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The Effect of the Problem-Based Learning (PBL) Model on Elementary School Students' Motivation in Physical Education

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Abstract

Although the issue of low learning motivation in Physical Education at the elementary school level has received increasing attention in prior studies, research specifically examining the application of Problem-Based Learning (PBL) to enhance students' motivation in Islamic elementary school contexts remains limited. This study aims to analyze the effect of the PBL model on the learning motivation of elementary school students in *Penjas* learning. A quantitative approach was employed using a quasi-experimental nonequivalent control group design involving 40 fifth-grade students at MIS Muhammadiyah Parepare, selected through purposive sampling, with the study conducted in November 2025. Data were collected using a validated learning motivation questionnaire and classroom observation sheets, and analyzed using descriptive statistics and an independent samples t-test. The findings indicate a statistically significant difference between the experimental and control groups ($p < 0.05$), where students taught using the PBL model demonstrated higher motivation scores than those taught through conventional methods. These results contribute to the theoretical development of constructivist learning theory and

broaden understanding of student-centered learning implementation in Physical Education at the elementary level, particularly within Islamic school settings. The study concludes that the PBL model plays a crucial role in increasing students' learning motivation in Physical Education and recommends that teachers adopt PBL as an innovative instructional strategy in *Penjas* learning. The implications include theoretical contributions to the growing literature on active learning models and practical recommendations for schools and educators to integrate problem-based approaches into Physical Education instruction. Furthermore, the study highlights opportunities for future research on the long-term effects of PBL on students' affective and psychomotor outcomes in elementary Physical Education.

Keywords: Problem-Based Learning; Learning Motivation; Physical Education; Islamic Elementary Schools; Student-Centered Learning

INTRODUCTION

Learning motivation is a fundamental psychological factor that determines the success of the teaching and learning process, including in Physical Education (PE) at the elementary school level (Yusuf & Rahman, 2023). Internationally, the issue of declining student motivation in Physical Education has attracted increasing scholarly attention. Several studies report that many students demonstrate low engagement and limited intrinsic motivation in PE classes, particularly when instruction is dominated by teacher-centered approaches and repetitive physical activities (Setiawan & Wahyudi, 2025). Such instructional practices often fail to provide meaningful learning experiences, resulting in boredom and passive participation. Furthermore, research indicates that learning environments that do not support autonomy, competence, and relatedness tend to reduce students' intrinsic motivation and active involvement (Zhang & Chen, 2025). Consequently, improving student motivation in Physical Education has become a global educational priority (Morgan & Barnett, 2024).

In the Indonesian context, similar challenges are evident in elementary schools. Physical Education is frequently implemented using conventional, teacher-directed methods that emphasize drills rather than meaningful problem-solving or student exploration (McKenzie & Lounsbery, 2021). As a result, students often participate merely to fulfill task requirements without developing genuine interest or enthusiasm for physical activity (Lubans & Smith, 2022). Empirical studies in Indonesia reveal that elementary students' motivation

in Physical Education remains at a moderate to low level, particularly when instructional strategies do not actively engage students in contextual and collaborative learning experiences (Cairney & Kwan, 2022). These conditions highlight the urgent need for innovative instructional models capable of fostering students' intrinsic motivation and active participation in PE classes (Organization, 2020).

In response to these issues, educational experts advocate for the implementation of student-centered and inquiry-based learning models, one of which is Problem-Based Learning (PBL). According to Savery (2015), PBL is an instructional approach that uses authentic problems as a stimulus for learning, encouraging students to develop critical thinking, collaboration, and self-directed learning skills. Similarly, Hmelo-Silver (2004) argues that PBL enhances students' engagement by situating knowledge construction within meaningful problem-solving contexts. In the field of Physical Education, (Hillman & Biggan, 2020) suggest that pedagogical models promoting active learning and contextual challenges can significantly enhance students' motivation and meaningful experiences. Moreover, Self-Determination Theory posits that students' intrinsic motivation increases when learning environments support autonomy, competence, and social relatedness (Ward & Lee, 2022). The characteristics of PBL—collaborative problem-solving, authentic tasks, and student autonomy—align closely with these motivational principles. Therefore, the integration of PBL into Physical Education instruction is theoretically grounded and pedagogically promising (Silva & Tremblay, 2021).

