Improving Elementary School Students' Learning Outcomes Using the Project Based Learning (PJBL) Model

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ABSTRACT
Classroom Action Research (CAR) was motivated by the results of science learning on the water cycle material for VA class students at SDN Beji 01 Batu which had not yet reached the minimum completeness criteria (KKM). This study aims to improve Natural Science learning outcomes on the water cycle material using a project-based learning model with a project to make a simple water purification tool for VA class students at SDN Beji 01, Batu Regency, in the 2025/2026 school year. Researchers carried out PTK in two cycles and each cycle was carried out in two meetings. The results of the research on the pre-cycle action which had classical completeness of 21.73% with an average value of 53 experienced an increase in the first cycle of action. In the first cycle the classical completeness reached 69.56% and an average value of 77. The research ended in cycle II achieving completeness classical 95.65% and average value 80. Based on the results of this study it can be concluded that the application of the Project Based Learning model can improve science learning outcomes on the water cycle material in class V students at SDN Beji 01 Batu in the 2025/2026 academic year.

Keywords: Learning Outcomes, Water Cycle, Project Based Learning.

INTRODUCTION

Humans are living beings created by God in a very perfect state, humans are different from animals or other living things that are not human. The fundamental characteristic that makes man the most perfect living creature created by God is the ability to think. Human thinking skills must be continuously nurtured and empowered through education. So a country needs to facilitate all its citizens to get education in accordance with the 1945 Constitution Article 31 Paragraph 1 which reads "Every citizen has the right to education". Based on what is written in Law Number 20 of 2003 concerning the National Education System Chapter I Article 1 Paragraph 1 that education is a way that can be done to develop human abilities as optimally as possible through the development of potential so that they become qualified individuals. Education is useful for improving the character of human resources. If the implementation of education is supported by quality resources, then the educational process will be of quality. The development of this potential can be done as early as possible, one of which is carried out at the elementary school (SD) level. (Amin Yusuf, 2014)

Success in achieving educational goals can be achieved through optimizing the learning process. Learning is a process of behavior change that occurs as a result of the interaction between stimulus and response as described in behavioristic theory. In the perspective of modern learning, these changes are not only seen in behavioral aspects, but also in the improvement of students' thinking abilities, skills, and attitudes as a result of meaningful learning experiences (Rahman & Supriyadi, 2023; Fitriani et al., 2024). Thus, learning is a process of changing students' ability to act and think better as a result of interaction with the learning environment.

Learning outcomes are abilities obtained by students after participating in the learning process which includes cognitive, affective, and psychomotor aspects. These three aspects are important indicators in measuring learning success because they reflect the mastery of knowledge, attitude formation, and skills possessed by students (Nurfadilah et al., 2023; Prasetyo & Wulandari, 2024). This is in line with Bloom's revision of Taxonomy which places the ability to think as a cascading process from remembering to creating. Learning is not only memorizing the material delivered by the teacher, but also producing behavioral changes, especially in the cognitive aspects in the form of improving critical thinking, analytical, and problem-solving skills. Learning experiences also encourage changes in affective aspects in the form of positive attitudes towards learning and the formation of character values. In addition, the psychomotor aspect is related to the ability of students to coordinate movements, practice and apply knowledge in real activities. These three aspects are interrelated and become indicators of students' success after participating in the learning process (Sari et al., 2025).

The learning process in the classroom must be designed in an interesting, interactive, conscious, and fun way so that it can provide a meaningful learning experience for students. Quality learning is not only oriented to the delivery of material, but also able to increase students' motivation, active involvement, creativity, and independence (Hidayat & Kurniawan, 2023; Wibowo et al., 2024). In line with the National Education Standards, the learning process must be carried out in an interactive, inspiring, fun, challenging manner, and provide space for students to develop their potential according to their talents, interests, and development characteristics. Teachers are also required to create inclusive learning by paying attention to all students, including those who have learning difficulties, so as to create a fair, comfortable, and non-discriminatory classroom atmosphere. Interesting learning is not only fun, but is able to lead students to achieve learning goals optimally (Kusuma & Lestari, 2025).

