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THE EFFECT OF THE PROJECT BASED LEARNING (PJBL) MODEL ON STUDENTS' CREATIVE THINKING ABILITIES IN THE SUBJECT OF SCIENCE CLASS IV

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh model pembelajaran Project Based Learning (PjBL) terhadap kemampuan berpikir kreatif siswa pada mata pelajaran IPAS kelas IV SD Negeri 124394 Pematangsiantar. Penelitian menggunakan metode kuantitatif dengan desain One Group Pretest-Posttest. Subjek penelitian adalah 23 siswa kelas IV. Instrumen penelitian berupa tes uraian berjumlah 6 soal yang divalidasi oleh ahli. Data dianalisis menggunakan uji N-Gain untuk melihat peningkatan kemampuan berpikir kreatif siswa. Hasil penelitian menunjukkan adanya peningkatan signifikan kemampuan berpikir kreatif setelah diterapkannya model PjBL, dengan nilai rata-rata pretest sebesar 35,95 dan meningkat pada posttest menjadi 84,60. Perhitungan N-Gain menunjukkan kategori tinggi dengan skor rata-rata 0,72 (72,18%). Dengan demikian, model pembelajaran PjBL terbukti berpengaruh positif dalam meningkatkan kemampuan berpikir kreatif siswa pada mata pelajaran IPA.

Keywords:
Project Based Learning, Creative Thinking, IPAS, Elementary School

ABSTRACT

This study aims to determine the effect of the Project Based Learning (PjBL) model on students' creative thinking skills in the Science and Social Studies (IPAS) subject for fourth-grade students at SD Negeri 124394 Pematangsiantar. This research employed a quantitative method with a One Group Pretest-Posttest design. The participants were 23 fourth-grade students. The research instrument consisted of six essay questions validated by experts. Data were analyzed using the N-Gain test to measure the improvement in creative thinking skills. The results showed a significant increase in students' creative thinking skills after the implementation of PjBL, with the average pretest score of 35.95 rising to 84.60 in the posttest. The N-Gain calculation indicated a high category with an average score of 0.72 (72.18%). Thus, thePjBL model has a positive effect on enhancing students' creative thinking skills in IPAS subjects

1. Introduction

Education has a category related to the development of the times, as a logarithmic activity. Education is in line with the development of science and technology (Simatupang & Yusuf, 2024) The simple definition of education is a human effort to grow and develop potential both physical and spiritual in accordance with the values that exist in society and culture. In the Law of the Republic of Indonesia Number 20 of 2003 concerning the national education system, it is explained that "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual strength in the field of religion, self-control, personality intelligence, noble morals, and skills needed by themselves, society and for the nation and state. So the above understanding in education in Indonesia is expected to prepare students to become citizens who have a strong and consistent commitment to maintaining the Unitary State of the Republic of Indonesia (Safitri et al., 2024).

The goal of national education, as stated in Law Number 20 of 2003 concerning the National Education System, is to develop the potential of individuals to become people who believe in and fear God Almighty, are noble, knowledgeable, creative, independent, and become democratic and responsible citizens. Another goal of education is to shape citizens who are responsible, possess politeness and morality, and become democratic citizens. Through education, it is hoped that students will have the skills and abilities to carry out their roles as local, national, and global citizens. (Hindun et al., 2024) . The goal of education is for students to possess creative thinking skills. Creative thinking is a thinking ability that can lead a person to creative thinking, enabling them to create new and unique works that differ from previous works (Noordin et al., 2018) .

In fact, creative thinking in Indonesia is very low based on the journal (TIMSS) according to Trianto (Putri et al., 2022) Schools play an important role in improving students' creative thinking skills. However, based on facts in the field, it is known that one of the thinking skills that has not been addressed in depth by teachers in schools is creative thinking. Munandar in (Ramadhan et al., 2020) also expressed a similar opinion, stating that creative thinking skills are not stimulated enough, so they are not used to thinking in various directions and with various possible solutions to problems. TIMSS (Trends in Mathematics and Science Study) One of the international studies of student cognitive abilities conducted by the IEA (International Association for the Evaluation of Educational Achievement) showed that in 2007 and 2011, more than 95% of students in Indonesia could only reach an intermediate level in science.

Factors that contribute to the low creative thinking abilities of Indonesian students are generally under-stimulated to improve higher-order thinking skills (Diana et al., 2021) . Therefore, both teachers and students must work together to develop students' creative thinking abilities (Biazus & Mahtari, 2022). As one of the subjects at the Elementary School level, Natural and Social Sciences (IPAS) is a subject that can be

combined with creative thinking. Because creative thinking skills are the most fundamental thing in IPAS learning (Fadhilah et al., 2023) , it can direct students to be able to think creatively and understand natural phenomena, real problems of human life and understanding the surrounding environment (Septiani & Suyanti, 2022). To enable students to guide their own understanding of IPAS concepts, creative thinking needs to be developed. Therefore, creative thinking is the most fundamental thing in IPAS learning.