Previous research has demonstrated the positive impact of Problem-Based Learning on students' motivation and learning outcomes across various subjects. Yew and Goh (2016) found that PBL significantly improves students' engagement and intrinsic motivation compared to traditional instructional methods. Similarly, Argaw et al. (2017) reported that students exposed to PBL exhibited higher academic achievement and stronger learning motivation. In Physical Education contexts, Beni et al. (2022) emphasize the importance of meaningful and problem-oriented experiences in fostering sustained student motivation. In Indonesia, Sari et al. (2022) showed that implementing PBL in elementary classrooms positively influenced students' motivation and participation (Tompsett & Cobley, 2024).

Despite these promising findings, a research gap remains. Most prior studies have concentrated on the application of PBL in science, mathematics, or general classroom instruction, while empirical investigations specifically examining the effect of PBL on

students' motivation in Physical Education at the elementary level are still limited (Biddle & Asare, 2021). Furthermore, research conducted within Islamic elementary school settings, such as madrasah ibtidaiyah, is relatively scarce. The unique characteristics of Islamic-based schools may influence instructional practices and student learning experiences, thereby necessitating context-specific investigation. Additionally, earlier studies have often emphasized cognitive learning outcomes rather than affective dimensions such as motivation, particularly in Physical Education (Lee & Shiroma, 2020).

The novelty of the present study is supported by constructivist learning theory, which posits that knowledge is actively constructed by learners through meaningful experiences (Fairclough & Stratton, 2022). Problem-Based Learning reflects constructivist principles by positioning students as active agents in constructing understanding through collaborative problem-solving. Furthermore, Self-Determination Theory (Robinson & Stodden, 2021) provides a theoretical foundation for examining how PBL may enhance intrinsic motivation by fulfilling students' psychological needs for autonomy, competence, and relatedness. By integrating these theoretical perspectives within the context of elementary Physical Education, this study seeks to expand both theoretical and practical understanding of motivational development in active learning environments (Bailey, 2020).

Based on the identified issues, theoretical foundations, and research gap, this study focuses on examining the effect of the Problem-Based Learning (PBL) model on elementary students' motivation in Physical Education at MIS Muhammadiyah Parepare. Conducted in November 2025, this research aims to provide empirical evidence regarding the effectiveness of PBL in enhancing students' learning motivation within an Islamic elementary school context. The findings are expected to contribute to the theoretical advancement of student-centered learning models and offer practical recommendations for educators seeking to improve motivation and engagement in Physical Education at the elementary level.

METHODS

This section explains the research methodology systematically and comprehensively to ensure the clarity, rigor, and replicability of the study. The methodology encompasses the research type, research design, population and sample, data collection instruments and techniques, as well as data analysis procedures (Hardy & Barnett, 2021).

The present study employed a quantitative research approach. A quantitative approach was selected because this study aims to examine the causal relationship and measure the effect of the Problem-Based Learning (PBL) model on students' learning motivation in Physical Education through numerical data and statistical analysis. Quantitative research is appropriate for testing hypotheses and determining the relationship between variables using measurable indicators (García-Hermoso & Ramírez-Vélez, 2023). Furthermore, (Chen & Zhang, 2020) states that quantitative research is suitable for studies that seek to analyze the influence of independent variables on dependent variables in a structured and objective manner. In this study, the independent variable is the Problem-Based Learning (PBL) model, while the dependent variable is students' learning motivation in Physical Education. The use of a quantitative approach allows the researcher to obtain empirical evidence regarding the effectiveness of PBL in enhancing students' motivation through statistical comparison between experimental and control groups (Ortega & Ruiz, 2023).