Various subjects in schools are held to improve the quality of human resources as well as the quality of national education. One of the subjects that plays an important role is Natural Sciences (IPA), which is a subject that studies natural phenomena in a rational, systematic, and

scientific-based manner. In the implementation of the Independent Curriculum, science subjects at the elementary school level are integrated with Social Sciences into Natural and Social Sciences (IPAS). The integration aims to build critical thinking skills, science literacy, social literacy, and problem-solving skills through student-centered contextual learning (Ministry of Education and Culture, 2022; Handayani & Purwanto, 2024). In the initial implementation stage, the Independent Curriculum was applied to grades I and IV of elementary schools so that grade V still uses the 2013 Curriculum.

Various subjects in schools aim to improve the quality of human resources and improve the quality of education in Indonesia. One of the rational and objective subjects about the universe and the universe with all its contents is Natural Sciences (IPA). Meanwhile, in the independent science curriculum it was replaced with Natural and Social Sciences (IPAS) where in semester 1 students studied science and in semester 2 students studied social studies, the independent curriculum at the elementary school (SD) level is still applied in grades 1 and 4 so it has not been applied to grade 5.

Science in elementary school should open up opportunities to cultivate students' curiosity naturally. This will help them to develop the ability to ask questions and seek answers based on evidence and develop a way of thinking that scientific can also provide hands-on experience. The science learning process emphasizes on providing direct experience to develop competencies to explore and understand the surrounding environment scientifically, this is done as a way of thinking students to gain an understanding of nature and its properties, a way of investigating how natural phenomena can be explained as a body of knowledge resulting from one's curiosity. Students are required to be active and creative in the science learning process, this is done so that students have the skills to investigate or observe things that happen in the environment or surrounding nature and can even demonstrate or use certain objects so that students can answer their curiosity. Science education is directed to discover and do so that it can help students to gain a deeper understanding of the surrounding nature. Science education is expected to be a vehicle for students to learn about themselves and the environment, as well as the prospects for further development in its application in daily life. (Samatowa , 2011) (Cahyo, 2013)

Based on the results of observations on October 27-28, 2025 at SDN Beji 01 Kota Batu, the science learning outcomes are still low, this is due to the learning process that is still not in accordance with the science learning objectives at school. The competence of the teacher's professional level as well as the methods, techniques and strategies of teachers in teaching are also very influential in the learning process to run effectively and efficiently. In addition to the above science learning in the classroom, it still uses lecture and assignment methods so that science learning is still monotonous and less varied, in addition to the use of methods, media and teaching aids that are less varied and less widely applied in science learning so that students only think abstractly about the lessons delivered by the teacher.

In the learning process, students tend to be passive because students only write and listen, students also find it difficult to understand the concepts given by the teacher because students only memorize the subject of learning. Teachers rarely give experiments to students who should be in the process of experimenting many benefits that can be received by students, one of which is that students can find out directly what they get during the experiment process, students communicate a lot with fellow group members, students also do not only take notes but observe, try, and are directly involved in the experiment.

The results of these observations are also supported by the results of interviews conducted with VA class teachers of SDN Beji 01 Kota Batu and class teachers of VB SDN Beji 01 Kota Batu who raised several problems when teaching, namely: (1) When learning is taking place, students rarely pay attention to the teacher and play more often in the classroom,

(2) Lack of knowledge of the learning model model, (3) Teachers rarely conduct experiments and give students projects, so students' curiosity about the lesson becomes low. This will affect student learning outcomes and motivation. (4) Teachers do not use TPACK-based media due to limited facilities at school. The above conditions are strengthened by the results of recording documents carried out at all SDN Beji 01 Batu City. Based on the recording of documents in science learning, it was obtained that the average pre-action score of science subjects of VA students was still below the KKM, which was 53.47%.