The Project Based Learning teaching model is often referred to as a teaching method that uses problem-based problems in its system with the aim of facilitating students in the process of understanding and absorbing the theory provided. This model uses a contextual approach and develops students' critical thinking skills. Thus, they are able to consider the best decisions taken as solutions to problems received. Considering the pros and cons of a decision used as a solution is also included in the theory provided (Silaban et al., 2025) . Project work is often interpreted as work composed of several tasks and is based on questions and problems that require students to tend to think critically in finding solutions. The problem-solving steps taken by students can be used as a basis for assessment (Sari et al., 2023) .

Based on observations conducted at the UPTD of Public Elementary School 124394 on June 2, 2025, it was found that students' creative thinking skills were still low. The adopted curriculum is the Independent Curriculum. However, this learning process is still conventional, with teachers always actively participating in the learning process. This, in turn, leads to students becoming bored with learning, often playing with their classmates or engaging in other activities unrelated to the learning process (Majid & Iram, 2021).

Based on the data on the grade IV students' science and technology score of UPTD SD Negeri 124394 Pematangsiantar in table 1.1 above, out of 23 students, only 9 (39.13%) have achieved the KKM, while 14 students (60.87%) have not achieved the specified KKM. This proves that the learning outcomes of students in the science and technology subject are not optimal and some students still have difficulty in understanding the science and technology material. The Project Based Learning Model is one of the learning models that can make students play an active role in learning, especially in science and technology learning so that what the teacher wants to convey can be understood well. (Wulandari et al., 2021).

So that this learning model becomes a fun learning model, because it is expected to change the way students learn independently by increasing learning motivation, increasing students' creativity in their work, as well as generating creative ideas and training critical thinking in responding to problems faced by students. (Kubilinskiene, 2020) . In addition, the Project Based Learning learning model is a learning model that prioritizes student experience, namely by confronting students with a problem or being given a project related to the material and then students will be asked to solve or create a project/activity based on questions and problems which are then continued with the process of searching, investigating and finding themselves. So that students gain complete knowledge by using ideas, or new ideas obtained from theories, concepts,

information that has been developed into something new and different. (Ebrahim & Brown, 2022) . In this learning model, students can also be trained to work independently or in groups to create and produce something. (Natty ddk 2019: 1084).

By using this Project Based Learning Model, it is directed that schools in Class IV of UPTD SD Negeri 124394 Pematangsiantar can increase their enthusiasm for learning science, increasing that as we know that learning science is one of the interesting and fun lessons to learn. Et al (2019:190). The research findings show that the Project Based Learning Model has a positive effect on students' science learning outcomes with a tendency for most students to score high,

Based on the problems above, the author is interested in conducting research entitled: The Influence of the Project Based Learning Model on Students' Creative Thinking Skills in the Science Subject of Grade IV UPTD SD 124394 Pematangsiantar

2. Method

Every writing must be planned in advance so that this research uses a quantitative approach and descriptive research type according to Sugiyono (Febriansyah et al., 2021). The quantitative method is called the traditional method model, because this method has been used for a long time so that it has become a tradition as a method for research. This method is called the positivistic method because it is based on the philosophy of positivism. (Budi, R., & Lestari, 2024) . This method is considered a scientific method because it meets the criteria of being empirical, objective, measurable, rational, and systematic. It is also called the discovery method because it allows for the discovery and development of various new science and technology. It is also called a quantitative method because the assessment data is in the form of numbers and the analysis uses statistics. The type of research used by the author is a Pre-Experimental Design using the One Group Pretest-Posttest Design. (Octariani & Rambe, 2018) .

Sugiyono (Krisdayanti et al., 2023) says that, Quantitative research is a research method based on the philosophy of positivism used for research on certain populations or samples, sampling techniques are generally carried out randomly, data collection is carried out using research instruments, data analysis is statistical in nature with the aim of testing the hypothesis that has been set to achieve the research objectives is a method that needs to be distinguished needs to be done what is meant by research methods is a general strategy that is regulated in the measurement and data used which is being investigated and because there is no control variant, and samples that are not selected randomly (Pranata et al., 2024) .

In this research, the author used a one-group pretest-posttest design. This study only involved one class, the experimental class, which first administered a pretest and then a posttest. Therefore, the author decided to use this design, and the results obtained were more accurate because they were compared to the conditions before the intervention.