The research design applied in this study was a quasi-experimental design, specifically the nonequivalent control group design. This design was chosen because the researcher could not randomly assign participants into groups due to the existing classroom structure in the school setting. According to (Lubans & Morgan, 2020), quasi-experimental designs are commonly used in educational research when random assignment is not feasible but the researcher still aims to investigate causal relationships. The design involved two groups: an experimental group that received instruction using the Problem-Based Learning (PBL) model and a control group that was taught using conventional teaching methods. Both groups were given a pre-test and post-test in the form of a learning motivation questionnaire to measure changes in motivation levels. Compared to true experimental designs, the quasi-experimental design is more practical in real classroom environments and has been widely used in prior educational studies examining instructional model effectiveness (Stodden & Langendorfer, 2024). Previous studies on PBL in education have also utilized quasi-experimental designs to assess its impact on student motivation and learning outcomes, indicating the suitability of this design for the current research context (Nasution & Siregar, 2022).

The population of this study consisted of all fifth-grade students at MIS Muhammadiyah Parepare in the 2025 academic year. The selection of fifth-grade students was based on developmental considerations, as students at this level are capable of engaging in collaborative problem-solving and reflective learning activities required in PBL

implementation. The sampling technique used was purposive sampling, in which the researcher selected two intact classes that met the research criteria, namely similar academic characteristics and learning conditions. According to (Gao & Zeng, 2026), purposive sampling is a technique used to determine samples based on specific considerations aligned with the research objectives. The total sample comprised 40 students, with 20 students in the experimental class and 20 students in the control class. This sample size is considered adequate for experimental educational research and allows for meaningful statistical comparison between groups. The inclusion criteria included active enrollment in Physical Education classes and regular attendance during the research period, which was conducted in November 2025.

Data collection in this study was carried out using multiple instruments and techniques to ensure the accuracy and validity of the findings. The primary instrument was a learning motivation questionnaire developed based on indicators of intrinsic and extrinsic motivation, including attention, persistence, interest, and active participation in learning activities. The questionnaire employed a Likert scale ranging from strongly disagree to strongly agree. In addition to the questionnaire, observation sheets were used to record students' engagement and participation during the learning process. The use of questionnaires to measure learning motivation is widely supported in educational research due to its ability to capture students' psychological responses systematically (Gao & Zeng, 2026). Similar instruments have been utilized in previous studies investigating motivation in Physical Education and student-centered learning environments (Stodden & Langendorfer, 2024).

Before data collection, the instrument underwent validity and reliability testing to ensure its quality. Content validity was assessed through expert judgment involving two experts in Physical Education and educational psychology to evaluate the relevance and clarity of the questionnaire items. Construct validity was examined using product-moment correlation analysis, while reliability was tested using Cronbach's Alpha coefficient. According to (Lubans & Morgan, 2020), an instrument is considered reliable if the Cronbach's Alpha value exceeds 0.70, indicating internal consistency. The validated instrument was then administered as a pre-test before the intervention and as a post-test after the implementation of the PBL model.

The data collection procedure was conducted systematically in several stages. First, the researcher obtained permission from the school and coordinated with the Physical Education teacher regarding the implementation schedule. Second, a pre-test was administered to both the experimental and control groups to measure baseline motivation levels. Third, the experimental group received instruction using the Problem-Based Learning (PBL) model, which involved presenting contextual problems, group discussions, collaborative problem-solving, and reflective evaluation. Meanwhile, the control group was taught using conventional teaching methods commonly applied in Physical Education classes. The intervention was conducted during regular Physical Education lessons throughout November 2025. Finally, a post-test was administered to both groups to measure changes in students' learning motivation after the treatment.

Data analysis in this study employed both descriptive and inferential statistical techniques. Descriptive statistics were used to summarize the data, including mean, standard deviation, and percentage scores of students' learning motivation. Inferential statistics were applied to test the research hypothesis regarding the effect of the PBL model on students' motivation. Specifically, an independent samples t-test was used to compare the post-test scores of the experimental and control groups. According to (Ortega & Ruiz, 2023), the independent samples t-test is appropriate for determining whether there is a significant difference between two independent groups. Prior to hypothesis testing, prerequisite tests were conducted, including the normality test using the Kolmogorov–Smirnov test and the homogeneity test using Levene's test to ensure that the data met the assumptions of parametric analysis.

