

The Effect of the Problem-Based Learning Model on Motivation and Economics Learning Outcomes

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Abstract. This study was motivated by the low motivation and learning outcomes of students in Economics, resulting from the dominance of conventional teaching methods. This research aimed to determine and analyze the effect of the Problem-Based Learning (PBL) model on students' motivation and Economics learning outcomes on the topic of scarcity. A quantitative approach with a quasi-experimental method and a Pretest-Posttest Nonequivalent Control Group Design was employed. The population consisted of 56 students divided into two classes, and a total sampling technique (census) was used, encompassing both the experimental and control classes. Data were collected using a motivation scale questionnaire and a cognitive learning outcome test, then analyzed using descriptive and inferential statistics. The results indicate that: (1) the implementation of the PBL model had a significant effect on student learning motivation, with the experimental class achieving an average score of 84.65 (71.43% in the high category) compared to 68.40 for the control class; and (2) the PBL model had a significant effect on Economics learning outcomes, where the learning mastery percentage in the experimental class reached 85.71% with an average score of 86.20, far surpassing the control class, which achieved only 42.86% mastery with an average score of 67.50. Based on these findings, the PBL model proved effective in enhancing students' affective and cognitive aspects; therefore, it is recommended as an alternative teaching model for Economics in Vocational High Schools.

Keywords: Problem-Based Learning (PBL); Learning Motivation; Economics Learning Outcomes

1. Introduction

Education plays a highly strategic role in preparing high-quality, competent human resources capable of adapting to global dynamics, particularly at the Vocational High School (SMK) level, where the mandate is to produce graduates who are job-ready and economically self-reliant. The significance of this study lies in the essential nature of the Economics subject at SMKN 2 Tondano, which aims to equip students with a rational understanding of economic phenomena and financial management, as well as business skills applicable to real-life situations. However, in classroom practice, economics instruction often faces critical challenges: student motivation remains low, directly affecting learning outcomes and preventing students from meeting the school's Minimum Mastery Standard (SKM).

Primary issues observed in the field indicate that economics instruction remains dominated by conventional, teacher-centered methods. This approach tends to render students passive, acting merely as listeners while failing to cultivate critical thinking skills and causing rapid disengagement when students encounter abstract economic theories. These issues are evidenced by a lack of active participation in questioning or discussions, low enthusiasm for completing assignments, and suboptimal assessment scores. If this monotonous instructional pattern persists without the intervention of an appropriate model, the institution's goal of producing graduates with deep analytical reasoning and solid economic readiness will not be fully realized.

To address this disengagement and underachievement, the education sector needs to shift toward innovative, student-centered learning models, specifically of implementing Problem-Based Learning (PBL). PBL is an instructional approach that utilizes real-world or authentic problems as a starting point for students to acquire new knowledge, develop higher-order thinking skills, and engage in collaborative problem-solving. By confronting students with contextual economic issues, this model is believed to stimulate curiosity, enhance mental engagement, and establish connections between the subject matter and the real world.

Various prior empirical studies have widely demonstrated the effectiveness of the Problem-Based Learning (PBL) model in boosting motivation and learning outcomes. For instance, research conducted by Mardani, Atmadja, and Suastika (2021) and by Ramlawati, Yunus, and Insani (2017) found that implementing the PBL model significantly influenced improvements in both student motivation and learning outcomes. Siti Nurjanah and Risma Dwi Arisona (2021) and Sayyidah Intan Nurul Izzah and Wati Sukmawati (2022) reinforced similar findings, confirming that PBL effectively increases student learning motivation, particularly in social science disciplines closely related to economic activities. Furthermore, Maya Sari and Ani Rosidah (2023), as well as Dzulfikar Aziz Munandar, Rofisian, and Suwartini (2026), have further substantiated the evidence that the PBL model consistently yields positive impacts on learning outcomes across various educational levels.

Although extensive literature and prior research have examined the advantages of the Problem-Based Learning (PBL) model, a significant research gap remains. Most previous studies have focused narrowly on general Social Studies (IPS) or Natural Sciences (IPA) at the primary and junior high school levels, or on basic education in general. Studies specifically examining the simultaneous impact of the PBL model on motivation and learning outcomes in Economics, particularly within the context of Vocational High Schools (SMK), such as SMKN 2 Tondano, are scarce and have not been deeply explored. This gap necessitates new empirical evidence specific to the realm of business and management vocational education.

