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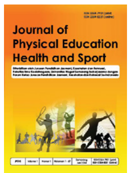

The Effect of Learning Models on Volleyball Passing Learning Outcomes, as Seen in The Senior High School of Self-Efficacy in Students of State Junior High School 3 Amlapura

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Abstract

The mastery of volleyball overhead passing is a fundamental yet complex skill for junior high school students, often hindered by traditional teaching methods and students' lack of self-confidence. This study aims to evaluate the effectiveness of the Project-Based Learning (PjBL) model compared to Direct Instruction on volleyball passing outcomes, while specifically analyzing the role of students' self-efficacy levels. The study utilized a quantitative experimental approach with a 2 \times 2 factorial design. To categorize student performance, five predefined score thresholds were applied: Very Good (>75), Good (58–75), Fair (42–57), Poor (25–41), and Very Poor (<25). The sample consisted of eighth-grade students at State Junior High School 3 Amlapura. Data were collected through self-efficacy questionnaires and standardized volleyball passing tests, subsequently analyzed using two-way ANOVA at a significance level of 0.05. The findings indicate that students taught through PjBL achieved significantly higher scores than those under Direct Instruction. Furthermore, students with high self-efficacy consistently outperformed those with low self-efficacy. A significant interaction effect ($p < 0.05$) was found between the learning model and self-efficacy; the combination of PjBL and high self-efficacy yielded the highest outcomes in the "Very Good" category, whereas Direct Instruction with low self-efficacy resulted in the lowest "Poor" performance. It is concluded that PjBL is a superior instructional model for enhancing volleyball skills, provided that students' psychological readiness and self-efficacy are also prioritized in the learning process.

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INTRODUCTION

Physical education is an integral part of general education, aimed at developing all aspects of life within students. Physical education differs from other forms of learning because it requires students to master specific skills (Dharmadi et al., 2023). Physical education encompasses five areas: large and small ball games, athletics, gymnastics, and rhythmic movement (Yoda, 2020). One of these areas is large ball games, which encompass a wide variety of topics, including volleyball. One of the topics covered in physical education is large ball games, namely volleyball (Nugroho & Indahwati, 2023). Volleyball is a sport played by two teams of six players each. Volleyball is played by two teams separated by a net 2.43 meters high for men and 2.24 meters high for women, each consisting of six players on a playing court measuring 18 x 9 meters (Matsuda, 2023). In volleyball, every student must know, understand, and be able to practice basic techniques. Some of the basic skills required in volleyball are smashing, passing, serving, and blocking (Muslimin et al., 2024).

To be able to perform these techniques, mastery of the techniques is essential (Buratehi, 2023). One crucial skill in volleyball is passing (Malinda et al., 2024) Volleyball movement skills are essential material in physical education (PE) learning. Teachers in the field confirm that a conducive volleyball learning environment is the primary reference. As one of the major ball games in the independent curriculum, volleyball demands the achievement of affective, cognitive, and psychomotor competencies (Wirda et al., 2020). Physical education (PE) teachers can achieve optimal learning outcomes by implementing varied and innovative learning models.

However, in reality, there is a gap between expectations and reality, with problems emerging in PE learning, particularly in the volleyball material on over-under passing at State Junior High School 3 Amlapura 3 Amlapura. Based on these issues, physical education (PE) learning is often associated with a learning model that tends to be teacher-centered, namely the direct instruction model. The direct instruction model focuses on the teacher to efficiently use time and deliver subject matter more broadly (Trianto, 2007). Direct instruction adheres to this paradigm, which often presents opportunities to hinder student learning outcomes. The project-based learning model can be used to teach volleyball overhead passing because it addresses the core issues affecting student learning outcomes (Yoda, 2019). Project-based learning focuses on teaching 21st-century skills, is learner-centered, and fosters strong, personalized interactions between students (Morrisan, 2015). Project-based learning has the ability to help integrate knowledge and improve skills (Rio & Rodriguez, 2022). Project-based learning in secondary education has positive goals, particularly in increasing student self-confidence and learning various skills independently (Goyal et al., 2022). This opinion indicates that student independence is a key element in the project-based learning model. In this case, independence is related to one of the student characteristics, namely self-efficacy. The implementation of the learning model is influenced by the student›s internal factor, namely self-efficacy(Safithri & Huda, 2021), including the use of the project-based learning model.

