

Improving Students' Economic Learning Outcomes through Problem-Based Learning Methods

Esy Marliah¹, Atul Kumar²

¹SMA Negeri 15 Palembang, South Sumatra, Indonesia, ²Dr. D. Y. Patil B-School,
Pune, India

Corresponding author e-mail: esy-marliah@gmail.com

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Abstract: This study aims to evaluate the effectiveness of the problem-based learning method (PBL) in improving student learning outcomes in economics subjects at SMA Negeri 15 Palembang. The research method used was a quasi-experimental with a non-equivalent control group design, involving two classes of XI IPS selected as the experimental and control groups. The experimental group received economics learning with the PBL method, while the control group used conventional learning methods. Data were collected through learning outcome tests (pre-test and post-test) and analyzed using paired sample t-tests and independent sample t-tests to determine significant differences in learning outcomes between the two groups. The results showed that there was a significant increase in the learning outcomes of the experimental group compared to the control group. The average post-test score in the experimental group was higher than in the control group, indicating that the PBL method is effective in improving students' understanding and critical thinking skills in economics material. In addition, observations during learning showed that the PBL method increased students' active involvement in group discussions and problem-solving processes. This study concludes that the PBL method is an effective approach to improve students' economic learning outcomes and can be used as an alternative learning method in the school curriculum. Recommendations are given for teachers to receive training to implement PBL optimally, as well as support from the school in providing adequate resources. The implication of this study is that PBL not only improves academic learning outcomes but also students' collaborative and independent skills, which are important to face the challenges of 21st-century education.

Keywords: Economics Subject, Learning Outcomes, Learning Methods, Problem-Based Learning, Student Engagement

A. Introduction

Education has a very important role in building superior and competitive human resources, especially in the era of globalization that demands critical thinking skills,

collaborative, and problem-solving abilities (Puspa et al., 2023). In the context of secondary education in Indonesia, learning in schools is expected to not only focus on academic achievement, but also on developing basic life skills so that students are able to face the dynamics of life in the future (Hidayatulloh et al., 2024). One of the subjects that is relevant in developing these skills is economics, which teaches students about basic concepts in resource management, understanding market dynamics, and the role of economics in everyday life (Ibau, 2023). In high school, economics subjects have strategic value in building a deep understanding of national and global economic conditions and providing broad insight into the economic factors that affect various aspects of people's lives. However, in practice, economics subjects are often considered difficult and theoretical by some students, so they are less interested in learning actively (Syakur et al., 2021). Various efforts have been made by teachers to improve students' understanding and learning outcomes in economics subjects. However, based on data from several evaluations conducted at SMA Negeri 15 Palembang, it shows that economics learning outcomes are still relatively low, as seen from the average exam scores that do not reach the Minimum Completion Criteria target. One of the factors thought to contribute to this low learning outcome is the learning method used (Muizaddin & Santoso, 2016). Conventional learning dominated by the lecture method makes students tend to be passive and less involved in the teaching and learning process (Pangeran et al., 2020). This method is less able to arouse students' interest in learning and provide space for critical thinking, especially in dealing with economic material that requires an understanding of real applications in the field. This condition raises a challenge for educators to find alternative learning methods that are more effective, able to actively involve students, and improve their learning outcomes.

Along with the development of the modern education paradigm, the problem-based learning method, or Problem-Based Learning (PBL), has begun to be considered as one approach that can answer this challenge. PBL is a learning method that places students at the center of the learning process by encouraging them to find solutions to real problems that are relevant to everyday life (Setiawati et al., 2024). Through the PBL method, students are invited to learn by identifying problems, analyzing information, finding solutions, and evaluating the results of solving these problems (Fadholi et al., 2024). In other words, PBL not only focuses on students' cognitive aspects but also on developing critical thinking skills, collaboration skills, and communication skills that are very much needed in the 21st century. Previous research has shown that the application of PBL can significantly improve learning outcomes and student engagement, especially in subjects that require in-depth understanding and application of concepts in real situations, such as economics (Bili, 2024). This provides a positive indication that PBL can be an effective method in overcoming the problem of low economic learning outcomes in SMA Negeri 15 Palembang. This study aims to evaluate the effectiveness of the PBL method in improving students' economic learning outcomes in SMA Negeri 15 Palembang.