Referring to the above problems, teachers should be more involved in learning in the classroom, and increase the use of learning models that are in accordance with the conditions of students and the characteristics of science learning materials that will be taught in the classroom. At this time, various innovative learning models have been developed to be applied in the science learning process in elementary school.

One of the learning model innovations in question is by applying the Learning model *Project Based Learning* (Kosasih, 2016) . Project- or activity-based learning models (*Project Based Learning*) as the goal. PJBL learning focuses on the main (central) concepts and principles of a discipline, engages students in problem-solving activities and other meaningful tasks, provides opportunities for students to work autonomously constructing their own learning, and culminates in producing valuable and realistic student work products.

From the above opinion, it can be concluded that the project-based learning model is a learning model that uses projects as its objectives and involves students in problem-solving activities and other meaningful tasks, provides opportunities for students to work autonomously to construct the learning of art students and ultimately produce valuable and realistic student work products.

The Project Based Learning (PjBL) learning model is a learning model that uses contextual problems as a starting point for learning to encourage students to produce a project or product as a solution to these problems. In this model, students are actively involved starting from the planning, implementation, to presentation of project results so that learning becomes more meaningful. The products produced can be in the form of works, media, reports, or activities that reflect the mastery of students' competencies (Handayani & Purwanto, 2024; Nurhayati et al., 2025). Through direct involvement in project completion, teachers can develop various 21st-century skills, such as critical thinking, creativity, collaboration, communication, as well as science process skills that include curiosity, problem-solving skills, perseverance, and confidence (Rahmawati et al., 2023; Suryani & Wibowo, 2024). The success of the implementation of PjBL is not only measured by the final product produced by students, but also by the learning process, activities, cooperation, and the ability of students to complete projects independently with teachers acting as facilitators, motivators, supervisors, and evaluators.

Use of the model *Project Based Learning* This follows phases including (1) Project determination. Students determine the type of activity or work they will do, according to their individual needs. Interests, abilities, and the availability of facilities and infrastructure must be considered by students in this step. The teacher's task is to direct these choices so that they remain in the learning corridor, still relevant to the KD that is being developed. (2) Project planning. Students design the steps of project implementation activities, from the beginning to the end of completion. The following are the steps for implementing project design activities (a) In the initial stage, in the form of planning tools, materials, time needed, and other things. Included in this stage is the division of tasks among them if the project in question is carried out in groups. (b) At the implementation stage, in the form of designing the core activities that students will carry out, including arranging the obstacles they may face and possible ways to overcome them. (c) At the final stage, in the form of follow-up planning if the project is

completed. For example, in the form of exhibitions, presentations, class discussions. (3) Preparation of Schedule.Under the guidance of the teacher, the students schedule all the activities that have been designed. The schedule shows how long the project must be completed step by step. The schedule in question is adjusted to the program available to the teacher himself, as well as the ability of students to complete the project that has been designed. (4) Project Completion.At this stage, students work on assignments according to the pre-designed reading. Teachers play a role in motivating, directing, coordinating so that student activities and projects can ensure their completion properly and on time. At the same time, teachers need to monitor student activities in the context of the assessment process, in accordance with the indicators that have been set, be it cognitive, psychomotor, or cognitive aspects. (5) Conveying the Results of Activities. In the scientific approach, this step is included in the process of communicating. The form of delivery depends on the project produced by the students. In this activity, students are also encouraged to learn to take responsibility for the events they have experienced. (6) Evaluation of Processes and Activity Results. Teachers and students reflect on a series of activities that they have undergone and the results. At this stage, students have the opportunity to express their experiences, impressions, and difficulties they face. Teachers then provide various inputs and considerations related to the quality of their work. (Kosasih, 2016)