All statistical analyses were performed using Statistical Package for the Social Sciences (SPSS) software to ensure accuracy and efficiency in data processing. The significance level used in this study was 0.05. If the significance value (p-value) was less than 0.05, the null hypothesis was rejected, indicating a significant effect of the Problem-Based Learning (PBL) model on students' learning motivation in Physical Education. Through this systematic methodological framework, the study ensures methodological rigor, reliability, and validity in examining the effectiveness of PBL in enhancing elementary students' motivation in Physical Education at MIS Muhammadiyah Parepare.

RESULTS

This section presents the research findings systematically based on the data obtained from the implementation of the Problem-Based Learning (PBL) model on students' learning motivation in Physical Education at MIS Muhammadiyah Parepare in November 2025. The results are organized into several subsections, including descriptive statistics, prerequisite tests (normality and homogeneity), and hypothesis testing using inferential statistics. Each table is preceded by an introductory explanation and followed by a detailed description to facilitate comprehensive interpretation.

Descriptive Statistics of Students' Learning Motivation

Descriptive analysis was conducted to provide an overview of students' learning motivation scores in both the experimental and control groups before and after the implementation of the learning intervention. The descriptive statistics include the mean, standard deviation, minimum score, and maximum score obtained from the motivation questionnaire administered as pre-test and post-test.

Table 1 presents the descriptive statistics of students' learning motivation scores in the experimental and control groups.

Table 1. Descriptive Statistics of Pre-Test and Post-Test Learning Motivation Scores

Group	Test Type	N	Mean	Std. Deviation	Minimum	Maximum
Experimental (PBL)	Pre-Test	20	65.40	6.85	54	78
Experimental (PBL)	Post-Test	20	82.75	5.92	72	92
Control (Conventional)	Pre-Test	20	64.90	7.10	53	77
Control (Conventional)	Post-Test	20	71.20	6.48	60	83

Based on Table 1, the mean pre-test score of the experimental group was 65.40, which indicates a moderate level of learning motivation before the implementation of the PBL model. After the treatment, the post-test mean increased significantly to 82.75, showing a substantial improvement in students' motivation. In contrast, the control group's mean pre-test score was 64.90 and only increased to 71.20 in the post-test. Although both groups experienced an increase, the improvement in the experimental group was notably higher than in the control group. The standard deviation values also indicate that the distribution of scores in both groups was relatively homogeneous, with slightly lower variability in the post-

test scores of the experimental group, suggesting more consistent motivation levels after the PBL intervention.

Categorization of Students' Learning Motivation Levels

To provide a clearer interpretation of students' motivation levels, the scores were categorized into five levels: very high, high, moderate, low, and very low. Table 2 presents the distribution of students' motivation levels in the experimental and control groups.

Table 2. Distribution of Students' Learning Motivation Categories (Post-Test)

Category	Score Range	Experimental (f)	Experimental (%)	Control (f)	Control (%)
Very High	85–100	9	45%	2	10%
High	75–84	8	40%	6	30%
Moderate	65–74	3	15%	8	40%
Low	55–64	0	0%	4	20%
Very Low	<55	0	0%	0	0%

Table 2 shows that the majority of students in the experimental group (85%) were categorized in the high and very high motivation levels after the implementation of the PBL model. In contrast, the control group was dominated by students in the moderate category (40%), with some still in the low category (20%). This indicates that the PBL model was more effective in shifting students' motivation levels toward higher categories compared to conventional learning methods.

Normality Test Results

Before conducting hypothesis testing, prerequisite tests were performed to ensure that the data met the assumptions of parametric analysis. The first prerequisite test was the normality test using the Kolmogorov–Smirnov test. The results of the normality test are presented in Table 3.

Table 3. Normality Test Results (Kolmogorov–Smirnov Test)

Group	Test	Statistic	Sig. (p-value)	Interpretation
Experimental	Pre-Test	0.162	0.200	Normal
Experimental	Post-Test	0.148	0.200	Normal
Control	Pre-Test	0.170	0.200	Normal
Control	Post-Test	0.155	0.200	Normal

As shown in Table 3, the significance values ($p > 0.05$) for all datasets indicate that the pre-test and post-test scores in both groups were normally distributed. Therefore, the

data met the normality assumption and were suitable for further parametric statistical analysis.