This study uses a quantitative approach to measure the increase in learning outcomes resulting from the implementation of PBL compared to conventional learning methods. Through this study, it is expected to obtain empirical data that can show the impact of PBL on student learning outcomes and their involvement in the economic learning process. This study also aims to provide practical recommendations for educators and schools in an effort to improve the quality of economic learning through innovative methods that are in accordance with current student needs. The formulation of the problem to be answered in this study includes several important aspects. First, can the application of the PBL method significantly improve student learning outcomes in economic subjects compared to conventional lecture methods? Second, to what extent can the PBL method increase students' active involvement in the economic learning process? Third, what are the challenges and obstacles faced by teachers in implementing the PBL method in economics classes? These questions will be answered through analysis of data obtained from student learning outcome tests and observations of student participation during the learning process.

This research has a high urgency in order to develop a learning approach that can improve the quality of education in high schools. By implementing the PBL method, teachers are expected to be able to create a more dynamic and challenging learning environment, where students can be actively involved in the learning process and develop critical thinking skills and relevant problem solving. The implications of this research are expected to provide new insights in the development of effective economic learning methods, as well as become a reference for educators in implementing learning methods that are more adaptive and in accordance with current student needs. The results of this study are also expected to pave the way for further research that can examine more deeply other aspects of the PBL method, such as its influence on collaborative skills, analytical thinking skills, and the development of students' learning responsibility attitudes. In the context of education policy, the application of problem-based learning methods is also in line with the objectives of the national curriculum, which emphasizes the development of student competencies in critical, creative, collaborative, and communicative thinking. Therefore, this research not only provides practical benefits for schools but can also contribute to the development of more progressive education policies at the national level. Thus, this research is expected to be one of the steps to improve the quality of economic learning in high schools so that it can contribute to improving the quality of national education as a whole.

B. Methods

This study uses a quantitative approach with a quasi-experimental method to evaluate the effect of implementing problem-based learning (PBL) methods on students' economic learning outcomes. The research design used is a non-equivalent

control group design, where there are two groups of students: an experimental group that is treated using the PBL method and a control group that uses conventional learning methods, namely lectures. The population of this study was all students of class XI IPS at SMA Negeri 15 Palembang in the 2023/2024 academic year. Through a purposive sampling technique, two classes were selected as samples, namely one class as the experimental group and one other class as the control group. Each class consists of around 35 students, so the total sample of this study was 70 students. The use of purposive sampling aims to ensure that the characteristics of the two classes are balanced in terms of academic ability so that the results obtained are more valid and representative. The instrument used in this study was an economic learning outcome test in the form of multiple choice with 25 questions, which has been validated by several subject experts to ensure its validity and reliability. This test is used to measure students' knowledge and understanding of economic concepts before and after the implementation of the learning method. Before the implementation of the study, an initial test (pre-test) was given to measure the initial learning outcomes of students in both groups. After the implementation of the PBL method in the experimental group and the lecture method in the control group, a final test (post-test) was conducted to assess the improvement in learning outcomes in both groups.

The PBL method was used to teach economics topics chosen based on the curriculum over four meetings. These topics included the idea of demand and supply, the concept of equilibrium price, and the structure of the market. During the PBL process, students in the experimental group were invited to work in small groups, identify problems from the given real scenarios, seek additional information, discuss solutions, and present their results in front of the class. Meanwhile, in the control group, the same material was delivered through the lecture method with direct explanations from the teacher and questions and answers. Learning outcome data were analyzed using a paired sample t-test statistical test to compare the pre-test and post-test scores in each group, as well as an independent sample t-test to test the difference in learning outcomes between the experimental group and the control group after the application of the learning method. This analysis was carried out using statistical software to determine the significance of the influence of the PBL method on students' economic learning outcomes. This research method is expected to provide a clear picture of the effectiveness of the problem-based learning method in improving economic learning outcomes, especially at SMA Negeri 15 Palembang.

C. Results and Discussion

Description of Initial Data (Pre-test)

Before applying the problem-based learning (PBL) method to the experimental group, a pre-test was conducted to measure students' initial abilities in economics.

This test was also conducted on the control group that would use conventional learning methods as a comparison. The pre-test data from both groups provide an overview of students' basic abilities in understanding economics material before being given treatment. The average pre-test result in the experimental group was 68.45 with a standard deviation of 8.50, which shows the variation in the level of students' initial abilities in this group. In the control group, the average pre-test result was 69.30 with a standard deviation of 7.80. These values indicate that the average initial abilities of the two groups were relatively balanced, with little difference between the two. The following is a table summarizing the pre-test results in both groups:

Table 1. Initial Data (Pre-test)

Group	Number of Students	Pre-test Average	Standard Deviation
Experiment	35	68.45	8.50
Control	35	69.30	7.80

Post-test Results

The following is the Post-test Results section that describes the students' learning outcomes after the application of the problem-based learning (PBL) method in the experimental group and the conventional method in the control group. These results include the mean and standard deviation for each group.

