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Comparing project-based learning with conventional models: Enhancing students' enjoyment of physical education

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ABSTRACT

Background Problems: The proliferation of diverse teaching methodologies underscores the evolving nature of pedagogical practices. Despite this trend, conventional instructional models persist in physical education and health curricula, with many educators continuing to employ traditional approaches. These conventional models limit student engagement and foster a sense of monotony within the learning environment. Conversely, effective physical education hinges on interactive communication, wherein student involvement and enjoyment serve as catalysts for positive motivation and enhanced learning outcomes. **Research Objectives:** The research aims to determine the enjoyment of students learning physical education using the project-based learning model. **Methods:** The experimental method was applied with a randomised control-group, pretest-posttest design. The population consisted of 600 students from a junior school in Bandung City. The sample was selected using the simple random sampling technique. The enjoyment of student learning questionnaire, which has a reliability value of 0.942. Data were analysed for normality using the Kolmogorov-Smirnov test and homogeneity using the Levene test; after that, the paired test and independent sample t test were carried out. **Findings/Results:** The result shows that the project-based learning model provides a better outcome than conventional learning, especially in the enjoyment of learning aspect, with $t = 17.622$ and $\text{sig} = 0.000$. **Conclusion:** The conclusions of this study indicate that employing a project-based learning paradigm centered on fostering enjoyment in the learning process represents a novel advancement in physical education curricula. Emphasising the role of enjoyment in learning, the project-based learning framework offers a fresh perspective on physical education programmes, enabling educators to facilitate more impactful instructional experiences compared to conventional methodologies.

Keywords: Project-based learning; physical education; enjoyment

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INTRODUCTION

Physical education learning today has developed rapidly, and in practice, physical education teachers must be able to make their students learn by not only focusing on developing their skills. Another goal that teachers have is to help students develop their potential and talents in sports. Physical education is basically a learning programme that

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14 provides this condition (Sari et al., 2023). Furthermore, physical education develops health-related quality of life (HRQOL), which is becoming a trend today (Ginanjar et al., 2023; Pavlović et al., 2022). Apart from improving skills and health-related quality of life, that is very important, namely the enjoyment of student learning, because students really like it and are also seen as being able to maintain good motivation in learning physical education. Regarding the enjoyment of learning, it is suggested that when students experience joy while learning, they are more motivated to learn, leading to personal benefits and satisfaction (Harefa et al., 2023). Additionally, enjoyment of learning can help students achieve their learning goals and increase their interest in enhancing their academic performance (Belleza et al., 2024; D'Cruz et al., 2024; Duan, 2024; Romero-Elías et al., 2024). So, in this condition, it is very important for physical education teachers to be able to manage it well. Learning objectives can be achieved well if learning is fun (Bukit et al., 2023). This needs to be realised because not all students have a good desire and interest in learning (Sari et al., 2023). This feeling is the key to realising enjoyable learning. Teachers are required to pay attention to being able to manage students' feelings in designing good learning strategies (Bukit et al., 2023).

Basically, students in junior high school are still in a transition phase where they have characteristics that like to play. Through learning the concept of play, students are indirectly given stimulation to think. This really strengthens the importance of fun learning, where students experience the enjoyment of learning themselves (Bukit et al., 2023). Therefore, this research offers several alternative strategies to make learning enjoyable for students. Through the close relationship between teachers and students, it becomes increasingly clear that teachers must facilitate and encourage students to achieve their potential (El-Tanahi et al., 2023; Fitriati et al., 2023; Tremoen & Lagestad, 2024). Teachers must be able to determine how students will carry out various learning activities (Beseler et al., 2024; Câmpean et al., 2024; Jongko et al., 2024). There are aspects that are very crucial in the teacher's efforts to provide enjoyable learning (Belleza et al., 2024; D'Cruz et al., 2024; Duan, 2024; Romero-Elías et al., 2024). These two aspects are learning that creates persistence in high learning motivation and persistence as an expressive attitude in student learning (Amukune & Józsa, 2023). These two aspects are advantages that can be utilised to provide useful learning for students.