According to the advantages of the project-based learning model, they are as follows: (1) Increase students' motivation to learn, encourage their ability to do important work, and they need to be appreciated. (2) Improve problem-solving skills. (3) Make students more active and successfully solve complex problems. (4) Improve collaboration. (5) Encourage students to develop and practice communication skills. (6) Improving the ability of students to manage resources. (7) Provide students with learning and practice experience in organizing projects, and make time allocations and other resources such as equipment to complete assignments. (8) Provide learning experiences that involve learners in a complex manner and are designed to evolve according to the real world. (9) Involving students to learn to take information and show their knowledge, then implement it with the real world. (10) Make the learning atmosphere fun, so that students and educators enjoy the learning process. (Rusman , 2017)

Based on the description that has been described, the research was carried out with the aim of testing whether there is a significant difference in science learning outcomes between the group of students who are taught and the learning model *Project Bassed Learning* and groups of students who are taught with conventional learning in VA class students of SDN Beji 01 Batu City.

METHOD

This type of research is Class Action Research (PTK) using the research design of the chemmis and M.C Tanggart model which consists of four recurring components including the stages of planning (plan), implementation (act), observation (observe), and reflection (reflect). Classroom action research is one of the teachers' efforts in the form of various activities carried out to improve or improve the quality of learning in the classroom.

This research was carried out in the odd semester of the 2025/2026 school year, namely in November. The subject of this study is the VA class students of SDN Beji 01 Batu City consisting of 23 students. The object of the research is to improve student learning outcomes of water cycle materials using the learning model *Project Bassed Learning*. This research will be carried out in 3 cycles with stages of each cycle, namely planning, implementation, action, observation and reflection (Kunandar, 2012).

1. Planning

   At this planning stage, the researcher prepares a Learning Implementation Plan (RPP) or teaching module, by looking at the curriculum used, analyzing the material that will be

given later, then determining the Learning Objectives Flow (ATP) to be taught, preparing science learning resources. Developing learning models, compiling LKPDs, and compiling learning instruments. This is done so that during the implementation of learning in accordance with the learning objectives to be achieved.

2. Implementation

   At this stage, the implementation of learning is carried out in accordance with the planning that has been made, both regarding the use of learning methods, the use of learning media, and other learning tools.

3. Observations

   In the observation activity, the researcher observed students who were learning with the problem model of the learning project. Observing student activity, student cooperation, cohesiveness. This observation also observed that learning must be in accordance with what has been planned, so that the researcher knows whether there are obstacles or not.

4. Reflection

   At this stage, the researcher conducts an evaluation by providing an assessment instrument in the form of a written test. This test is carried out to find out the extent of student learning outcomes.

   Based on the results of the pre-cycle, cycle I and cycle II analysis on the understanding of the concept of science of water cycle materials. So the researcher concluded whether the action hypothesis was achieved or not if the use *of the problem bassed learning model* with interactive media of the type of experiment in making a simple water purification tool could improve the learning outcomes of science water cycle material for students in class VA of SDN Beji 01 Kota Batu.

   Data analysis is used with quantitative data analysis to analyze data based on student learning outcomes during learning. The analysis of research data is to be followed up in the form of observation to students and with descriptive analysis to explain the data produced from the research described in accordance with the data collected.

RESULTS AND DISCUSSION

This research is a Class Action Research (PTK). This Classroom Action Research (PTK) is considered very suitable for use, because this research is focused on learning problems that arise in the classroom, in order to improve learning and improve the teaching and learning process more effectively. The reason for choosing the Classroom Action Research (PTK) research technique is that it is easy for teachers to do, does not interfere with teachers' working hours, besides that while teaching you can simultaneously conduct research and do not require comparisons. Therefore, this sub-chapter presents an explanation of data that supports the implementation of class action research conducted by researchers. The results of the research that will be presented are the results of research on improving the learning outcomes of science water cycle materials using a project-based learning model with experimental media for making simple water purification tools with reference to the research objective, which is to increase the learning outcomes obtained by students.

