



Application of *Problem Based Learning* (PBL) Learning Model to Improve Attitude of Independence and Mutual Cooperation (Pancasila Student Profile) in Grade V Students of Muhamadiyah Ambarbinanngun Elementary School

Shelvia Rizka Saputri ^{1*}, Atika Triana Okta Abidin¹, Farhan¹, Wisti Madani¹, Heru Purnomo¹

¹ Universitas PGRI Yogyakarta, Yogyakarta, Indonesia

*Corresponding author. Email: rizkashelvia8@gmail.com

Abstract. This study aims to determine the effectiveness of the Problem Based Learning (PBL) model in improving students' independence and mutual cooperation at the elementary school level. The research employed a quantitative approach using a quasi experimental design with a nonequivalent control group design. The sample consisted of fifth-grade students selected through purposive sampling, divided into an experimental class and a control class. Data were collected using questionnaires and observation sheets, and analyzed using N-Gain and independent sample t-test. The results showed that both groups had relatively similar initial conditions, with the average pretest score of the experimental class at 28.57 and the control class at 28.43. After the implementation of PBL, the experimental class demonstrated a higher improvement, with a posttest mean score of 44.81 compared to 33.67 in the control class. The N-Gain score of the experimental class (0.84, high category) was significantly higher than that of the control class (0.27, low category). In addition, observation results indicated better behavioral outcomes in the experimental class (83%) compared to the control class (62.5%). These findings indicate that the Problem Based Learning (PBL) model is effective in enhancing students' independence and mutual cooperation, making it a suitable approach for strengthening character education in elementary schools.

Keywords: PBL learning model, independence, mutual cooperation, elementary school

1. Introduction

Education is a planned process that aims to develop the potential of students, both in terms of knowledge, attitudes, and skills. The strategic role of education has been affirmed in the 1945 Constitution of the Republic of Indonesia which guarantees the right of every citizen to obtain proper and quality education. Education not only functions as a means of knowledge transfer, but also as a process of character formation

and overall skill development of students. However, various international indicators show that the quality of learning outcomes of Indonesian students still needs to be improved. The results of the *Programme for International Student Assessment (PISA)* in 2022 show that Indonesia's reading literacy score is 359 points (below the OECD average of 476), numeracy is 366 points (OECD 472), and science is 383 points (OECD 485) [1]. The data shows that there are significant gaps, especially in critical thinking, problem-solving, and collaboration skills.

This condition indicates that the learning process is not fully able to develop 21st century skills optimally. In fact, the demands of 21st century education emphasize the importance of mastering critical *thinking*, collaboration, communication, and *creativity* skills as the main competencies of students [2]. In addition, education policy in Indonesia through the Pancasila Student Profile also places character strengthening as an integral part of the learning process. The dimensions of independence and mutual cooperation are the main focus in forming students who are not only academically superior, but also able to interact socially and responsibly in the learning environment [3]. However, various studies show that the integration of cognitive and character aspects in learning is still not optimal at the elementary school level [4].

Elementary schools have a fundamental role in shaping the basis of students' academic abilities and character. In this phase, students are at a concrete operational stage, so they need a learning experience that is contextual, meaningful, and involves direct activities [5]. An active and collaborative learning environment is indispensable to foster independent learning habits and the ability to work together. Research shows that learning experiences that involve students' active participation can improve students' social, emotional, and self-confidence development [6]. Therefore, the quality of learning in elementary schools is a determining factor in shaping students' independence and mutual cooperation ability from an early age.

However, this condition has not been fully reflected in the learning practices at Muhammadiyah Ambabarbinangun Elementary School. Based on the results of observations, it was found that most students still showed high dependence on teachers in completing assignments. Students tend to wait for instruction without initiative to explore the material independently. In addition, the implementation of group work has not been effective, which is shown by low active participation, the dominance of several students in the group, and the lack of an even division of tasks. Interaction between students in learning is also still limited, so the value of mutual cooperation has not developed optimally. This condition is reinforced by preliminary observational data showing that the level of active participation of students in group discussions is still in the low category, and most students are not able to express opinions or cooperate effectively.

This problem is inseparable from the characteristics of learning that are still dominated by conventional approaches. *Teacher-centered* learning causes students to play more of a role as passive recipients of information. As a result, students' opportunities to develop critical thinking, problem-solving, and collaboration skills are limited. Studies show that conventional learning tends to be less effective in developing students' learning independence and social skills [8]. The lack of student involvement in the learning process has an impact on the low ability to work together and the lack of development of individual responsibility attitudes.

To overcome these problems, learning model innovations are needed that are able to encourage active student involvement and develop high-level thinking and collaboration skills. One of the relevant learning models is *Problem Based Learning (PBL)*. PBL is a student-centered learning model with an emphasis on contextual problem solving as the main trigger for the learning process. Through PBL, students are actively involved in identifying problems, seeking information, discussing, and formulating solutions collaboratively. This process not only encourages the development of critical thinking and problem-solving skills, but also trains learning independence and the ability to work together in groups.