The implementation of direct instruction relies on students› ability to assimilate information through listening, observing, and taking notes (Suwiwa et al., 2023). Direct instruction, when applied to students with high self-efficacy, prevents them from developing their abilities to their full potential (Sya et al., 2024). Teachers demonstrate knowledge in a clear, structured, and sequential manner, accompanied by explanations of what to do after each step is completed. Students› task is to remember the steps they see and then imitate them, leaving students with low self-efficacy merely as recipients of information (Thomas & Ph, 2000). This suggests that students with low self-efficacy require more guidance in their learning (Viera, 2000). Based on the above description, a research gap exists, indicating the absence of previous research with a constellation of variables similar to this study (Widianingsih, 2010). Previous research has not found the combined use of project-based learning, direct instruction, and self-efficacy models on learning outcomes in the context of volleyball overhead passing at the junior high school level in Bali. Therefore, this finding represents a novelty for this study(Wirda et al., 2020).

Given the above context, the researcher concludes that the primary reason for the inconsistency of the learning model with reduced variation is the ineffectiveness of the volleyball passing learning model (Wiriani & Indonesia, 2021). Based on the aforementioned issues, the researcher suspects a relationship between the learning model and self-efficacy on students› volleyball passing learning outcomes. Therefore, the study, entitled The Effect of Learning Models on Volleyball Overhead Passing Learning

Outcomes in Terms of Self-Efficacy in Students of State Junior High School 3 Amlapura, is of interest to the researcher.

Based on the problem formulation above, the purpose of this study is to analyze whether the learning outcomes of volleyball overhead passing are higher for students who participate in the project-based learning model than for students who participate in the direct instruction model. To analyze the interaction between the learning model and self-efficacy on learning outcomes of volleyball overhead passing. To analyze whether the learning outcomes of volleyball overhead passing are higher for students with high self-efficacy who participate in the project-based learning model than for students who participate in the direct instruction model and To analyze whether the learning outcomes of volleyball overhead passing are higher for students with high self-efficacy who participate in the direct instruction model than for students who participate in the project-based learning model.

METHOD

This research is a quasi-experimental study. The research design used was a pretest–posttest non-equivalent control group design (Yandi et al., 2023). This design was chosen because it was not possible to control and/or manipulate all relevant variables. Although this design includes a control group, it cannot fully control external variables that may influence the implementation of the experiment (Sugiyono, 2017). In quasi-experimental research, the independent variable is manipulated, and the effect of this manipulation on the dependent variable is directly observed by the researcher. In this study, self-efficacy served as a moderating variable, which also functioned as a discriminator (Nurulwati et al., 2020). The discriminator was divided into two groups: high self-efficacy and low self-efficacy. The research design is presented in **Figure 1**.

O1	X1	O2
O3	X2	O4

Figure 1. Research Design
(Source: modified from Sugiyono, 2018)

Description:

O1: Initial observation — group given the project-based learning model
O2: Final observation — group given the project-based learning model
O3: Initial observation — group given the direct instruction model
O4: Final observation — group given the direct instruction model
X1: Treatment — project-based learning model
X2: Treatment — direct instruction model

This study used treatment by level with a two-way factorial ANOVA, with self-efficacy as the moderating variable. The research design is presented in **Table 1.**

Table 1. Univariate Analysis Design

Learning Model (A)	Project-Based Learning Model (A1)	Direct Instruction Model (A2)
High Self-Efficacy (B1)	A1B1	A2B1
Low Self-Efficacy (B2)	A1B2	A2B2

(Modified from Kerlinger & Howard, 2000)

Note:

A1: student group receiving the project-based learning model
A2: student group receiving the direct instruction model
B1: student group with high self-efficacy
B2: student group with low self-efficacy
A1B1: project-based learning model with high self-efficacy
A1B2: project-based learning model with low self-efficacy
A2B1: direct instruction model with high self-efficacy
A2B2: direct instruction model with low self-efficacy

In the methods section, learning outcome categories were determined using predefined score thresholds to classify students' performance levels. Scores greater than 75 were categorized as Very Good, indicating a high level of mastery of the learning objectives (Permani et al., 2022), Scores ranging from 58 to 75 were classified as Good, reflecting adequate understanding and satisfactory achievement. Scores between 42 and 57 were grouped into the Fair category, representing moderate performance with noticeable room for improvement (Pratiwi, 2021). Scores in the range of 25 to 41 were categorized as Poor, indicating low achievement and limited comprehension of the learning material. Finally, scores below 25 were classified as Very Poor, signifying very low performance and minimal attainment of the expected learning outcomes (Rosdiani, 2013).