A population is a collection of data that has similar characteristics and becomes the object of inference. Arikunto (Emily Williamson, 2023) states that, "Population is the entire object of research. If someone wants to examine all elements within the research

area, then the research is a census. In this study, the population is 23 fourth-grade students at the UPTD SD Negeri 124394 Pematangsiantar."

A sample is a portion of a population selected to represent the entire population. A sample can be defined as a representative portion, and given the relatively large population, making a total sample encompassing the entire population would be a daunting task, both in terms of time, cost, and the researcher's capabilities. Furthermore, Sugiyono (Maysyaroh & Dwikoranto, 2021) also states that a sample is a subset of the population's population and its characteristics. The sample in this study consisted of students who are part of the population, possessing the same traits or characteristics, thus truly representing the population. (Guo et al., 2020) .

The purpose of this research is to obtain information about the research object by observing it as part of the population. The sampling technique used in this research is nonprobality sampling, and the type of sample is saturated sampling. Nonprobality sampling is a sampling technique that does not provide an equal opportunity for each element as a member of the population to be selected as a sample. (Sunardi & Hasanuddin, 2019) .

The independent variable is the variable that influences or causes changes or the emergence of the independent variable in this study is the Project Based Learning Model. This research uses a quantitative analysis, namely an analysis technique that includes mathematical calculations because the data obtained is in the form of numbers, namely the learning outcome test that will be given to students. (Andriani et al., 2023) . Furthermore, the data collected from an experimental class was processed and analyzed to draw conclusions regarding the presence or absence of differences in creative thinking skills taught using the Project Based Learning Model. The data analysis technique in this study used the hake factor or gene factor. (Wijayanto et al., 2020) .

3. Result and Discussion

Research Description

Description of Expert Validation Results Data

This research was conducted in the fourth grade of SD Negeri 124394 Pematangsiantar, specifically among fourth-grade students. This research was conducted in the odd semester of the 2025/2026 academic year in September 2025, with 30 students as the sample. This study adopted a *one-group design. The pretest* and *posttest* are *used* to measure students' creative thinking skills before *the Project-Based Learning model* is used (Prabawati, 2022) . Next, students are given treatment in the form of learning using the *Project-Based Learning model .* After the learning process is complete, students are given a final test (*posttest*) to determine the extent of *the Project-Based Learning model's impact* on their abilities after implementation. (Aulia et al., 2022)

The material used in this research is "plant body parts". The research implementation procedure begins with giving *a pretest* to students to determine the students' creative thinking abilities before the learning model is implemented. *Project Based Learning ,* then continued with the learning process using the model *Project-Based Learning* . This learning model encourages students to think logically and systematically

to find the right answer. After the learning process, students are given *a posttest* to determine their creative thinking skills after the model is implemented. *Project Based Learning* (Farokhah et al., 2019) . The purpose of this study was to determine the influence of the learning model on students' creative thinking abilities compared to before being given treatment (Amril & Thahar, 2022) .

Instrument Test Data Results

Before conducting the research, the researcher first conducted an instrument test that was validated by two validators, one lecturer, namely Dr., Assistant Fernando Siagian, M.Pd and one teacher, namely Jojor Sihombing , S.Pd, the homeroom teacher of grade IV at the UPTD of SD Negeri 12 4394. The researcher calculated the value of content validation, construct validation, and language using the Aiken V formula to determine whether the questions were valid or not. The formula used to calculate the value of content, construct, and language validation is as follows (Martati, 2022) :

$$v = \frac{\sum S^1}{n\,(C-1)}$$

$$s = r - lo$$

Information :

V : Aiken's V coefficient
$\sum s$: the sum of the scores given by all validators for each item
Io : lowest validity assessment score (Io = 1)
c : highest validity assessment score (c = 5)
n : number of validators
s : score given by the assessor for each item
r : number given by the validator