In line with that, physical education teachers need renewal and qualified abilities to be able to teach well. Physical education teachers must be able to plan their learning well and must also be able to make learning fun and inspire students to be actively involved (Bukit et al., 2023). One lesson that requires good planning is the project-based learning model, where the physical education teacher must determine the project that will be carried out (Darmuki et al., 2023). So when this project-based learning model is able to make students learn happily, cheerfully, and joyfully with high active learning time, then the physical education teacher is seen as having been able to make good learning plans (Belleza et al., 2024; D'Cruz et al., 2024; Duan, 2024; Romero-Elías et al., 2024). The project-based learning model gives students the freedom to plan, implement, and create their own projects to present to the class (Darmuki et al., 2023). There are several reasons why the project-based learning model plays a crucial role in physical education learning, including being able to integrate a series of activities and understanding as evidenced by clear project assignments, especially for health (Pavlović et al., 2022), and is seen as being able to improve students' social cognition in their learning (Ginanjar et al., 2020, 2022; Umar et al., 2023; Umar & Ko, 2022). The PJB model developed students' positive attitudes (Kao, 2019), forming an understanding of how students can become independent learners (Li et al., 2023), and being creative and encouraging positive

attitudes. students in cultivating health-related quality of life (Ginanjar et al., 2023; Pavlović et al., 2022).

Currently, physical education teachers still often use conventional models (Lu, 2024; Tagimaucia et al., 2024; Wang, 2024). Teachers are too dominating in their activities, so students' activities are centred on the teacher and seem monotonous. A fact that teachers need to realise is that students' passive attitudes occur because learning is right on target (Dervić et al., 2018; Enriquez & Oliver, 2021; Ginanjar et al., 2020, 2022; Ginanjar & Tarigan, 2018; Murphy et al., 2021). In fact, good physical education occurs through good communication and discussion. The enjoyment of learning creates positive motivation in students and will influence learning productivity (Fuaddi et al., 2020). Teachers must be wiser and open their eyes to the arrival of new developments. Physical education teachers must also include scientific activities in their learning activities (Hafid & Damiti, 2023; Treadwell, 2018).

Usually, researchers emphasise aspects of students' critical thinking skills (Barak & Yuan, 2021; Shin et al., 2021), cooperation (Pinter & Čisa, 2018), creativity (Albar & Southcott, 2021; de Oliveira Biazus & Mahtari, 2022; Hanif et al., 2019; Salehudin et al., 2020; Ummah et al., 2019), motivation (Belagra & Draoui, 2018; Guo et al., 2020; Hernandez-Mangas & Alvarez, 2021; Hira & Anderson, 2021; Nicolás, Ramos, 2020; Oh et al., 2020), learning outcome (Alamri, 2021; Aliriad, 2021; Ngereja et al., 2020; Rohm et al., 2021; Simonton et al., 2021), project assignments (Morrison et al., 2021; Revelle et al., 2020), student engagement in learning (Almulla, 2020; Crespí et al., 2022; Greenier, 2020; Markula & Aksela, 2022; Umar & Ko, 2022; Wang, 2020; Wilson, 2021), teacher and student communication patterns in learning (Febiyanti et al., 2021; Oliver et al., 2020), learning evaluation (de la Torre-Neches et al., 2020; Sgro et al., 2019), and social aspects (Beier et al., 2019; Hidayat, 2020; Mahasneh & Alwan, 2018), which have also developed significantly developed with the use of this PJBL model. However, in several aspects, research related to the enjoyment of student learning in physical education is still very lack. It is necessary to carry out further investigation regarding the lack of results from this research in order to complement the research results in project-based learning in physical education.