Based on the results of the pre-action test, it was illustrated that of the 23 students in class VA of SDN Beji 01 Kota Batu who took the test, 17 students or 73.91% had not reached the limit of completeness, namely a score below KKM (70), while those who had reached the limit of completeness obtained a score above 70 as much as 21.73%. After observing the science learning process in the VA class at the initial test stage or pre-cycle, then the researcher as a model teacher plans actions for the next stage, namely the first cycle stage to improve science learning outcomes. Before carrying out the first cycle, there are several things that need to be identified, namely, the implementation of learning still has one-way communication, the learning

model used has not been able to improve the learning outcomes of science water cycle materials, and the learning in the classroom related to the learning method has not been effective.

Observation in cycle I was carried out by observers. The observers in this study are fellow model teachers. Observers are asked to fill in the observation sheet that has been prepared (attached). The observation sheet consists of observations of teachers and students. The results of the observation of teacher performance in the first cycle had a score of 75 with a percentage of 62.5%. With this score, the performance of teachers in cycle II is in the category of sufficient. Meanwhile, the results of the students' observation assessment in the first cycle had a score of 69 with a percentage of 57.5%. This score makes the condition of students in the first cycle in the category of sufficient. The results of the final test of the first cycle obtained an average score of 70 students. From the results of the final test of the first cycle, the learning outcomes of students have increased when compared to the results of the final pre-action test. 16 students have obtained scores above 70, have met the minimum completeness criteria. The percentage of learning completeness in the first cycle is 69.5%, which means that the percentage of learning completeness of students has not met the predetermined completion criteria, which is 85%. So it is still necessary to hold the next cycle, namely the 2nd cycle.

After the implementation of cycle II learning, the results of teacher performance observation in cycle II had a score of 93 with a percentage of 77.5%. With this score, the performance of teachers in cycle II is in the good category. Meanwhile, the results of the observation assessment of students in cycle II had a score of 89 with a percentage of 74.2%. This score makes the condition of students in cycle II in the good category. The classical completeness obtained by students in the second cycle was 95.65% or as many as 22 students who had completed in answering the questions that had been given, while as many as 4.3% or 1 student who had not completed answering the questions given. This proves that the learning outcomes of students in science subjects of water cycle material have been very good and the completeness of students' learning outcomes classically has been achieved. Therefore, the next cycle is no longer implemented.

The improvement in student learning outcomes can be seen from the completeness of learning with the Minimum Completeness Criteria (KKM) set at 70. It is evident from the results of the initial test, out of 23 students who took the test, only 5 students completed their studies and 17 students did not complete their studies. With a learning completion percentage of 21.73%. Increasing in the results of the first cycle test, completeness reached 69.56% and in the second cycle reached 95.65%.

Table 1 Comparison of Pre-Action, Cycle I and Cycle II Data

Cycles	Completion Percentage
Pre-Actions	21,73%
Cycle I	69,56%
Cycle II	95,65%

Based on the table above, it can be concluded that the application of the Project Base Learning learning model with the experimental media of making a simple water purification device can improve student learning outcomes while showing that students feel happy. The Project Based Learning learning model shows that students can be more active in learning activities. This is in line with the author's goal, which is to improve the science learning outcomes of students.

CONCLUSION

Based on the results of the research, the class action of applying the Project Based Learning learning model with experimental media for making simple water purification tools in Class VA water cycle material to improve science learning outcomes, it can be concluded that: The application of the Project Based Learning model with experimental media for making simple water purification tools can improve the learning outcomes of science water cycle materials in students. The data on the improvement of the ability was obtained based on the percentage of the value of the evaluation results. 23 students who took the test, only 5 students completed their studies and 17 students did not complete their studies with a learning completion percentage of 21.73% with an average score of 53. There was an increase in the results of the first cycle of the test, the completeness reached 69.56% with an average score of 70 and in the second cycle reached 95.65% with an average score of 80.

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