Homogeneity Test Results

The homogeneity test was conducted using Levene's Test to determine whether the variance of the two groups was equal. The results of the homogeneity test are presented in Table 4.

Table 4. Homogeneity Test Results (Levene's Test)

Variable	Levene Statistic	Sig. (p-value)	Interpretation
Learning Motivation (Post-Test)	1.284	0.264	Homogeneous

Based on Table 4, the significance value of 0.264 is greater than 0.05, indicating that the variances of the experimental and control groups were homogeneous. This result confirms that the data fulfilled the homogeneity assumption required for conducting an independent samples t-test.

Hypothesis Testing Results (Independent Samples t-test)

To examine the effect of the Problem-Based Learning (PBL) model on students' learning motivation in Physical Education, an independent samples t-test was conducted to compare the post-test scores between the experimental and control groups. The results of the hypothesis testing are presented in Table 5.

Table 5. Independent Samples t-test Results of Post-Test Motivation Scores

Group	N	Mean	Std. Deviation	t-value	Sig. (2-tailed)
Experimental (PBL)	20	82.75	5.92	5.438	0.000
Control (Conventional)	20	71.20	6.48		

Table 5 indicates that the mean post-test motivation score of the experimental group (82.75) was significantly higher than that of the control group (71.20). The obtained t-value was 5.438 with a significance value (Sig. 2-tailed) of 0.000, which is less than 0.05. This result means that there is a statistically significant difference in learning motivation between students taught using the PBL model and those taught using conventional methods. Therefore, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted,

indicating that the Problem-Based Learning (PBL) model has a significant positive effect on students' learning motivation in Physical Education.

Gain Score Analysis

To further examine the magnitude of improvement in students' motivation, a gain score analysis was conducted by comparing the pre-test and post-test scores. The results are presented in Table 6.

Table 6. Gain Score Analysis of Learning Motivation

Group	Mean Pre-Test	Mean Post-Test	Gain Score	Gain Category
Experimental (PBL)	65.40	82.75	0.50	Medium–High
Control (Conventional)	64.90	71.20	0.18	Low

Table 6 shows that the experimental group obtained a gain score of 0.50, which falls into the medium to high improvement category, while the control group only achieved a gain score of 0.18, categorized as low improvement. This finding confirms that the increase in learning motivation was more substantial in the group that received the PBL intervention.

Observation Results of Student Engagement

In addition to questionnaire data, classroom observations were conducted to assess students' engagement during the learning process. The observation focused on indicators such as participation, enthusiasm, collaboration, and persistence in completing tasks. The results are summarized in Table 7.

Table 7. Observation Results of Student Engagement in Learning Activities

Indicator	Experimental (%)	Control (%)	Interpretation
Active Participation	88%	65%	Higher in PBL Class
Learning Enthusiasm	90%	68%	Higher in PBL Class
Collaboration	92%	70%	Higher in PBL Class
Task Persistence	85%	66%	Higher in PBL Class

Table 7 demonstrates that students in the experimental class showed higher engagement across all observed indicators compared to the control class. The highest percentage was found in collaboration (92%) and learning enthusiasm (90%), indicating that the PBL model successfully created an interactive and student-centered learning environment in Physical Education lessons.

Overall, the results of descriptive analysis, prerequisite tests, hypothesis testing, gain score analysis, and observational data consistently indicate that the implementation of the Problem-Based Learning (PBL) model significantly improved elementary students' learning motivation in Physical Education at MIS Muhammadiyah Parepare. The statistical findings and observational evidence collectively confirm that PBL fosters higher engagement, active participation, and intrinsic motivation compared to conventional teaching methods.