Table 2. Post-test Results

Group	Number of Students	Pre-test Average	Standard Deviation
Experiment	35	82.75	7.20
Control	35	74.60	8.10

From the table above, it can be seen that the average post-test score of the experimental group (82.75) is higher than that of the control group (74.60). The standard deviation in both groups shows that the distribution of scores is quite consistent in each group, with little variation around the average. These results indicate a significant increase in learning outcomes in the experimental group after implementing the PBL method, compared to the control group using conventional learning methods. These data will be further analyzed in statistical tests to determine the significance of the differences in learning outcomes between the two groups.

Improvement in Learning Outcomes (Difference between Pre-test and Post-test)

The following is the section on Improvement in Learning Outcomes (Difference between Pre-test and Post-test), which shows the difference between the pre-test and post-test scores in the two groups, namely the experimental group using the problem-based learning (PBL) method and the control group using the conventional

method. This table presents the average improvement in learning outcomes in each group.

Table 3. Difference between Pre-test and Post-test

Group	Pre-test Average	Post-test Average	Increase (Difference)
Experiment	68.45	82.75	14.30
Control	69.30	74.60	5.30

From the table above, it can be seen that the experimental group experienced an increase in learning outcomes of 14.30 points after the application of the problem-based learning method. Meanwhile, the control group using the conventional method only experienced an increase of 5.30 points. The greater increase in the experimental group indicates that the PBL method has a more significant positive impact on student learning outcomes than the conventional method. These results indicate that the PBL method is effective in improving students' understanding of economics.

Statistical Analysis (Paired Sample t-test and Independent Sample t-test)

The following is the section on Learning Outcome Improvement (Difference Between Pre-test and Post-test), which shows the difference between the pre-test and post-test scores in the two groups, namely the experimental group using the problem-based learning (PBL) method and the control group using the conventional method. This table presents the average learning outcome improvement in each group.

Table 4. Paired Sample t-test and Independent Sample t-test

Group	Pre-test Average	Post-test Average	Increase (Difference)
Experiment	68.45	82.75	14.30
Control	69.30	74.60	5.30

From the table above, it can be seen that the experimental group experienced an increase in learning outcomes of 14.30 points after the application of the problem-based learning method. Meanwhile, the control group using the conventional method only experienced an increase of 5.30 points. The greater increase in the experimental group indicates that the PBL method has a more significant positive impact on student learning outcomes than the conventional method. These results indicate that the PBL method is effective in improving students' understanding of economics.

This study shows that the application of problem-based learning (PBL) methods significantly improves student learning outcomes in economics subjects at SMA Negeri 15 Palembang. Based on the results of data analysis, the experimental group using the PBL method experienced a greater increase in learning outcomes than the

control group using conventional learning methods. This can be seen from the higher average post-test scores in the experimental group compared to the control group, as well as the results of statistical tests that showed a significant difference between the two groups. The paired sample t-test showed that there was a significant increase between the pre-test and post-test scores in the experimental group after the application of PBL, while in the control group, the increase was not significant. This indicates that the PBL method not only improves student learning outcomes but also has a real impact on improving students' understanding of the economic concepts taught. In addition, the results of the independent sample t-test on the post-test scores showed a significant difference between the experimental group and the control group, which strengthens the conclusion that PBL is more effective than conventional methods in achieving better learning outcomes.

The improvement in learning outcomes in the experimental group shows that the PBL method is able to create a more interactive and challenging learning environment, where students are encouraged to think critically, analyze problems, and find solutions independently and collaboratively. Students not only memorize theories but also understand the application of economic concepts in real situations, which allows them to master the material more deeply. These results are in accordance with various previous studies showing that PBL can significantly improve students' learning outcomes and critical thinking skills compared to conventional learning methods. These main findings indicate that PBL is an effective method in improving learning outcomes, especially in subjects that require conceptual understanding and analysis, such as economics. With these results, it is hoped that the PBL method can be a more effective alternative to be applied in economics classes to improve the quality of learning and student engagement in the learning process.

