Direct Instruction and Teaching Games for Understanding in Volleyball Learning

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Abstract

This study aimed to compare the effectiveness of the Direct Instruction (DI) and Teaching Games for Understanding (TGFU) learning models in improving volleyball game performance among beginner-level extracurricular participants at State Junior High School 12 Bandung. A quasi-experimental method with a pretest-posttest nonequivalent group design was used. The sample taken in this study consisted of 10 students, each divided into two groups: DI (n=5) and TGFU (n=5). In this study, the Game Performance Assessment Instrument was used as the research instrument. Statistical hypotheses were tested using paired sample t-test and independent sample t-test. The results showed that both models significantly improved volleyball game performance ($p < 0.05$). However, the improvement in the DI group (mean pretest 41.12 to posttest 85.80) was significantly higher than in the TGFU group (mean pretest 41.00 to posttest 63.40). the independent sample t-test showed a significant difference between the two groups ($p = 0.000$). It was concluded that H0 is rejected and Ha is accepted, so the DI model is more effective in improving volleyball game performance among beginners with low basic technical skills, likely due to its structured, technique-focused approach. These findings provide practical implications for physical education teachers in selecting and sequencing learning models according to student foundational skill levels.

How to Cite

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INTRODUCTION

Physical Education, Sports and Health (PE) is the one of a fundamental study of national education that aimed to develop students physical, cognitive and social-emotional competencies. this objective is very aligned with the target of Indonesia's Merdeka Curriculum, which focus to student competency-based with differentiated learning, teachers are pushed to encourage the adoption of instructional models that are effective, engaging, and adjusted to student characteristics (Standar et al., 2022). Volleyball is one of the most popular sports with teams in schools. this sport requires not only technical

mastery of skills to play, such as several techniques, serving, passing, and spiking, but also mastery of tactical awareness and in-game decision-making (Mahendra, 2017). Two famous pedagogical models was frequently discussed in sports education research are Direct Instruction (DI), this explain structured learning is done with a teacher-centered approach focusing on player skill repetition and correction (Casey & MacPhail, 2018). and Teaching Games for Understanding (TGFU) are student-centered based, using tactical approaches that focus on understanding how the game is played, and how players make adaptive decision-making (Griffin & Butler, 2005; Harvey et al., 2020). According to a systematic review and meta-analysis of game interventions in teaching comprehension, TGfU consistently improves decision-making outcomes across multiple educational stages. The review also emphasized TGfU›s strengths in tactical learning, even compared to conventional teaching approaches that focus on technical aspects (González-Valero et al., 2024). These models explain how highly contrasting aspects of technical proficiency and philosophy versus tactical intelligence, both of which are very important for holistic volleyball performancein a game.

Initial observations were conducted in the volleyball extracurricular program in junior high school 12 Bandung. These observations revealed that most early adolescent students struggled to master basic volleyball techniques. Their performance during play was inconsistent, with errors predominantly occurring in passing and serving, and a lack of tactical awareness throughout the game. Student participation was recorded as low during theory-based sessions, but increase while practice, although there›s no improvement corresponding in execution

or decision-making skills. This gap in both engagement and performance shows that conventional teaching methods do not meet students› needs, especially when integrate game techniques with tactical understanding on game in a real-game context.

Previous research has shown that DI is effective for understanding fundamental techniques. Direct instruction is very effective for beginning students in improving basic technical skills because it emphasizes structured instructional sequences, clear demonstrations, guided practice, and immediate feedback (Bessa et al., 2021). While TGFU excels in tactical aspects and student motivation. In a study focused on U-12 students, (Sierra-Ríos et al., 2020). Conducted a comparative analysis between Direct Instruction and Game Teaching for Understanding. They concluded that while both teaching approaches contributed to learning outcomes, the Game Teaching program was more effective in improving tactical behavior and decision-making during games, while the Direct Instruction program was more effective in improving tactical game-related performance. Although this study was conducted in a soccer context, it provides relevant information on the differences between technical and traditional teaching models in Physical Education. Therefore, few studies have directly compared the two models in the specific context of volleyball extracurricular activities at the junior hight school level using a holistic instrument like the Game Performance Assessment Instrument (GPAI). This study aims to fill that gap by testing and comparing the effectiveness of both models in improving overall volleyball game performance in an extracurricular setting.