Prior studies have explored the association between project-based learning and students' enjoyment within the context of physical education instruction. However, investigations specifically comparing project-based learning with conventional methodologies in terms of students' enjoyment within physical education contexts remain scarce. Moreover, prior research has primarily focused on younger age groups, particularly preschool and elementary school students, with insufficient attention given to middle school students. Thus, this study aims to extensively investigate and evaluate potential disparities in students' enjoyment of learning between project-based learning and conventional instructional models in physical education settings.

METHOD

Study Participants

The experimental group studied using the PJBL model; the control group studied using conventional models and saw how it affected students' enjoyment of learning. This is an experimental study with a randomised pretest-posttest design (Creswell, 2017). The population is 600 students at Junior High School from the city of Bandung; the sample was selected using the simple random sampling technique (Creswell, 2018), and 30 students from each of Classes VII.1 and VII.6. The enjoyment of student learning questionnaire (Ginanjar, 2014), which was modified from Khanifatul (2012), was used

because it has a reliability value of 0.942, which means it is a good condition to measure enjoyment of students' learning.

Study Organisation

The author conducted a preliminary survey to see the actual problems that occurred at Junior High School in the city of Bandung, then communicated with the principal and physical education teacher at Junior High School in the city of Bandung regarding permission to conduct research. After that, the author wrote a notification letter to the students' parents that in the period from August to December 2023, all students involved had received approval from their parents (Jakarta State University Ethics Committee). In this research, each student must obtain approval from their parents to be involved, and parents provide written consent, which is also acknowledged by the school principal. Before starting, the author explains the purpose and benefits of this research to students. In his explanation, he was still accompanied by the school, and in anticipation of risks that might occur, the researcher also asked the school health unit team to help in carrying out the research. If something fatal happened, he would immediately be taken to a hospital covered by the researcher.

Table 18. Randomised Pretest and Posttest Control-Group Design (Creswell, 2018)

Group A	R	O ₁	X	O ₂
Group B	R	O ₃		O ₄

Next, the author determined the population and sample of students and prepared the enjoyment of student learning questionnaire, which was modified from and conducted a pretest on 17 students. After carrying out the initial test, the author carried out a treatment where the experimental class studied with the PJBL model every Monday and Thursday, while the control class studied with the conventional model every Tuesday and Friday. This activity was carried out in 12 meetings, with the duration of each material provided being 90 minutes.

Table 2. The Instruction of the PJBL and Conventional Model

PJBL Model		Conventional Model
<ul style="list-style-type: none"> Introduce the physical education learning process using the Project-Based Learning model to students. Divide students into several groups. 	Lesson 1	<ul style="list-style-type: none"> Introduce the physical education learning process using conventional learning models to students. Divide students into several groups.
<ul style="list-style-type: none"> Project determination by the teacher. Design of Project Completion Steps prepared together with teachers and students. Preparation of Project Implementation Schedule by each group. 	Lesson 2	<ul style="list-style-type: none"> Students watch physical education learning videos that the teacher has prepared beforehand. The teacher determines the learning steps that must be carried out by students in their group.
Completion of the Project with teacher facilitation and monitoring in the following materials: Football, Badminton, Athletics - Relay running, Pencak silat, Development activities, Gymnastics Activities, Rhythmic Activities, Aquatics, and health education.	Lesson 3	Learn physical education guided by the teacher in groups with the following material: Football, Badminton, Athletics - Relay running, Pencak silat, Development activities, Gymnastics Activities, Rhythmic Activities, Aquatics, and health education.
Preparation of Reports and Presentations.	Lesson 4	The teacher evaluates performance by group.
Evaluation	Lesson 5	

The author conducted a posttest after the last meeting and processed and interpreted the results. To facilitate further processing of this research, the important points are presented in Table 3.