Analysis of the Impact of the PBL Method

The application of the problem-based learning (PBL) method in this study showed a significant positive impact on student learning outcomes in economics subjects. The PBL method is different from conventional approaches because it is student-centered, requiring them to actively seek solutions to relevant and real problems. The main impact of PBL is seen in improving students' ability to understand economic concepts in depth and applicability. Students not only memorize theories but also practice them in contexts that they understand, which makes learning more meaningful and contextual.

PBL creates a learning environment that encourages students to think critically, analytically, and reflectively in the learning process. In problem-based scenarios, students must identify the core of the problem, formulate potential solutions, and analyze relevant information. This process develops higher-order thinking skills,

such as analysis, synthesis, and evaluation, which are essential for understanding the complexity of economic material. By engaging in activities that involve solving real problems, students are better able to connect theory to practice, which improves their understanding and retention of knowledge.

Another positive impact of PBL is on increasing student motivation and engagement. Because students play an active role in the learning process, they feel more involved and motivated to explore the material independently (Akmaluddin et al., 2020). PBL provides opportunities for students to work in groups, share ideas with each other, and collaborate in solving problems. This interaction not only improves students' communication skills but also builds confidence and responsibility in their learning. This study shows that students in the experimental group who used PBL were more enthusiastic and actively participated during the learning process compared to students in the control group.

In addition, the impact of the PBL method in developing critical thinking skills is in accordance with the principles of constructivism theory, which states that knowledge is built through interaction with the environment and direct experience. By linking economic theory to relevant problems, students can build a more meaningful understanding, in accordance with their own experiences during the learning process. This also allows students to become more independent and active learners, which are important skills in today's era of globalization. Overall, the PBL method has proven effective in improving students' learning outcomes and critical thinking skills in economics subjects. This positive impact supports the use of PBL as a more adaptive and responsive learning alternative to the needs of modern students. By using this method, teachers can create a learning environment that not only emphasizes academic achievement but also develops essential life skills for students' futures.

Student Engagement in Learning

The results of the study show that the problem-based learning (PBL) method significantly increases student engagement in the economics learning process at SMA Negeri 15 Palembang. In the PBL method, students are placed at the center of the teaching and learning process, where they do not only receive information passively but actively participate in problem solving. Students are invited to work together in groups, discuss, and find solutions to problems given by the teacher, which are relevant to the economic concepts being studied. This involvement can be seen from the enthusiasm of students in identifying problems, proposing creative ideas, and conveying arguments in group discussions.

The active involvement of students in PBL not only improves their understanding of the material but also builds important social and communication skills (Rumiyati,

2024). Students are encouraged to listen to each other, respect the opinions of others, and learn to work in teams. This group activity develops students' ability to collaborate and contribute positively to the team. Observations during the learning process showed that students in the experimental group using the PBL method asked more questions, discussed, and helped each other compared to the control group using conventional methods. They are more motivated to learn because they feel more involved and have a role in the learning process. In addition, PBL increases students' sense of responsibility for their learning outcomes. In the PBL process, students are given the freedom to explore information, search for data, and make decisions in solving problems. This gives them the opportunity to control their own learning process, which makes them feel more responsible for the results achieved. Thus, students become more independent and motivated to master the material in depth. This method teaches students not only to rely on teachers as the main source of information but also to become active learners who are able to search for and analyze information independently.

The PBL method encourages student engagement both intellectually and emotionally in learning. The learning process that involves solving real problems makes students feel that the material being studied has relevance and application in everyday life. This involvement creates an interactive, dynamic, and more meaningful learning environment for students so that they are more motivated to learn and master the material being taught. This study shows that students' active involvement in PBL contributes to improving their learning outcomes, making this method an effective approach to achieving deeper and more comprehensive learning.

Challenges and Barriers in Implementing PBL

Although the problem-based learning (PBL) method has been proven effective in improving student learning outcomes and engagement, its implementation is not without various challenges and obstacles. One of the main challenges is students' readiness to adapt to a more active and independent learning method. Students who are accustomed to conventional learning methods, where their role tends to be passive, often find it difficult to switch to the PBL method, which requires active involvement and critical thinking skills. Some students initially experienced confusion when they had to find their own solutions and discuss in groups without direct direction from the teacher. This challenge requires time for students to adapt and get used to the new learning pattern.