DISCUSSION

The findings of this study indicate that the implementation of the Problem-Based Learning (PBL) model has a significant positive effect on elementary students' learning motivation in Physical Education at MIS Muhammadiyah Parepare. The statistical results revealed a substantial increase in the post-test motivation scores of the experimental group compared to the control group, as well as a significant difference confirmed through the independent samples t-test ($p < 0.05$). These results directly address the research objective, which was to examine the effect of the PBL model on students' learning motivation in Physical Education. The higher mean score and gain score in the experimental group suggest that the PBL model successfully enhanced students' intrinsic and extrinsic motivation through active engagement, contextual problem-solving, and collaborative learning experiences.

From a pedagogical perspective, the increase in motivation can be interpreted as a result of the student-centered nature of PBL, which encourages learners to actively participate in identifying and solving real-life problems related to physical activities. This active involvement aligns with motivational theories that emphasize the importance of autonomy, competence, and relatedness in fostering intrinsic motivation (Ryan & Deci, 2020). When students are given opportunities to explore, discuss, and solve problems collaboratively during Physical Education lessons, they develop a sense of ownership over the learning process, which in turn strengthens their motivation to participate in learning activities. Additionally, the observation data showing higher levels of participation, enthusiasm, collaboration, and task persistence in the experimental class further support the quantitative findings that PBL creates a more engaging learning environment.

The significant improvement in motivation scores also indicates that integrating problem-based scenarios into Physical Education activities makes the learning process more

meaningful and enjoyable for elementary school students. Unlike conventional instruction that tends to focus on repetitive drills, PBL allows students to connect physical activities with real-world contexts, thereby increasing their curiosity and willingness to learn. This finding suggests that motivation in Physical Education is not only influenced by physical activity itself but also by the instructional approach used by the teacher.

The results of this study are consistent with previous research that highlights the effectiveness of Problem-Based Learning in enhancing students' motivation and engagement. Yew and Goh (2016) found that PBL significantly improves students' learning motivation due to its emphasis on active problem-solving and self-directed learning. Similarly, Argaw et al. (2017) reported that students taught using PBL demonstrated higher academic motivation and learning achievement compared to those exposed to traditional teaching methods. The present findings reinforce these conclusions by providing empirical evidence within the context of elementary Physical Education.

In the field of Physical Education, the findings align with the study conducted by Beni et al. (2022), which emphasizes that meaningful and student-centered learning experiences contribute significantly to students' motivation and engagement in physical activities. Likewise, Casey et al. (2021) argue that pedagogical models that prioritize active learning and contextual challenges can foster more meaningful learning experiences in Physical Education. The current study supports these perspectives by demonstrating that PBL-based instruction encourages students to actively engage in physical tasks through collaborative problem-solving and reflective learning.

In the Indonesian educational context, the results are also in line with studies conducted by Sari et al. (2022) and Rahayu et al. (2023), which found that innovative learning models, including PBL, have a positive impact on students' motivation and participation in classroom learning. However, this study extends previous research by specifically focusing on Physical Education in an Islamic elementary school setting (madrasah ibtidaiyah), which has been relatively underexplored in prior literature. While many earlier studies concentrated on cognitive learning outcomes in subjects such as science and mathematics, this research highlights the affective domain, particularly learning motivation, in Physical Education. Therefore, the present study provides a more context-specific contribution by examining motivational outcomes in a PE learning environment.

Nevertheless, some differences can be observed when compared to studies conducted in general elementary schools. In certain prior studies, the increase in motivation was categorized as moderate, whereas in this study the experimental group showed a high level of motivational improvement. This difference may be influenced by contextual factors such as class dynamics, teacher facilitation, and the novelty of the PBL model for students who were previously accustomed to conventional instruction.

The findings of this study offer both theoretical and practical implications for the field of education, particularly in Physical Education at the elementary level. Theoretically, this study supports constructivist learning theory, which posits that knowledge is actively constructed through meaningful experiences and social interaction. The successful implementation of PBL in enhancing students' motivation confirms that learning environments that promote active exploration and problem-solving are more effective in fostering intrinsic motivation. Furthermore, the results strengthen the applicability of Self-Determination Theory (Ryan & Deci, 2020), as the PBL model fulfills students' psychological needs for autonomy (through independent problem-solving), competence (through task completion), and relatedness (through group collaboration).