Table 3. The Key Points of the Research

The study design,	:	The experimental method applied with randomised control-group pretest-posttest design
Population,	:	The population is students at Junior High School 12 Bandung
Sample size,	:	600 students at Junior High School 12 Bandung
Sampling method,	:	The Simple Random Sampling technique and 30 students from each Classes VII.1 and VII.6
Research instruments,	:	The enjoyment of student learning questionnaire (Ginanjar, 2014), which was modified from Khanifatul (2012), has a reliability value of 0.942.
Statistical tests,	:	The normality test (Kolmogorov-Smirnov test) and homogeneity (Lavene test). After that, continue testing using paired tests and independent t tests

Statistical Analysis

The research carried out was experimental, using a questionnaire using a Likert scale as a measuring tool. Microsoft Office-Excel and IBM SPSS Statistics v.26 were used to test the hypothesis. Meanwhile, for the statistical analysis, the author carried out the normality test (Kolmogorov-Smirnov test) and homogeneity test (Lavene test). After that, continue testing using paired tests and independent t tests. The choice of paired test and independent t test was carried out because if the data is not normally distributed or homogeneous, it can still be continued with the Wilcoxon and Man-Whitney U tests.

RESULTS AND DISCUSSION

After the researcher has processed and analysed the data, the next step is that the data begins to be reported because the research results must be interpreted. The interpretation of the research results is as follows:

Table 4. Characteristics of the Research Subjects

Class	N	Average of Age	Average of Height	Average of Weight	Body Mass Index	
					Average	Description
Experiment Male	15	13	1.60 Meter	51.13 Kg	19.86	Normal
Experiment Female	15	13	1.56 Meter	50.13 Kg	20.65	Normal
Control Male	15	13	1.58 Meter	49.13 Kg	19.74	Normal
Control Female	15	13	1.56 Meter	50.60 Kg	20.87	Normal

The subject of this study was divided into male and female groups within each class. There are 15 male and female participants. The average age of both was 13 years. The average height of the experimental male is 1.60 metres, the experimental female is 1.56 metres, the control male is 1.58 metres, and the control female is 1.56 meters. The average weight of the experimental male is 51.13 kg, the experimental female is 50.13 kg, the control male is 49.13 kg, and the control female is 50.60 kg. While for the category of body mass index, experimental males have an average of 19.86 (normal), experimental females have an average of 20.65 (normal), control males have an average of 19.74 (normal), and control females have several 20.87 (normal).

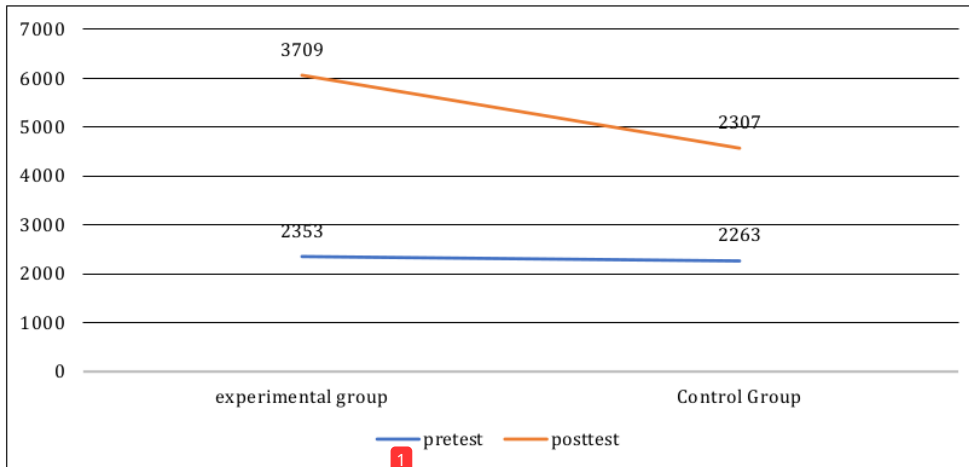


Figure 1. Result of the Enjoyment of Student Learning

The experimental group that studied with the PJBL model got a pretest score of 2353 and a posttest score of 3709, while the control group that studied with the conventional model got a pretest score of 2263 and a posttest score of 2307. This means that students who studied with the PJBL model had better scores than students who studied with the conventional model.