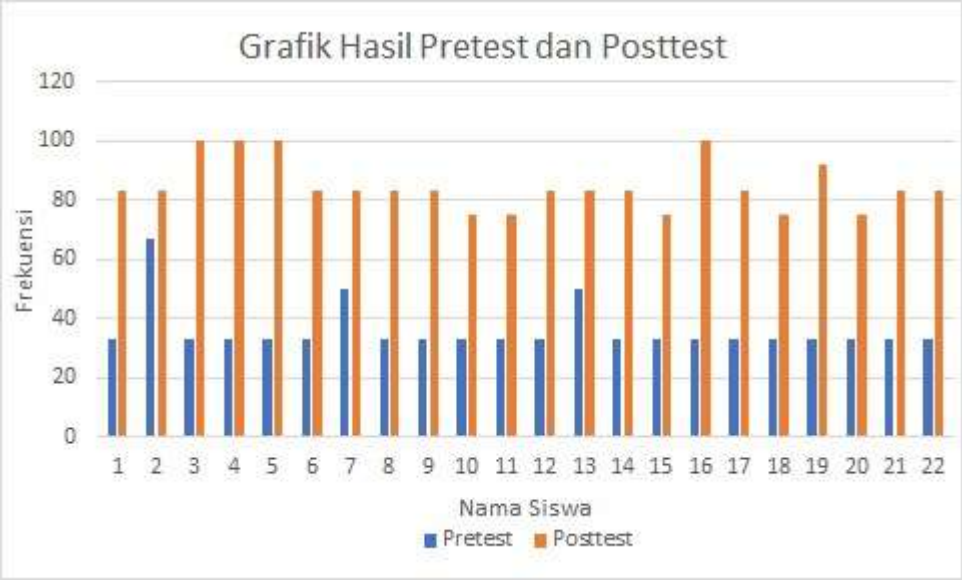

Figure 1. Graph of Pretest and Posttest Results

Discussion

This research was conducted at SD Negeri 124394 Pematangsiantar in the 2025/2026 Academic Year. The researcher provided treatment using the Project Based Learning learning model in the science learning of the material of force. This model encourages students to be skilled, thereby increasing their participation and creative thinking abilities. (Stefania Palieraki, 2021) .

In implementing the Project Based Learning model, students showed significant changes. They became more active in the learning process, dared to express their opinions, and were able to express ideas logically. This is in line with the opinion of Muh Rais (2022) who concluded that Project Based Learning is very influential in creating a structural vision and real understanding in learning. And Suharno (2014) concluded that the Project Based Learning model can impact students' creative thinking skills and learning outcomes. (Maharani & Yohandri, 2020) .

Data analysis was carried out using the N-Gain test to determine the effectiveness of the Project Based Learning learning model on students' creative thinking abilities. (Nurfadillah et al., 2023) . The analysis results showed that the average normalized gain score was 0.72, categorized as high. Of the 23 students, 13 were in the high category and 10 were in the moderate category. Students in the moderate category generally lacked the skills to express opinions and ideas creatively. (Condliffe, 2017) .

Thus, it can be concluded that the Project Based Learning model has a large and significant influence on the creative thinking skills of fourth-grade students on the topic of force at SD Negeri 124394 Pematangsiantar. Therefore, the alternative hypothesis (Ha) is accepted and the null hypothesis (Ho) is rejected. The results of this study are supported by previous research, such as that conducted by Arifin & (Afriana et al., 2016) which shows that the Project Based Learning model is effective in improving the creative thinking skills of fourth grade students in the science subject. Research by Wati & Mahmuddin (Maudi, 2016) also shows that the combination of the PJBL and Project Based Learning models can significantly improve learning outcomes and creative thinking skills

4. Conclusion

Based on the results of research conducted at the UPTD of State Elementary School 12 4394 Pematangsiantar with a sample of 23 fourth-grade students, it can be concluded that the *Project Based Learning model* has a significant influence on students' creative thinking skills in science learning on the topic of force. This is proven through the N-Gain test which shows that the average *pretest* 41.43 and *the posttest* average 84.60 . Where the lowest N-Gain *Score* is 0.4 and the highest N-Gain *Score* is 1.00, thus obtaining a gain of 0.72. This means that the class experienced an increase in creative thinking skills with a high category because (g) ≥ 0.70. Based on these data, it can be concluded that the implementation of *the Project Based Learning model has succeeded in increasing students'* creative thinking skills .

Suggestion

Based on the results of the research conducted on the creative thinking abilities of fourth grade students at SD Negeri 12 4394 Pematangsiantar, the researcher describes several suggestions that can be used as a follow-up to the results of this research, namely:

1. Schools. Research shows that schools and educational institutions play a crucial role. Educational institutions are expected to foster and develop their schools to make education and teaching more effective and efficient. Schools are expected to pay attention to student learning outcomes and implement policies that can improve teacher professionalism by considering each teacher's choice of learning model.
2. Teachers **.** When delivering a lesson, teachers are expected to choose the right learning model. The chosen learning model should encourage students to be more active in the teaching and learning process. Selecting the right learning model can influence learning success.
3. Other researchers **.** Other researchers can conduct research by developing other topics, so that they can obtain information about *the Project Based Learning model* in science learning and can be used for other subjects

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