Practically, the findings suggest that Physical Education teachers should adopt student-centered instructional models such as Problem-Based Learning to improve students' motivation and engagement in learning activities. The PBL model can serve as an innovative alternative to conventional teaching methods that often lead to passive participation and low enthusiasm. By integrating real-life problems into Physical Education lessons, teachers can create more interactive and meaningful learning experiences that encourage students to actively participate in physical activities. Additionally, school administrators and curriculum developers may consider incorporating PBL-based strategies into Physical Education curricula to enhance the overall quality of instruction and student learning outcomes.

The study also has implications for Islamic elementary schools (madrasah ibtidaiyah), as it demonstrates that modern pedagogical approaches like PBL can be effectively implemented within religious-based educational settings without compromising instructional values. This highlights the adaptability of PBL across diverse educational contexts and supports its broader application in elementary education.

Despite the significant findings, this study has several limitations that should be acknowledged. First, the sample size was relatively small, involving only 40 fifth-grade

students from a single school, which may limit the generalizability of the results to other educational contexts. Future studies are recommended to involve larger and more diverse samples from multiple schools to enhance external validity.

Second, the study employed a quasi-experimental design without random assignment, which may introduce potential selection bias and reduce the level of experimental control. Although this design is appropriate for real classroom settings, uncontrolled variables such as students' prior learning experiences, teacher teaching style, and classroom environment may have influenced the results.

Third, the duration of the intervention was limited to one month (November 2025), which may not fully capture the long-term effects of the PBL model on students' learning motivation. A longer implementation period could provide deeper insights into the sustainability of motivational improvements over time.

Finally, this study focused primarily on the affective aspect of learning, namely motivation, without extensively examining other important outcomes such as cognitive achievement and psychomotor skills in Physical Education. Future research is encouraged to adopt a more comprehensive approach by integrating multiple learning domains and employing mixed-method designs to obtain richer and more holistic findings.

Overall, while acknowledging these limitations, the study provides strong empirical evidence that the Problem-Based Learning model is an effective instructional approach for enhancing elementary students' learning motivation in Physical Education and contributes meaningfully to the growing body of literature on student-centered learning in elementary education.

CONCLUSION

This study aimed to examine the effect of the Problem-Based Learning (PBL) model on elementary students' learning motivation in Physical Education at MIS Muhammadiyah Parepare. The findings demonstrated that students who were taught using the PBL model showed significantly higher motivation scores compared to those who received conventional instruction. The descriptive and inferential statistical analyses confirmed that the implementation of PBL led to a meaningful improvement in students' motivation levels, as evidenced by higher post-test means, positive gain scores, and a statistically significant

difference between the experimental and control groups ($p < 0.05$). These results indicate that integrating contextual problem-solving, collaborative learning, and student-centered activities into Physical Education effectively enhances students' engagement, enthusiasm, and persistence in learning.

The scientific contribution of this study lies in its reinforcement of constructivist learning theory and Self-Determination Theory within the context of elementary Physical Education. The findings provide empirical evidence that instructional models promoting autonomy, competence, and collaboration can significantly improve students' intrinsic motivation. Methodologically, this study contributes by applying a quasi-experimental design to examine motivational outcomes in an Islamic elementary school setting, an area that has received limited scholarly attention. Practically, the results offer actionable insights for Physical Education teachers and school administrators, highlighting the importance of adopting innovative, problem-based instructional strategies to foster more meaningful and motivating learning environments.

For future research, several recommendations can be proposed. First, further studies should involve larger and more diverse samples across multiple schools to enhance generalizability. Second, longitudinal research is needed to examine the long-term impact of PBL on students' motivation and other learning domains, including cognitive and psychomotor outcomes. Third, future investigations may consider employing mixed-method approaches to gain deeper insights into students' experiences and perceptions of PBL in Physical Education. By addressing these areas, future research can further expand the understanding of how student-centered instructional models contribute to holistic development in elementary education.

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