Various studies show that the application of *Problem Based Learning* can significantly increase student involvement, critical thinking skills, and collaboration skills. In addition, the characteristics of PBL that emphasize group work and individual responsibility are in line with strengthening the dimensions of independence and mutual cooperation in the Pancasila Student Profile. Thus, PBL has a strong potential to overcome the problem of low independence and student cooperation in learning in elementary schools. Based on this description, this study aims to determine the application of *the Problem Based Learning (PBL) learning model* in improving the attitude of independence and mutual cooperation of grade V students of Muhammadiyah Ambarbinang Elementary School.

2. Research Methods

This research is designed using a quantitative approach with a *quasi-experimental design*. The selection of this design was based on field conditions that did not allow the researcher to fully randomize the subject, so the research utilized existing classes as a research group. The design used is a *nonequivalent control group design*, which involves two groups, namely the experimental group and the control group. The experimental group was given treatment in the form of the application of *the Problem Based Learning (PBL) learning model*, while the control group used conventional learning. The use of this design aims to test the difference in the increase in independence and mutual cooperation of students after the treatment is given.

The population in this study includes all grade V students of Muhammadiyah Ambarbinangun Elementary School in the ongoing school year. The research sample

was determined using *purposive sampling techniques* by considering the equality of academic and social characteristics between classes. The sample consisted of two classes, namely one class as the experimental group and one class as the control group. The class selection was based on the similarity of initial abilities measured through *pretest* scores, so that the two groups had relatively comparable initial conditions before being given treatment [21].

The research procedure is carried out in three stages, namely the preparation, implementation, and final stages. The preparation stage includes the preparation of *Problem-Based Learning-based learning tools*, the preparation of research instruments, and the validity and reliability test of instruments. At the implementation stage, both groups were given a *pretest* to determine the initial ability of student independence and mutual cooperation. Furthermore, the experimental group participated in learning using *the Problem Based Learning* model with stages: problem orientation, organization of students in groups, investigation guidance, development and presentation of results, and analysis and evaluation of problem solving. Meanwhile, the control group followed the learning with conventional methods. The final stage is carried out by giving a *posttest* to find out the changes that occur after the treatment is given.

The research instruments are in the form of questionnaires and observation sheets. Questionnaires were used to measure the level of independence and mutual cooperation of students using the Likert scale, while observation sheets were used to observe student behavior during the learning process. Indicators of independence include learning initiatives, responsibility, and self-management skills, while indicators of mutual cooperation include cooperation, communication, and participation in groups. The validity of the research instrument was tested through the validity test of content and construct, and its reliability was tested to ensure the consistency of the data [21].

The data analysis technique was carried out quantitatively using statistical tests. The data obtained were analyzed through normality tests and homogeneity tests as prerequisites for analysis. Furthermore, an *independent sample t-test* was carried out to find out the difference in results between the experimental group and the control group. *N-Gain* analysis was used to determine the level of increased independence and mutual cooperation of students after treatment was given. The results of the analysis were used to draw conclusions about the effectiveness of *the Problem Based Learning (PBL)* learning model in increasing student independence and mutual cooperation.

3. Results and Discussion

3.1 Research Results

This research began by measuring the initial condition of students through a *pretest* to determine the baseline of independence and mutual cooperation attitudes in both groups. The results of the data analysis showed that the average *pretest* score of the experimental class was 28.57, while the control class recorded a score of 28.43. The very thin score indicated that both groups had relatively homogeneous or equivalent initial abilities before being given treatment. This balanced initial condition is crucial

in experimental design so that the changes that occur are truly sourced from the intervention of the learning model. This equivalence ensures that the internal validity of the research is well maintained from the early stages of the subject's distribution.

Table 1. Comparison of Pretest and Posttest Results

Groups	Pretest	Posttest	Improvement
Experiment (PBL)	28,57	44,81	16,24
Controls	28,43	33,67	5,24

Based on the table above, the implementation of the *Problem Based Learning (PBL)* learning model in the experimental class showed a significant change in achievement compared to the control class. The average *posttest* score in the experimental class increased to 44.81 after the series of problem-based learning was implemented. This achievement is higher than the control class which only achieved an average score of 33.67 with the use of conventional methods. These differences in outcomes show a clear gap between students who are actively involved in the problem-based learning process and students who participate in regular learning. This indicates that the application of *Problem Based Learning* has a positive influence on the development of students' attitudes of independence and mutual cooperation.

The effectiveness of the *Problem Based Learning learning model* was also strengthened through the results of the *N-Gain* calculation which showed a considerable difference in improvement. The experimental class obtained an *N-Gain* value of 0.84 which was in the high category, while the control class only obtained a value of 0.27 which was in the low category. This difference shows that problem-based learning is more effective in increasing students' independence and cooperative ability. Student involvement in the process of identifying problems, group discussions, and developing solutions independently and collaboratively are factors that drive this improvement.