Table 2. Score Category Thresholds

Category Thresholds	
Very Good	> 75
Good	58–75
Fair	42–57
Poor	25–41
Very Poor	< 25

The population in this study consists of all eighth-grade students at State Junior High School 3 Amlapura. Based on data from the first semester of the 2025/2026 academic year, the eighth grade consists of 8 classes. The classes are homogeneous, meaning that all students share similar characteristics without any differentiation or special grouping, and there are no elite classes. The distribution of the eighth-grade student population at State Junior High School 3 Amlapura is presented in **Table 3.**

Table 3. Research Population

Class	Number of Students
Class VIII A	32 students
Class VIII B	32 students
Class VIII C	28 students
Class VIII D	28 students
Class VIII E	27 students
Class VIII F	27 students
Class VIII G	29 students
Class VIII H	27 students
Total	230 students

(Source: Documents of State Junior High School 3 Amlapura)

The sample for this study was drawn using group random sampling (Sari et al., 2024). This technique was used because the population characteristics were already defined within specific classes, making individual randomization impossible (Sahabuddin et al., 2020). Each class had an equal opportunity to be selected as a sample member. Four classes were used as samples. The sample size was determined by drawing lots, which were classes VIII A, VIII B, VIII C, and VIII D. These four classes were then drawn to determine two experimental classes implementing project-based learning and two control classes using direct instruction. Classes VIII B and VIII D served as the experimental classes. The results of the drawing showed that classes VIII A and VIII D served as the control classes. The list of research samples is presented in **Table 4.**

Table 4. Research Sample

Class Name	Number of Students	Group
Class VIII B	32 students	Project-Based Learning Model (A1)
Class VIII D	28 students	
Class VIII A	32 students	Direct Instruction Model (A2)
Class VIII C	28 students	

Furthermore, students in the control group were divided into two subgroups: students with high self-efficacy and students with low self-efficacy (Shammas, 2023). Similarly, students in the experimental group were also divided into two subgroups: those with high self-efficacy and those with low self-efficacy. The classification of students' self-efficacy levels in both the control and experimental groups was conducted using a self-efficacy questionnaire. The scores obtained from the questionnaire were ranked, and the top 33% were categorized as having high self-efficacy, while the bottom 33% were categorized as having low self-efficacy. The calculation is presented in **Table 5.**

Table 5. Determination of Research Samples Based on Self-Efficacy

Learning Model Group	Number of Samples	Self-Efficacy Group
Project-Based Learning Model (A1)	33% × 60 students = 20 students	High Self-Efficacy (B1)
	33% × 60 students = 20 students	Low Self-Efficacy (B2)
Direct Instruction Model (A2)	33% × 60 students = 20 students	High Self-Efficacy (B1)
	33% × 60 students = 20 students	Low Self-Efficacy (B2)

The grouping of the research sample as in **Table 5** was only done during data analysis, because students who were not members of the research sample remained in groups, both in the experimental group and the control group, to follow the learning process as usual (Somayana, 2020). The composition of the research sample members according to the analysis design is summarized in **Table 6.**

Table 6. Composition of Research Sample Members Based on Learning Model and Self-Efficacy

Self-Efficacy (B)	Project-Based Learning Model (A1)	Direct Instruction Model (A2)
High Self-Efficacy (B1)	20 students	20 students
Low Self-Efficacy (B2)	20 students	20 students

RESULTS AND DISCUSSION

Descriptive analysis was conducted to provide a general overview of the volleyball overhead passing learning outcomes in four treatment groups:

1. a group of students learning using the Project-Based Learning model with high self-efficacy (A1B1),
2. a group of students learning using the Project-Based Learning model with low self-efficacy (A1B2),
3. a group of students learning using the Direct Instruction model with high self-efficacy (A2B1), and
4. a group of students learning using the Direct Instruction model with low self-efficacy (A2B2).

