully capable of developing new ideas to solve the given problems. In Cycle II, students began to adapt more comfortably to this learning method. The Discovery Learning model emphasizes hands-on experiences and an understanding of key structures or concepts within a discipline, engaging students actively and enhancing various other aspects of learning (Nuraeni Yulistiawati, Khoimatun, and Fatkhiyani, 2022). The learning material was presented in the form of questions or problems to be solved, allowing students to acquire new knowledge through discovery rather than direct instruction. However, despite this approach, students still required significant teacher guidance to fully understand the concepts being studied.

Conclusion

The implementation of Classroom Action Research using the Discovery Learning model in IPAS learning showed an increase in both student learning outcomes and motivation from Cycle I to Cycle II. Although students initially struggled to understand the concepts and relate them to real-life situations, teacher guidance and hands-on experiences through experiments facilitated their learning process. The pretest and posttest analysis results indicated an increase in the average learning outcome from 52.82% in Cycle I to 68% in Cycle II, while learning motivation increased from 70% to 75%. Students became more familiar with this method, although they still required teacher guidance to fully grasp concepts. Thus, the Discovery Learning model is proven to be a viable approach to enhancing students' understanding and learning motivation. However, further improvements are needed to

encourage students to become more independent in their concept discovery process.

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