Table 5. The Result of Normality and Homogeneity

	Normality	Sig.
Experimental Pre-test	0.112	0.200
Experimental Post-test	0.068	0.200
Control Pre-test	0.112	0.200
Control Post-test	0.109	0.200
	Homogeneity	Sig.
Experiment >< Control Group	5.228	0.026

Normality test results show that the pretest experimental group obtained a statistical value of 0.112, sig. 0.200, and the posttest obtained a statistical value of 0.068, sig. 0.200. The pretest control group obtained a statistical value of 0.112, sig. 0.200, and the posttest obtained a statistical value of 0.109, sig. 0.200. These results indicate that both classes have a normal distribution. Homogeneity results used the Lavene test, and the results of the experimental and control groups obtained a statistical value of 5.228, sig. 0.026. This shows that the learning enjoyment of Experiment and Control class students is homogeneous.

Table 6. Paired and Independent Sample t Test

Paired Test	T	Sig.
Experimental Group	-21.620	0.000
Control Group	-0.774	0.45
Independent t Test	T	Sig.
Experimental >< Control Group	17.622	0.000

The results of the paired test in the experimental group obtained a statistical value of 21.620, sig. 0.000. This means that there is an increase in students' enjoyment of learning in the experimental class. The results of the paired test in the control group obtained a

statistical value of -0.74, sig. 0.445. This means there is no increase in students' enjoyment of learning. The results of the independent t test show a statistical value of 17.622, sig. 0,000. This means that the PJBL model has a better influence on students' enjoyment of learning than conventional ones.

PJBL Model Increased the Enjoyment of Student Learning

The PJBL model in physical education requires projects by students in groups. This process creates cognitive, affective, and psychomotor aspects that are appropriate to the student's growth and development process (Pavlović, 2018). Students are increasingly honing their social aspects and are also required to collaborate with each other. The situation in the PJBL model is more intense and enjoyable, with the teacher acting as the facilitator and students becoming more creative and seeming to be able to express the ideas they have. This creates a learning situation full of intimacy between students in groups, groups of students with each other, and the relationship between students and teachers. This creative process can occur if teachers are able to use it. Indirectly, this also affects the social experience of students, which can be seen in Figure 2.