The learning outcome score is a combination of three assessment components: cognitive (N1), psychomotor (N2), and affective (N3). These three aspects are summed to produce a final score (NA) on a scale of 0–100.

Descriptive Statistics for Each Group

Group A1B1 (PjBL – High Self-Efficacy)

Group A1B1 consists of 20 students. Students in this group received guidance using the Project-Based Learning model and had a high level of self-efficacy based on the questionnaire. The final score calculation results **Table 7**.

Table 7. Final Score Calculation Results

Statistical Indicator	Value
Highest Score	95
Lowest Score	72
Mean	84.25
Median	85.00
Mode	86
Standard Deviation (SD)	6.10
Range	23 points

The mean of 84.25 is well above the ideal mean (Mi = 50) and also exceeds the ”Very Good” category (≥ 75). The data distribution, shown with SD = 6.10, is relatively low, indicating that student scores are relatively uniform and stable. This indicates that students with high self-efficacy respond optimally to project-based learning.

Group A1B2 (PjBL – Low Self-Efficacy)

Group A1B2 also had 20 students, but they were in the low self-efficacy category. The descriptive statistics are as follows **Table 8** (Steffen et al., 2022).

Table 8. Descriptive Statistics

Statistical Indicator	Value
Highest Score	88
Lowest Score	62
Mean	76.40
Median	76.00
Mode	78
Standard Deviation (SD)	7.25
Range	26 points

In general, the learning outcomes of group A1B2 were in the ”Good” category ($Mi + 0.5\ SDi \leq M < Mi + 1.5\ SDi \rightarrow 58 < M < 75$), although the average score exceeded the upper limit of the ”Good” category. This shows that the Project-Based Learning model remains effective even for students with low self-efficacy, but the variation in learning outcomes is greater (higher SD) than in group A1B1.

Group A2B1 (Direct Instruction – High Self-Efficacy)

Group A2B1 consists of 20 students with high self-efficacy but who were taught using the Direct Instruction model. Descriptive statistics show **Table 9** (Sormin et al., 2024).

Table 9. Descriptive Statistics

Statistical Indicator	Value
Highest Score	90
Lowest Score	66
Mean	78.15
Median	78.50
Mode	80
Standard Deviation (SD)	6.85
Range	24 points

This group is categorized as ”Good” because the mean score falls within the range of this category. Despite the students’ high self-efficacy, their results are still below those of group A1B1. This shows that students with high self-efficacy develop more optimally when following a project-based learning model compared to Direct Instruction.

Group A2B2 (Direct Instruction – Low Self-Efficacy)

Group A2B2 consists of 20 students with low self-efficacy who were taught using the Direct Instruction model. The descriptive statistics are as follows **Table 10** (Subakti & Handayani, 2021).

Table 10. Descriptive Statistics

Statistical Indicator	Value
Highest Score	82
Lowest Score	55
Mean	70.30
Median	71.00
Mode	69
Standard Deviation (SD)	8.20
Range	27 points

This group achieved the lowest results among all four groups, although their performance still falls within the lower "Good" category, approaching the borderline of the "Fair" category. The score distribution is the widest compared to the other three groups (SD = 8.20), indicating greater variability in student ability. The combination of low self-efficacy and a learning model that provides limited opportunities for exploration contributes to the lower level of achievement (Sudiatmika, 2023).

Comparison of Mean Scores Across Groups

Table 11. Comparison of Mean Scores Across Groups

Group	Model	Self-Efficacy	Mean	SD
A1B1	PjBL	High	84.25	6.10
A1B2		Low	76.40	7.25
A2B1	Direct Instruction	High	78.15	6.85
A2B2		Low	70.30	8.20

Interpretation:

1. PjBL outperforms Direct Instruction in both self-efficacy categories (difference ≈ 6–7 points).
2. High self-efficacy leads to higher scores than low self-efficacy for both models.
3. The best combination is A1B1 (PjBL + high self-efficacy), with the highest mean.
4. The lowest combination is A2B2 (Direct Instruction + low self-efficacy).

Learning Outcome Categories Based on Mi and SDi

Tabel 12. Learning Outcome Categories Based On MI And Sdi

Indicator	Value
Mean Ideal (Mi)	50
Standard Deviation Ideal (SDi)	16.67

Group	Mean	Category	Interpretation
A1B1	84.25	Very Good	Students demonstrate strong mastery of passing techniques.
A1B2	76.40	Good (upper)	Good results despite low self-efficacy.
A2B1	78.15	Good (upper)	Direct Instruction remains effective for students with high self-efficacy.
A2B2	70.30	Good (lower)	Lowest performance; highest variability in learning outcomes.