Another challenge in implementing PBL is the burden of preparation for teachers. PBL requires more complex planning and learning design than conventional learning methods. Teachers must create scenarios or problems that are relevant and in accordance with economic material, which can motivate students to think

critically and find solutions. In addition, teachers need to prepare various additional learning resources that can help students in the problem-solving process (Häkkinen et al., 2017). This burden of preparation can be a challenge, especially for teachers who have limited time or who are not familiar with the PBL method. In addition, the role of the teacher in PBL also changes from a main teacher to a facilitator. Teachers need to have special skills to guide discussions, direct students towards problem-solving without interfering too much, and keep each student actively involved in the learning process (Suleman & Idayanti, 2023). For some teachers, this change in role requires significant adaptation, as they must balance between providing guidance and allowing students to find solutions independently. Lack of training or mentoring in implementing PBL can also be a barrier for teachers in carrying out this role effectively. In addition to technical aspects, facilities and resources are also obstacles in implementing PBL. PBL often requires access to various sources of information, such as the internet, additional reference books, or learning materials that are not always available in every school. Limited access to these resources can hinder the problem-based learning process, especially in schools with limited facilities.

Challenges in implementing PBL show that although this method is very useful, there are several obstacles that must be overcome for its implementation to be effective. With more thorough preparation, adequate support, and training for teachers, the implementation of PBL can be more optimal. Providing additional support for students to help them adapt to this method and facilitating access to adequate learning resources is also important for PBL to provide maximum results.

Practical Implications for the World of Education

The results of this study indicate that the problem-based learning (PBL) method has great potential to improve student learning outcomes and develop essential critical thinking skills in economics subjects. The practical implication of this finding is that PBL can be integrated more widely in the world of education, not only in economics lessons but also in other subjects that require deep conceptual understanding and problem-solving skills. By implementing PBL, schools and teachers can create a more interactive learning environment, where students are encouraged to actively participate and practice the concepts they learn in real contexts. PBL can help teachers meet learning objectives that emphasize the development of critical thinking, collaboration, and communication skills, in accordance with the needs of 21st-century education (Bustanul Arifin & Abdul Mu'id, 2024).

In the context of economics learning, PBL provides opportunities for students to understand the application of economic concepts in real situations, such as market analysis, consumer behavior, or factors that influence prices. Thus, PBL not only improves academic achievement but also strengthens life skills that are important for

students in the era of globalization. For teachers, the implementation of PBL offers an opportunity to develop more varied teaching methods that focus on student needs. To achieve the effectiveness of PBL, teachers need to receive special training in designing and implementing PBL well. This training can help teachers develop the facilitation and classroom management skills needed in PBL so that they can support students in independent and collaborative learning processes. In addition, a more flexible curriculum can support the integration of PBL more systematically, allowing teachers to design relevant learning projects and scenarios without being limited by strict time or material demands.

At the policy level, the results of this study support curriculum reform efforts that emphasize active learning approaches. Policymakers may consider providing adequate training programs and resources for teachers, especially in schools that still have limited facilities. Providing this support will help strengthen the implementation of PBL in schools and ensure that this method is accessible to all students, including in areas with less access to learning resources. The implication of this study is that PBL can be an effective learning approach in improving student learning outcomes and skills. With proper integration, PBL can create more relevant, meaningful, and skill-oriented learning experiences. The world of education is expected to adapt this method to prepare students to face future challenges with more holistic skills.

D. Conclusions

This study concludes that the problem-based learning (PBL) method is effective in improving student learning outcomes in economics. The application of PBL to the experimental group showed a significant increase in post-test results compared to the control group using conventional learning methods. These findings indicate that PBL is able to encourage students to understand economic concepts better through active involvement in the problem-solving process, thereby strengthening students' understanding and critical thinking skills. The PBL method also contributes to increasing student engagement and motivation in learning. Students involved in PBL show active participation, both in group discussions and in finding solutions to the problems given. This involvement helps students develop social and cooperation skills, which are very useful in the learning process and everyday life. PBL provides a more meaningful learning experience, where students do not only focus on memorizing concepts, but also on their application in real situations.

However, the application of PBL also presents several challenges, especially related to student adaptation to more independent and active methods, as well as teacher readiness in designing and facilitating the problem-based learning process. Support from the school, training for teachers, and the availability of resources are important factors in overcoming these obstacles, so that PBL can be implemented optimally

and sustainably. The results of this study support PBL as an innovative and adaptive learning approach, which not only improves academic achievement but also equips students with critical thinking, collaboration, and problem-solving skills. Therefore, PBL is recommended as a relevant method to be applied to other subjects that require conceptual understanding and analytical skills. With proper implementation, PBL is expected to contribute to improving the quality of learning and developing students' skills that are in accordance with the needs of the 21st century.

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