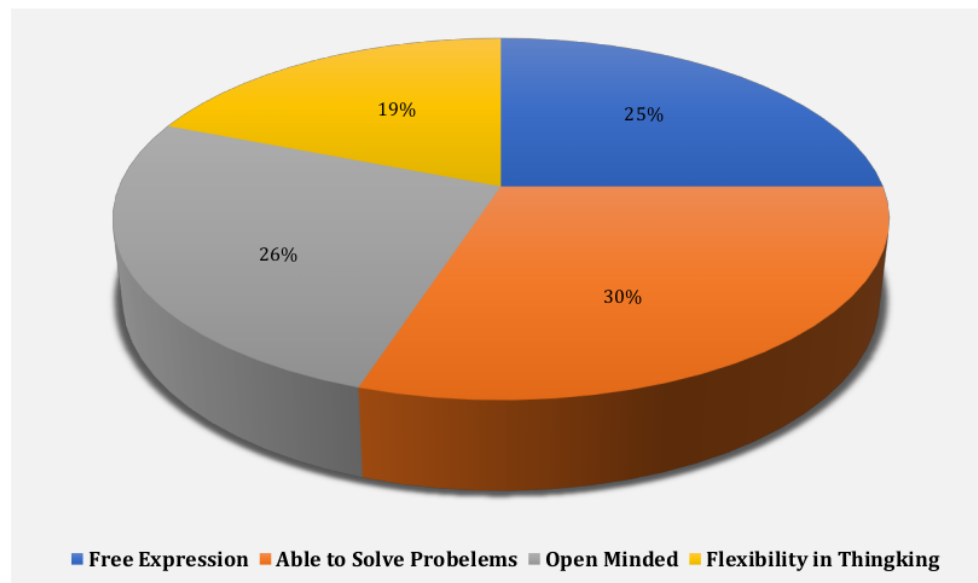


Figure 2. Impact of Learning Creativity Through Social Life Experience

Enjoyable learning conditions characterised by an attitude of free expression are the main highlight, with an allowance of 25% for creative learning outcomes (Hardika et al., 2023). It is hoped that this 25% free expression using the PJBL model will inspire other aspects, such as being open-minded, flexible in thinking, and able to solve problems. All components of learning creativity can be accommodated, and students gain the benefits. The PJBL model, with the right strategy, fosters mutual trust between students so that the communication process runs smoothly with all students actively involved in learning. Especially when the project given by the teacher can be completed according to students' expectations, this will give rise to feelings of joy and foster a positive attitude of responsibility in students (Cox & Meaney, 2018). For example, when playing basketball to complete his team's project, Andi (a male student), who was originally quiet, became active in providing input and evaluation to his teammates. Andi is also careful and uses

good language, especially with female students, when giving input. This is an example of a commendable attitude that needs to be applied to physical education learning at school and is in line with government objectives. Another example was when Almira and Siti (female students) at the beginning of the activity were lazy and tended to be passive, but in the fifth meeting, they were able to work together well, make passes accurately, and actively discuss with their fellow teammates.

The enjoyment of learning emerged from their faces, especially when Almira and Siti were able to score points. The PjBl model trains cognitive, affective, and psychomotor aspects (Hadiana et al., 2022), because students become accustomed to thinking critically and carefully (Cox & Meaney, 2018; Indahwati et al., 2019). This condition increases student collaboration in learning. This enjoyment of learning is the main factor in forming a positive attitude (Simonton et al., 2021) and how students are actively involved in learning. Teachers also need to be aware that when students experience challenging and enjoyable activities (Dorofieieva et al., 2019; Hafid & Damiti, 2023), they are sure they will be able to achieve extraordinary achievements.

The Conventional Models Decreased the Enjoyment of Student Learning

When physical education learning is carried out using a conventional model, some students look gloomy and less enthusiastic, especially male students. They think that this kind of learning is very boring. Repetition of basic basketball techniques in conventional learning, such as the 1-minute check pass against the wall and zigzag dribbling of the ball, indirectly eliminates students' enjoyment of learning. This repetition makes students learn in a state of anxiety and reduces students' creative thinking abilities (Aulawy et al., 2022; Ginanjar et al., 2020, 2022; Ginanjar & Tarigan, 2018). This makes students less active in learning (Aeltermann et al., 2019) because students just follow the teacher's instructions without any challenges to learning. An anxious attitude also appears when entering the real basketball game phase. This situation occurs because students are afraid of losing a match and become a source of weakness for their team, which is exploited by the opponent. By placing greater emphasis on the iterative process, this conventional model is often considered outdated (Enriquez & Oliver, 2021). Even though the syllabus prepared by the teacher is modern, the assumption of learning success is still seen in the movement test alone leaving out other assessment aspects (Pavlović, 2018).

Typical conventional learning, with its highly competitive elements, makes the learning atmosphere too rigid (Dervić et al., 2018). This makes it difficult for students to communicate and also makes them not focus on the game. For example, Dadan and Ahmad, when practicing in their group, look fine. When competing with another team, Dadan and Ahmad looked nervous and anxious. Dadan and Ahmad often make passing mistakes because of this condition. This is clearly one of the impacts of the monotonous learning they do through the conventional model, with the teacher always being at the centre of the learning. If this condition continues, there will be a decline in student performance (Cupeiro et al., 2020). In this situation, teachers need to understand that students' hopes when studying physical education are to gain knowledge and skills, but this must be supported by personal satisfaction and enjoyment when they learn (Murphy et al., 2021). Students do not find clear conditions in conventional learning because students always repeat a series of exercises without knowing the meaning, which makes them confused about the learning objectives (Enriquez & Oliver, 2021; Murphy et al., 2021).