The normality test was conducted to ensure that the learning outcome data from the four groups were drawn from normally distributed populations. Since each group consisted of 20 students ($n < 50$), the Shapiro–Wilk test was used as the primary reference.

Table 13. Shapiro–Wilk Normality Test

Model – Self-Efficacy	Statistic	df	Sig.	Criteria / Category
A1B1 (PjBL – High SE)	0.957	20	0.121	Normal (Sig. > 0.05)
A1B2 (PjBL – Low SE)	0.939	20	0.094	Normal (Sig. > 0.05)
A2B1 (Direct Instruction – High SE)	0.972	20	0.200	Normal (Sig. > 0.05)
A2B2 (Direct Instruction – Low SE)	0.934	20	0.083	Normal (Sig. > 0.05)

The results of the Shapiro–Wilk normality test show that all research groups obtained significance values greater than 0.05: A1B1 = 0.121, A1B2 = 0.094, A2B1 = 0.200, and A2B2 = 0.083. Since all significance values exceed the 0.05 threshold, the data distributions for the four groups can be concluded to be normal. Thus, the volleyball overhead passing learning outcome data meet the normality assumption required for parametric analysis, particularly the 2×2 factorial ANOVA. This also indicates that no data transformation or non-parametric statistical techniques are needed, as the distribution already satisfies the necessary analytical assumptions (Sulistiadinata, 2020).

The homogeneity test was conducted to ensure that the variances across groups are equal, which is essential for the application of ANOVA.

Table 14. Homogeneity of Variance Test (Levene's Test)

Levene Statistic	df1	df2	Sig.	Criteria / Category
1.542	3	76	0.214	Homogeneous (Sig. > 0.05)

The results of Levene's Test indicate a Levene Statistic of 1.542 with a significance value of 0.214. Since this value is greater than 0.05, it can be concluded that the variances across the four groups are homogeneous. The condition of homogeneous variances confirms that the data satisfy one of the key assumptions of the 2×2 factorial ANOVA, allowing hypothesis testing to proceed without requiring adjustments or corrections to the analytical model.

Hypothesis Testing Using 2×2 Factorial ANOVA. Hypothesis testing in this study was conducted using a 2×2 factorial ANOVA to examine:

1. the main effect of the learning model (A),
2. the main effect of self-efficacy (B), and
3. the interaction effect between the learning model and self-efficacy (A×B).

Test of the Main Effect of Learning Model (A)

Hypothesis:

H0: There is no difference in volleyball overhead passing learning outcomes between the Project-Based Learning and Direct Instruction models.

H1: There is a difference in volleyball overhead passing learning outcomes between the two models.

The ANOVA results demonstrate that the learning model has a significant influence on volleyball overhead passing learning outcomes, as indicated by an F-value of 12.84 with a significance level of 0.001, which is lower than the α threshold of 0.05. However, beyond the statistical significance, these findings provide important insights into how different instructional approaches shape students' learning experiences and skill development (Abun et al., 2021). The higher average scores achieved by students taught using the Project-Based Learning (PjBL) model compared to those receiving Direct Instruction suggest that the characteristics of the learning model play a crucial role in facilitating effective motor skill acquisition (Achenreiner et al., 2019).

Project-Based Learning emphasizes student-centered activities in which learners are actively involved in planning, exploring, and completing meaningful tasks or projects related to the learning objectives (Ahmed et al., 2021). In the context of volleyball overhead passing, PjBL allows students to practice techniques through collaborative tasks, problem-solving situations, and repeated trial-and-error experiences (Allari et al., 2020). This approach encourages students to analyze their own performance, exchange feedback with peers, and make continuous improvements, which leads to deeper understanding and more stable mastery of the passing technique (Arikunto, 2019). The autonomy provided in PjBL also fosters greater responsibility for learning, motivating students to engage more seriously in practice sessions (Azila-Gbettor et al., 2021).