The novelty of this study lies in the direct comparison between Direct Instruction and Teaching Games for Understanding methods in the context of extracurricular volleyball activities at the junior high school level. This study specifically involved beginner students with low basic abilities and used the Game Performance Assessment Instrument (GPAI) as a holistic assessment tool that encompasses technical skills, decision-making, and participation in the game. The finding that Direct Instruction is more effective than TGFU in improving overall game performance for beginner players provides a new contribution in selecting and sequencing learning models that are appropriate to the characteristics and initial ability levels of students.

Based on the theoretical gap and empirical need identified above, this study aims to address

the following questions; (1) How does the Direct Instruction model influence the improvement of volleyball game performance in junior high school extracurricular participants?, (2) How does the Teaching Games for Understanding model influence the improvement of volleyball game performance in junior high school extracurricular participants?, (3) Is there a significant difference in effectiveness between the Direct Instruction and Teaching Games for Understanding models in improving volleyball game performance?

To empirically address these reasearch questions and achieve the study's objectives, the following statistical hypotheses were formulated and tested:

1. H0: There is no improvemnet in volleyball game performance after the application of the DI model. Ha: There is an improvement in volleyball game performance after the application of the DI model.

2. H0: There is no improvement in volleyball game performance after the application of the TGFU model. Ha: There is an improvement in volleyball game performance after the application of the TGFU model.

3. H0: There is no difference in the improvement of volleyball game performance between the DI and TGFU models. Ha: There is a difference in the improvemnet of volleyball game performance between the DI and TGFU models.

METHOD

The approach used in this study is quasi-experimental by dividing research respondents into groups with non-equivalent pretest and posttest. The research design is illustrated schematically in **Figure 1.**

As shown in **Figure 1**, the participants were students from the volleyball extracurricular program at junior high school 12 Bandung, Indonesia. The total population consisted of 10 students, all of whom were included as samples through saturated sampling. Using the ABBA matching technique based on initial ability scores from the pretest, participants were systematically distributed into two groups to ensure baseline equivalence: the Direct Instruction (DI) group (n=5) and the Teaching Games for Understanding (TGFU) group (n=5). The research instrument used was the Game Performance Assessment Instrument (GPAI) (Oslin et al., 1998). All games were recorded on video, which was then evaluated and reviewed by coaches who are competent in their respective fields, referring to the

GPAI protocol, which serves as a standard for determining inter-rater reliability in this study. This reliability had previously been investigated to verify the consensus procedure between the evaluators before proceeding to the data analysis stage.
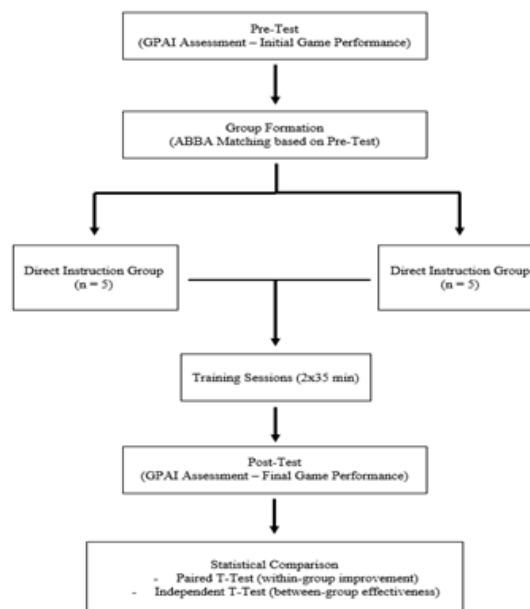

Figure 1. Experimental Design of the Study (Developed by the authors)

Next, data collection followed the flowchart sequence in **Figure 1.** Both groups completed identical pre-test assessments using the GPAI. The data collected consisted of quantitative GPAI scores obtained from the pre-test and post-test assessments. Then, every assigned group in the game participated in eight structured training sessions 2 x 35 minutes per session, that implemented respective instructional approach. The characteristics of the DI program emphasize the use of clear instructions, modeling, and repetitive practice to acquire technical skills, whereas the TGFU program is game-oriented, designed to train tactical reliability and decision-making. The intervention phase will begin once each group has completed the post-test assessment corresponding to the previously conducted pre-test.

Quantitative data obtained from the GPAI assessment were analyzed using IBM SPSS software. The analysis was carried out by verifying parametric assumptions through the Shapiro-Wilk normality test and Levene's homogeneity test, hypothesis testing was also carried out using a paired sample t-test to check whether there was an increase in the group and an independent sample t-test to compare the effectiveness of the learning models that had been carried out, with

significance determined by a value of α = 0.05.