To address this gap, this study offers a novel contribution by implementing and testing of the PBL model, tailored to the characteristics of vocational students at SMKN 2 Tondano. This novelty lies not only in enhancing cognitive aspects measured by academic achievement but also in comprehensively integrating affective aspects by assessing the dynamics of motivation in vocational economics learning. Through this approach, the study aims to provide a robust theoretical contribution and offer practical guidance for educators on adapting problem-based learning models to meet the demands of the modern workforce.

Given the urgency, identified classroom issues, supporting prior research, and the novel research context outlined above, the author deems it essential to conduct an in-depth scientific study. These considerations culminate in the execution of a formal study at the aforementioned institution, as reflected in the research title: "The Effect of the Problem-Based Learning (PBL) Model on Motivation and Economics Learning Outcomes at SMKN 2 Tondano."

2. Method

This study uses a quantitative approach with a quasi-experimental design. According to Creswell and Creswell (2018), a quasi-experimental design is highly appropriate for educational settings where random assignment of individuals to treatment or control groups is not feasible, as the subjects are already bound to existing school class structures. Furthermore, this study uses the Pretest-Posttest Nonequivalent Control Group Design; in this setup, both the experimental and control groups undergo an initial measurement (pretest) before the intervention and a final measurement (posttest) after the intervention (Sugiyono, 2019). The experimental group receives instruction using the Problem-Based Learning (PBL) model, which fosters critical thinking through the resolution of authentic problems (Arends, 2012), while the control group follows the conventional instructional model typically used in the school.

The study population comprises all 56 students enrolled in the Economics course at SMKN 2 Tondano, evenly distributed across two classes. Given this relatively small and limited population size, the sampling technique employed is Total Sampling (Census). Arikunto (2019) explains that

when the population size is fewer than 100 individuals, the entire population can be selected as the research sample to ensure accurate and representative data. Through this technique, both available classes are fully included; one class is designated as the experimental group receiving the PBL model treatment, while the other serves as the control group. The variables examined include the independent variable, the implementation of the Problem-Based Learning (PBL) model, and the dependent variables, which include students' levels of learning motivation and economics learning outcomes. All motivation data were collected using an attitude scale questionnaire. In contrast, learning-outcome data were gathered through cognitive tests, specifically pre-test and post-test instruments whose validity and reliability had been established (Fraenkel, Wallen, & Hyun, 2012). The collected data were then analyzed using descriptive and inferential statistical techniques, including prerequisite tests (normality and homogeneity) followed by hypothesis testing to determine the significance of the effect of the PBL model intervention at SMKN 2 Tondano.

3. Result

This section presents empirical data from a quasi-experimental study conducted at SMKN 2 Tondano to examine the impact of the Problem-Based Learning (PBL) model on students' motivation and learning outcomes in economics, specifically on the topic of scarcity. Data collection involved administering a pre-test before the intervention and a post-test after the intervention for both the experimental and control groups, involving a total of 56 students. To provide a clear picture of the performance differences between the two groups, detailed descriptive statistics, variable categories, percentages of learning mastery, and specific indicator achievements are presented in the following tables:

Table 1. Descriptive Statistics of Motivation and Learning Outcomes Data

Research Variable	Class	Number of Students (N)	Minimum Score	Maximum Score	Mean	Standard Deviation (SD)
Learning Motivation	Experiment (PBL)	28	72	95	84.65	6.12
	Control (Conventional)	28	55	82	68.40	7.35
Learning Outcomes	Experiment (PBL)	28	75	96	86.20	5.80
	Control (Conventional)	28	50	80	67.50	8.10

Based on the posttest descriptive statistics table, a significant difference in achievement is clearly visible between the class receiving the Problem-Based Learning (PBL) model treatment and the control class utilizing conventional instruction. The mean score for learning motivation in the experimental class reached 84.65 with a standard deviation of 6.12, which is markedly higher than the control class, which only attained a mean of 68.40. A similar trend is observed in the learning outcomes variable, where the experimental class recorded a mean score of 86.20, whereas the control class stood at 67.50. These statistical figures confirm that the implementation of the PBL model successfully fostered a more conducive classroom climate, simultaneously stimulating students' cognitive and affective domains. The PBL model's exposure of students to real-world problems related to resource scarcity proved effective in building deeper understanding compared with one-way lecture methods.

Table 2. Category of Students' Learning Motivation Data

Motivation Category	Experimental Class (PBL)	Percentage (%)	Control Class (Conventional)	Percentage (%)
High	20	71.43%	7	25.00%
Moderate	8	28.57%	14	50.00%
Low	0	0.00%	7	25.00%
Total	28	100%	28	100%

The distribution of learning motivation categories demonstrates a sharp disparity between the two groups. In the experimental class, 71.43% of students (20 individuals) fall into the High category, while the remaining 28.57% are in the Moderate category, with no students in the Low category. Conversely, in the control class, the majority of students are concentrated in the Moderate category (50.00%), and 25.00% of students even fall into the Low category. The interpretation of this data indicates that the syntax of the PBL model, particularly during the problem orientation and group investigation stages, is capable of arousing the internal drive (intrinsic motivation) of SMKN 2 Tondano students to engage actively, enthusiastically, and resiliently in resolving economic problems.