Table 2. Observation Results of Independence and Mutual Cooperation

Groups	Percentage (%)	Categories
Experiment (PBL)	83%	Excellent
Controls	62,5%	Enough

Based on the table above, the field observation data provides support for the quantitative results obtained. The level of achievement of independence and mutual cooperation in the experimental class reached 83% with the very good category, while

the control class only reached 62.5% with the adequate category. These results show that the application of *Problem Based Learning* is able to create more active and collaborative learning interactions. Through discussion activities, group work, and problem-solving, students show improvements in participation, responsibility, and the ability to work together. Thus, the application of *Problem Based Learning* has proven to be more effective than conventional learning in supporting the strengthening of the character of independence and mutual cooperation of students in elementary school.

3.2 Research Discussion

The results showed that the initial condition of students in the experimental class and the control class was at a relatively equal level. The average *pretest scores* were almost the same, indicating that there was no significant difference in the initial ability of independence and mutual cooperation before treatment was given. This equivalence forms a strong basis in experimental research because it ensures that the changes that occur after treatment actually come from the intervention applied. This situation supports the internal validity of the research so that the results obtained can be scientifically accounted for [22]. The homogeneous initial conditions also provide an opportunity to compare the effectiveness of treatment more objectively between the two groups.

The improvement that occurred in the experimental class after the application of *the Problem Based Learning (PBL)* learning model showed a significant change compared to the control class. The higher average *posttest scores* in the experimental class showed that PBL was able to have a positive impact on students' independence and mutual cooperation. The problem-based learning process encourages students to be active in identifying problems, seeking information, and developing solutions independently or in groups. This active involvement contributes to the emergence of initiative, responsibility, and the ability to manage oneself. These findings are in line with a *student-centered learning approach* that emphasizes the importance of active participation in improving the quality of student learning outcomes and attitudes [23].

The difference in *N-Gain* values between the experimental class and the control class further strengthens the effectiveness of the *Problem Based Learning* learning model. The *high N-Gain* value in the experimental class indicates that the increase that occurred was in the optimal category. In PBL, students not only receive information, but are directly involved in the contextual problem-solving process. This process allows students to build knowledge and attitudes through meaningful learning experiences. This is in line with the theory of constructivism which states that learning is more effective when learners actively build their own knowledge through direct experience [24]. In addition, discussion and reflection activities in PBL also support the development of students' independence and cooperation skills.

The results of the observation showed that the behavior of independence and mutual cooperation of students in the experimental class was in the very good category. The high percentage of achievement indicates a real change in students' attitudes during the learning process. Activities in PBL that emphasize group work and joint problem-

solving encourage more intensive interaction between students. Students are seen to be more active in communicating, sharing assignments, and participating in solving the given problems. These findings are in line with social learning theory which states that interactions in groups can improve students' collaborative abilities and social attitudes [25]. Thus, PBL not only has an impact on cognitive aspects, but is also effective in shaping positive social behaviors.

Meanwhile, the results obtained in the control class showed a relatively lower improvement than in the experimental class. Conventional *teacher-centered* learning limits students' opportunities to be actively involved in the learning process. As a result, students tend to be passive and lack space to develop independence and teamwork skills. This condition is in line with the opinion that *teacher-centered* learning is less effective in developing students' social skills and learning independence [26]. Comparison of results between the two groups showed that *the Problem Based Learning (PBL) learning model* was more effective in increasing the independence and mutual cooperation of elementary school students.

5. Author's Contribution

Shelvia Rizka Saputri Initiating the preparation of articles as part of academic activities, designing research ideas, In addition, responsible for the preparation of research designs, planning data collection procedures, and writing the initial draft of the manuscript as a whole.

Atika Triana Okta Abidin²: Plays a role in the development of research instruments and planning of data collection techniques, as well as preparing a design for quantitative data analysis to be used in research.

Farhan³: Conduct literature searches and reviews from various relevant international journals, contributes to the preparation of introductory sections and theoretical studies, and ensures the consistency of citations in accordance with scientific writing standards.

Wisti Madani⁴: Involved in the preparation of student activity observation plans, as well as designing qualitative data analysis techniques related to students' learning behavior.

Heru Purnomo: Acts as a research supervisor who provides conceptual and methodological direction thoroughly. Validate the design of the research, as well as provide critical editing of the manuscript. In addition, it is responsible for the correspondence process during the submission stage to the publication of the article.

Acknowledgement

The author expresses gratitude to God Almighty for the completion of writing this article. The author also expressed his gratitude to Mr. Dr. Heru Purnomo, M.Pd., as a supervisor who has provided patience guidance, as well as very valuable direction in making this article.

The author also expresses his gratitude to his fellow students, Shelvina, Atika, Farhan, Wisti for their hard work, critical discussions, and tireless technical assistance during the drafting to data analysis.

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