RESULTS AND DISCUSSION

This study was conducted during the volleyball extracurricular program at junior high school 12 Bandung over a period of eight instructional sessions, each lasting 2 × 35 minutes. The study participants consisted of 10 junior high school students who were members of an extracurricular volleyball program. Before the study, all participants completed a pretest using the Game Performance Assessment Instrument (GPAI) to assess their baseline volleyball performance.

To ensure equivalence between groups, an ABBA matching technique based on pre-test scores was applied. The groups were then divided into two groups: the Direct Instruction (DI) group (n = 5) and the Teaching Games for Comprehension (TGFU) group (n = 5). Both groups received the instructed treatments, each for a similar duration and under similar conditions. After the intervention phase, post-test was conducted using the same GPAI procedure. This section describes the results of the intervention and explains the findings and how they relate to the research questions, relevant learning theories, and previous studies

Effect of Direct Instruction on Volleyball Game Performance

Table 1 explains the descriptive statistics of GPAI scores for the Direct Instruction group before and after the intervention.

Table 1. GPAI Scores of the Direct Instruction Group

Test	Mean	Std. Dev	Information
Pretest	41,12	8,72	significant
Posttest	85.80	3.19	

The results of this study indicate a significant increase in the average GPAI score of the DI group from pretest to posttest. Analysis of statistics using test-t theory which shows that paired samples show that the increase is significant (p < 0,05) which reflects the DI model has a positive and significant impact on student volleyball performance.

The results of this study align with teaching practices that emphasize structured demonstrations, guided practice, and direct feedback to learners (Harvey & Jarrett, 2014). This method is particularly effective for beginner students who require clear instruction during the initial skill acquisition stage. Structured and systematic direct instruction helps students improve technical execution and game performance. This improvement can be observed through skill execution and decision-making indicators assessed using the Game Performance Assessment Instrument (GPAI) (Stephen A. Mitchell, Judith L. Oslin, 2013).

These findings are consistent with previous research showing that direct instruction (DI) effectively improves students' technical skills through structured practice and guidance (Bessa et al., 2021). Furthermore, physical education offers additional benefits by increasing student engagement, responsibility, and confidence. This study also demonstrates that the development of technical fundamentals can be implemented and integrated into formal education (Bessa et al., 2020).

Effect of Teaching Games for Student Understanding on Volleyball Game Performance

The impact of this game-based learning also contributed to the improvement of basic technical skills in the DI group, enabling them to gain a comprehensive understanding of volleyball performance. Research on secondary school students using TGfU demonstrates notable increases in student engagement and enjoyment throughout learning in addition to technical results (Batez et al., 2021). Descriptive statistics for the Game-Based Learning group as material for understanding are presented in **Table 2.**

Table 2. GPAI Scores Of The Teaching Games For Understanding Group

Test	Mean	Std. Dev	Information
Pretest	41,00	10.95	correlation
Posttest	63.40	2.41	

Using the TGFU method, the results show that the TGFU group simultaneously experienced an increase in GPAI scores from pretest to posttest, as evidenced by the paired sample t-test with a p-value <0.05. This indicates a correlation between TGFU and volleyball performance.

Games that are modified with the aim of training tactical awareness and quick decision-making are applied through the TGFU method (Griffin & Butler, 2005). This method enables students to analyze game situations responsively to make their best decisions in the game, which will be evaluatively reviewed using GPAI.

The Teaching Games for Understanding (TGfU) model prioritizes tactical understanding and game performance over the separate mastery of technical skills. In contrast, Direct Instruction (DI) focuses on structured practice of basic

techniques (Rachman, 2008). To ensure that novice players can participate effectively in game-based learning, TGfU may require careful adaptation and support of tasks. This is due to TGfU's focus on the context of play and problem-solving. This pedagogical emphasis demonstrates a distinct educational goal, despite inherent shortcomings, and suggests that TGfU design should be tailored to the learner's initial skill level. In a recent experimental study comparing TGfU and direct instruction in volleyball classes, no significant differences were found in tactical-technical performance between the two models. However, the TGfU group demonstrated more student-focused outcomes, such as their perceptions of teamwork (Arantes et al., 2025).

Comparison Between Direct Instruction and Teaching Games for Understanding

Experimental data indicates that Teaching Games for Understanding (TGfU) and direct instruction interact to affect technical results in volleyball practice. This implies that compared to TGfU, the DI model might enhance initial technical performance more (Dona et al., 2024).