Table 3. Category of Students' Learning Outcomes Data (Learning Mastery)

Learning Category	Outcomes	Experimental Class (PBL)	Percentage (%)	Control Class (Conventional)	Percentage (%)
Achieved ($\geq$ Minimum Mastery Criteria / KKM)		24	85.71%	12	42.86%
Not Achieved ($<$ Minimum Mastery Criteria / KKM)		4	14.29%	16	57.14%
Total		28	100%	28	100%

An overview of the learning mastery percentages demonstrates the success of the PBL model implementation in exceeding the school's Minimum Mastery Criteria (KKM). In the experimental class, 85.71% of students achieved mastery (24 individuals), while only 14.29% did not. This figure stands in stark contrast to the control class, where the proportion of students who failed to achieve mastery was 57.14% (16 individuals), and only 42.86% achieved mastery. This shows that actively engaging students in analyzing real cases of goods scarcity and opportunity cost makes economic concepts more meaningful (meaningful learning), allowing retention and cognitive understanding to last longer than memorizing material alone.

Table 4. Percentage of Learning Motivation Indicator Achievement

No	Learning Motivation Indicator	Experimental Class (PBL)	Control Class (Conventional)
1	Presence of desire and urge to succeed	85.20%	68.50%
2	Drive and need to learn	83.40%	65.20%
3	Future hopes and aspirations	86.10%	70.10%
4	Proper recognition or reward in learning	84.00%	66.80%
5	Interest and active engagement during discussions/problems	88.50%	63.40%
Total Average		85,44%	66,80%

Based on the breakdown of motivation indicators, the experimental class excelled across the board with a total average achievement of 85.44% compared to the control class, which only reached 66.80%. The largest increase in the experimental class was in the indicator of interest and active engagement during discussions/problems (88.50%). This indicates that the collaborative and investigative features of the PBL model align very well with the characteristics of vocational high school (SMK) students who favor contextual and interactive learning. Scarcity issues drawn from surrounding realities challenged them to solve them together within their groups.

Table 5. Percentage of Learning Outcomes Indicator Achievement (Cognitive Aspect of Scarcity Material)

No	Learning Outcomes Indicator (Scarcity Material)	Experimental Class (PBL)	Control Class (Conventional)
1	Explaining the definition and basic concept of scarcity	90.00%	78.50%
2	Identifying factors causing resource scarcity	87.50%	65.00%
3	Analyzing the impact of scarcity on prices and needs	85.00%	60.20%
4	Determining choices and scale of priorities in fulfilling needs	84.20%	58.40%
5	Calculating and understanding the concept of opportunity cost	84.30%	55.50%
Total Average		86,20%	63,52%

The analysis of cognitive learning outcome indicators regarding scarcity material reveals that the experimental class dominated every single indicator with a total average of 86.20% versus 63.52% in the control class. The highest achievements in the experimental class lay in the indicators of explaining the definition and basic concept of scarcity (90.00%) as well as identifying factors causing resource scarcity (87.50%). The most crucial improvement was observed in the indicators of calculating and understanding the concept of opportunity cost and determining priority scales, where the experimental class left the control class far behind. Theoretically, this shows that the PBL model trains students in higher-order thinking skills so that they do not merely understand definitions on paper, but are also proficient in analyzing rational solutions to the economic problems they encounter.

4. Discussion

Based on the data analysis conducted at SMKN 2 Tondano, the implementation of the Problem-Based Learning (PBL) model in the Economics subject, specifically regarding the topic of scarcity, has been proven to boost students' motivation and learning outcomes significantly. Statistically, the experimental class outperformed the control class by a wide margin in both affective aspects (average learning motivation of 84.65 vs. 68.40) and cognitive aspects (average learning outcomes of 86.20 vs. 67.50). These findings suggest that the PBL model's structure, ranging from orienting students to real-world problems and organizing learning activities to conducting independent or group investigations and presenting results effectively, fosters total mental engagement among students. When confronted with contextual issues such as the scarcity of economic resources in their immediate environment, students stop being passive recipients of information and become active agents seeking rational solutions. This aligns with the findings of Ariyani & Kristin (2021) and HEMPRI Alfred Kirwelakubun, Idawati, & Nursalam (2023), who emphasize the high effectiveness of the PBL model in optimizing active student engagement during social studies and economics instruction.