PJBL Model Gives Better Influence Than Conventional Towards the Enjoyment of Student Learning

In physical education that uses a conventional model, students continue to experience repetition of exercises with teacher-centred learning. Whether the teacher realises it or not, the teaching and learning process can influence students' feelings and thinking processes. Students who are unhappy or even emotional will produce bad results (Lavoie et al., 2021). This situation is reflected when a basketball game takes place. Students who study using the conventional model are always trying to direct attacks. This happens when students get used to carrying out the understanding they bring when they are bored with conventional learning. This means that adapting to students' learning will add to problems and hinder the achievement of physical education goals (Hafid & Damiti, 2023).

Different conditions when used the PJBL model correctly, it can make students active in learning (Lim et al., 2023). This happens because team building, teamwork, and team performance are formed naturally. The opposite happens in physical education learning with the conventional model, which focuses on what the teacher exemplifies and just waits for one's turn. This prevents students' team building, teamwork, and team performance from being formed. Repetition of activities and lack of challenge are the main issues that decrease students' enjoyment of learning and make students less active in learning (Aelterman et al., 2019; Aliriad et al., 2023).



Figure 3. TTT Framework (Dincă et al., 2023)

33 This is in line with the concept of understanding the TTT Framework when using the project-based learning model, enabling teachers to involve every student in their learning. In its implementation, after students learn basketball on the field, they are given the obligation to complete their project assignments. Physical education learning situations that use this active PJBL model can be utilised for optimal learning. Teachers must remain focused, direct students to complete their project assignments, and provide a good result (Lavoie et al., 2021), with students trying to meet the learning expectations expected by the teacher. Besides that, teachers must also be able to present interesting learning that their students like (Cupeiro et al., 2020; Sandoval, 2023). This situation makes students try to solve their own problems through careful planning, teacher monitoring, and the self-evaluation process (Li et al., 2023). A good teacher's plan for the learning programme is the key to successful learning (Ismail et al., 2023; Nopembri & Sugiyama, 2021), so that carrying out the assignments is more meaningful, and the teacher's expected goals can be achieved. This can make students healthy (Dorofieieva et al., 2019) and increasing their understanding (Sudirman et al., 2023; Whittle et al., 2018). Through the PJBL model, physical education learning becomes more effective and provides benefits for students. It is hoped that there will be more educational innovations in Indonesia.

Our research faces several limitations that need acknowledgment when interpreting the results and extending their implications. Primarily, the restricted sample size might

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diminish the representativeness of the research outcomes for the complete population of junior high school students in Bandung City. Despite endeavours to ensure diversity in sample selection based on prevalent social and demographic characteristics, the obtained results may not entirely encapsulate the heterogeneity among junior high school students in the locality. Consequently, these constraints may compromise the precision of generalising research findings to broader populations beyond the research context.

CONCLUSION

The PJBL model has demonstrated a significant increase in student learning enjoyment compared to the conventional model. By prioritising the enjoyment of learning, the PJBL model presents a novel approach to physical education programmes, enabling teachers to deliver more engaging and effective lessons than traditional models. Students crave learning experiences that are both enjoyable and stimulating in physical education classes, fostering enthusiasm, and enhancing their athletic abilities. This unique focus allows students to engage actively in project assignments while enjoying the learning process a feature lacking in conventional models. Without the element of enjoyment in learning, the educational objectives set by teachers may not be fully achieved.

Moving forward, future research should delve into how the PJBL model influences the content of physical education learning materials, focusing on various psychological aspects of students such as mental, spiritual, and motor skills across different educational levels. Understanding teachers' strategies for designing adaptable learning environments will also be pivotal. The aspiration is that the PJBL model will not only facilitate project completion but also cultivate a conducive learning atmosphere where students experience genuine enjoyment, thereby meeting educational objectives effectively.

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4 CONFLICT OF INTEREST

The author declares no conflict.

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