Findings from the study tested using an independent t-test showed that the post-test significance value with GPAI was $p < 0.001$, where DI was more effective than TGFU.
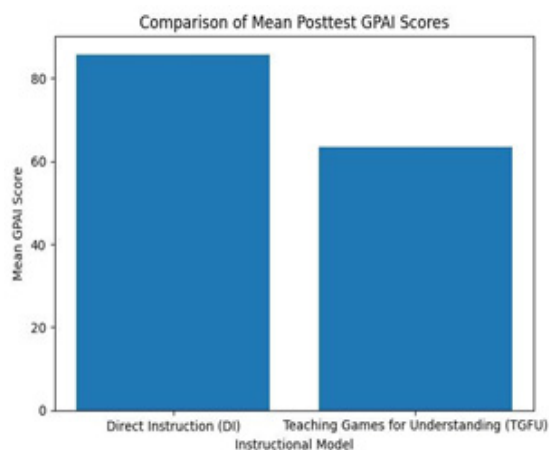

Figure 2. Comparison of Mean GPAI Posttest Scores Between DI and TGFU Groups

Figure 2 presents a comparison of the mean post-test GPAI scores between the DI and TGFU groups based on the results of the independent sample t-test analysis that has been conducted. Figure 2 shows that the Direct Instruction group achieved a higher mean post-test GPAI score (M = 85.8) than the Teaching Games for Understanding group (M = 63.4). This indicates that students taught using Direct Instruction de-

monstrated superior overall volleyball game performance compared to students taught using the Teaching Games for Understanding approach.

These findings indicate that Direct Instruction is more effective than Games for Understanding in improving volleyball performance among junior high school extracurricular participants. These results support previous comparative studies in the volleyball learning context, which reported that Direct Instruction tends to be more effective in improving technical execution, while tactical approaches are superior in developing decision-making skills (Sierra-Ríos et al., 2020).

Because GPAI integrates various frameworks, including skills in execution and decision-making. Based on the experiment, DI provided superior technical improvements and contributed substantially to the overall score in the experiment. This was observed in students with low technical skills. After using the DI method, it was observed that there was an improvement in overall game performance rather than just an improvement in tactical skills.

Synthesis of Findings

Based on the results of the within-group and between-group analyses that have been conducted, the following synthesis summarizes the overall findings of this study.

Both Direct Instruction and the Game Teaching for Understanding approach positively improve the performance and volleyball skills of students participating in extracurricular activities at the junior high school level, although Direct Instruction tends to produce greater improvements compared to TGFU.

In implementing training methods, it is also important to consider the students' initial technical abilities as well as their learning needs. For beginner players, the Direct Instruction (DI) method is more suitable for mastering basic techniques, which will serve as a foundation for playing more effectively. For players who already possess adequate basic technical skills, the Teaching Games for Understanding (TGFU) method is more appropriate for teaching tactics and proper decision-making skills. A combination of both methods will constitute an effective formula for maximizing training outcomes, particularly in middle school volleyball extracurricular activities.

CONCLUSION

From the research presentation above, it can be concluded that both the DI and TGFU learning models, implemented through GPAI,

have been proven effective in demonstrating an improvement in volleyball game performance for junior high school students participating in volleyball extracurricular activities. The application of structured learning interventions contributes positively to enhancing student performance, even though it only occurs for a short period, the results have an overall positive impact.

The findings of this study indicate that a more effective method to enhance performance is DI because a structured approach led by a coach, with clear guidance and instructions, is highly effective in improving basic skills, which is suitable for beginners in the initial stages of learning, compared to methods employed through the TGFU approach.

The TGFU method has been proven effective in improving game performance when students participate in play. Nonetheless, the scores achieved using the TGFU method are still lower than those obtained with the DI method; this finding remains crucial to demonstrate that game-based methods can effectively train tactical skills, decision-making abilities, and more active gameplay patterns. It is worth noting that the TGFU method will be significantly more effective if students have already mastered basic skills to reach the full potential of this approach.

Reviewing this study as a whole highlight the importance of implementing learning models while considering the initial skill levels in volleyball practice. For beginners, Direct Instruction (DI) has proven to be an effective choice for building a strong foundation in technical skills, whereas Teaching the Game for Understanding (TGFU) can be gradually applied at advanced levels to enhance tactical understanding and overall game performance. DI and TGFU can be used complementarily and sequentially in school extracurricular volleyball programs to achieve more comprehensive learning outcomes and significantly more effective improvement.

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