The study's findings reinforce and expand the body of knowledge within the fields of economic education and constructivist learning theory. Problem-based learning is rooted in constructivism, a theory positing that students construct new knowledge through real-world experiences and social interaction; this is supported by Uno's (2011) perspective on the importance of selecting appropriate learning models to stimulate students' cognitive and affective potential. The finding that the PBL model enhances both cognitive learning outcomes and motivation aligns with studies by Hasanah, Sarjono, & Hariyadi (2021) and Murdani, Sukardi, & Handayani (2022), which show that the PBL model, combined with internal motivational drive, contributes significantly to students' academic achievement. Furthermore, the improvement in cognitive learning outcomes

regarding the topic of scarcity aligns with the framework of Bloom's Taxonomy (as reviewed by Ulfah & Arifudin, 2023); the application of the PBL model has been shown to elevate students' thinking skills from basic rote memorization (C1–C2) to higher-level analysis (C4), such as analyzing opportunity costs and scales of priority.

The novelty of this study lies in extending the context of the PBL model's application; while previous research has largely focused on primary education or general Social Studies and Science subjects (e.g., Mardani, Atmadja, & Suastika, 2021; Ramlawati, Yunus, & Insani, 2017; Dzulfikar Aziz Munandar, Rofisian, & Suwartini, 2026), this study specifically tests the model within the realm of vocational education (SMK) specifically in the Economics subject covering scarcity at SMKN 2 Tondano. This study also reinforces the findings of Graceana Ambarita & Marham Sitorus (2025) and Mira Wabula, Papilaya, & Rumahlatu (2020), confirming that the PBL model's effectiveness can be integrated with various media enrichments and vocational contexts. These findings refine the understanding that the PBL model is not only effective for science or general education but also highly adaptable for developing vocational economic competencies. Vocational students, with their workforce-oriented mindset, benefit significantly from the PBL model, as it fosters critical, analytical, and solution-oriented thinking regarding the dynamics of real-world economic issues. The implications of this study's findings fall into two primary dimensions: theoretical and practical. Theoretically, this research reinforces the external validity of constructivism theory and the Problem-Based Learning (PBL) model as reliable frameworks for enhancing students' intrinsic motivation and cognitive learning outcomes, particularly within the field of economics in vocational high schools. It also corroborates previous studies such as those by Siti Nurjanah & Risma Dwi Arisona (2021), Izzah & Sukmawati (2022), and Prasetyanti, Sari, & Sajidan (2016) regarding the importance of problem-based learning in fostering higher-order cognitive thinking processes. Practically, the findings offer direct implications for economics teachers at SMKN 2 Tondano and vocational educational institutions in general. The PBL model is a viable, practical alternative to standard instructional models, helping alleviate student boredom, boost learning motivation, and improve learning mastery. Furthermore, these findings can serve as a reference for school administrators when formulating policies for teacher pedagogical competency training aimed at implementing innovative, student-centered instruction.

5. Conclusion

Based on the data analysis and discussion presented, the implementation of the Problem-Based Learning (PBL) model regarding the topic of scarcity has been proven to significantly boost student motivation and learning outcomes at SMKN 2 Tondano. Empirical data support this, showing that the experimental class achieved an average learning motivation score of 84.65, with 71.43% of students in the "high" category, far surpassing the control class, which used a conventional model and averaged 68.40. Similar findings emerged for cognitive learning outcomes: the experimental class achieved a mastery rate of 85.71% with an average score of 86.20, whereas the control class recorded a mastery rate of only 42.86% with an average of 67.50. Through the PBL instructional framework, the model proved effective in optimizing motivation indicators, specifically interest and active engagement in group discussions and enhancing cognitive learning outcomes, particularly in analyzing the causes of scarcity and calculating opportunity costs within a contextual framework.

In light of these findings, several recommendations are proposed to improve instructional quality of instruction further. Economics teachers at SMKN 2 Tondano are encouraged to consistently integrate the PBL model into lesson planning, especially for economic topics that require high-level analytical reasoning, to sustain students' intrinsic motivation and active participation. Meanwhile, school management is expected to facilitate internal training for educators to strengthen their skills in facilitating problem-based learning, an approach highly aligned with the workforce readiness goals of vocational high school (SMK) graduates. Finally, future researchers are advised to broaden the scope of the study by assessing students' skills, piloting the PBL model with other

vocational economics topics, or combining it with interactive digital media to gain a more comprehensive understanding.

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