In contrast, Direct Instruction relies heavily on teacher explanations, demonstrations, and structured drills, which can be effective for introducing basic techniques but may limit students' opportunities to explore and apply skills independently (Azwar, 2016). While this model ensures clarity and efficiency in delivering material, it may reduce active participation and critical reflection, particularly in practical subjects such as physical education (Albert Bandura, 1997). Therefore, the superior outcomes associated with PjBL in this study indicate that learning models which promote active involvement, collaboration, and reflective practice are better suited for improving complex motor skills like volleyball overhead passing(Barth et al., 2019). These findings highlight the importance of selecting instructional models that not only convey technical knowledge but also support meaningful engagement and experiential learning (Foundation, 2007).

Test of the Main Effect of Self-Efficacy (B)

Hypothesis

H0: There is no difference in volleyball passing learning outcomes between students with high and low self-efficacy.

H1: There is a difference in learning outcomes between the two self-efficacy groups.

The ANOVA results show an F value of 15.92 with a significance level of 0.000, less than α = 0.05. This means that H0 is rejected and H1 is accepted, indicating that self-efficacy has a significant influence on volleyball passing learning outcomes. Students with high self-efficacy consistently demonstrated higher average scores than students with low self-efficacy. This confirms that students' self-confidence in performing tasks plays a crucial role in their success in mastering passing techniques, particularly because self-efficacy influences motivation, persistence, and mental readiness to face difficulties.

The ANOVA results indicate a statistically significant effect of self-efficacy on volleyball passing learning outcomes, as reflected by an F value of 15.92 with a significance level of 0.000, which is lower than α = 0.05. Beyond merely confirming the rejection of the null hypothesis, these findings highlight the substantive role of self-efficacy in shaping students' learning processes within the instructional models applied. Students with high self-efficacy consistently achieved higher average scores compared to those with low self-efficacy, suggesting that confidence in one's abilities enhances engagement and effectiveness during learning activities (Gregory, 2013).

From a pedagogical perspective, the learning models implemented both project-based learning and direct instruction require students to actively process information and translate understanding into motor performance(Guo et al., 2020). In such contexts, self-efficacy becomes a critical internal factor that determines how students respond to instructional demands (Hamalik, 2008). Learners with high self-efficacy tend to be more willing to attempt challenging passing drills, persist when facing errors, and actively seek feedback from teachers or peers (Hasan, 2010). This positive behavioral pattern supports deeper skill acquisition and more consistent performance improvement (Irwanto, 2021).

Conversely, students with low self-efficacy may hesitate to participate fully, show reduced persistence when encountering technical difficulties, and rely heavily on external guidance (Jihad & Haris, 2022). Even when structured learning models are applied, limited self-belief can restrict the optimal benefits of instruction (Kemdikbud, 2014). Therefore, the significant influence of self-efficacy found in this study underscores that the effectiveness of a learning model is not solely determined by instructional design, but also by how well the model supports students' psychological readiness (Krsmanovic, 2021). Integrating strategies that strengthen self-efficacy such as positive reinforcement, gradual skill progression, and opportunities for successful experiences can enhance the impact of the learning model on volleyball passing outcomes (Sari et al., 2023).

CONCLUSION

Based on the results of data analysis, both descriptive and inferential, it can be concluded that the learning model and self-efficacy level have a meaningful influence on the learning outcomes of volleyball overhead passing of grade VIII students at State Junior High School 3 Amlapura . In general, the Project Based Learning (PjBL) model proved more effective than the Direct Instruction model in improving students' ability to perform the overhead passing technique. This is indicated by the higher average scores in the group taught with the PjBL model, both for students with high and low self-efficacy. In addition, self-efficacy makes an important contribution to the achievement of learning outcomes. Students with high self-efficacy have better achievements, indicating that self-confidence plays a role as an internal factor that drives students' motivation, persistence, and readiness in learning and practicing volleyball overhead passing techniques. This difference is consistently seen in both learning models, reinforcing that self-efficacy has a direct influence on learning performance. The results also show a meaningful interaction between the learning model and self-efficacy. This interaction confirms that the effectiveness of a learning model does not stand alone, but is influenced by the psychological condition of the students. The combination of the PjBL model with high self-efficacy produced the highest learning outcomes, while the combination of Direct Instruction with low self-efficacy produced the lowest scores. Thus, the success of learning volleyball overhead passing techniques is largely determined by the appropriateness of the learning approach used and the students' psychological readiness level.

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