



The Effectiveness of the Teaching Games for Understanding (TGfU) Model in Improving Students' Futsal Game Performance

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Abstract

This study aimed to examine the effectiveness of the Teaching Games for Understanding (TGfU) model in improving students' futsal game performance at SMK Negeri 9 Garut, Indonesia. A quantitative approach employing a quasi-experimental method with a One Group Pretest–Posttest design was adopted. The participants consisted of 30 tenth-grade students selected through purposive sampling. Futsal game performance data were collected before and after the intervention using the Game Performance Assessment Instrument (GPAI). Data were analysed using descriptive statistics, the Shapiro–Wilk normality test, a paired-samples t-test, N-Gain analysis, and effect size. The findings revealed that the implementation of the TGfU model significantly improved students' futsal game performance. The mean score increased from 62.47 in the pretest to 81.63 in the posttest, while the paired-samples t-test indicated a statistically significant difference ($p < 0.05$). The N-Gain score of 0.58 indicated a moderate level of improvement, whereas the effect size demonstrated a large practical impact. These findings suggest that the TGfU model is an effective instructional approach for futsal education, as it enhances game performance, decision-making, tactical understanding, skill execution, and teamwork in authentic game situations.

Keywords: Teaching Games for Understanding (TGfU); futsal game performance; physical education; game-based learning.

INTRODUCTION

Physical Education (PE) is an integral component of the educational system that contributes to the holistic development of students by fostering physical, cognitive, affective, and social competencies through structured movement experiences (Budiman et al., 2025). Contemporary physical education extends beyond the improvement of physical fitness, aiming to cultivate critical thinking, decision-making, collaboration, sportsmanship, and problem-solving skills that emerge during game participation. Therefore, effective physical education instruction should provide meaningful learning experiences by actively engaging students in authentic game situations. In line with the paradigm shift toward student-centred learning, contemporary PE pedagogy encourages learners to construct knowledge, develop tactical understanding, and improve game performance through contextual and experiential learning activities (Casey & MacPhail, 2018; Kirk, 2017; Light, 2023; Metzler, 2017)

Among the various learning contents in physical education, futsal occupies an important position because it represents an invasion game that requires the integration of

technical skills, tactical understanding, decision-making, communication, and teamwork within a fast-paced and spatially constrained environment. These characteristics make futsal an effective medium for simultaneously developing students' motor competence and cognitive abilities. Successful futsal performance is not merely determined by mastery of fundamental technical skills such as passing, dribbling, shooting, and ball control, but also by the ability to apply these skills appropriately according to game situations, anticipate teammates' and opponents' movements, create space, and make rapid and effective decisions (Travassos et al., 2018). Consequently, futsal instruction requires pedagogical approaches capable of integrating technical and tactical learning in order to prepare students to perform effectively in authentic game situations.

Despite its educational potential, futsal instruction in many schools continues to rely predominantly on drill-based instructional approaches, in which repetitive technical practice is emphasised at the expense of tactical understanding and decision-making. As a result, students often develop isolated technical competencies without understanding how and when these skills should be applied during actual gameplay. This instructional approach frequently limits students' ability to make appropriate decisions, maintain effective positioning, create attacking opportunities, and collaborate with teammates during competitive situations. Furthermore, teacher-centred instruction tends to reduce student engagement, intrinsic motivation, and opportunities for independent tactical exploration. Similar findings have been reported in Indonesian physical education settings, where technique-oriented instruction has been found insufficient for developing comprehensive game performance because tactical awareness and decision-making receive limited instructional attention (Festiawan, 2020). Recent international evidence also suggests that traditional skill-based instruction is less effective than game-centred pedagogies in promoting students' tactical behaviour, cognitive engagement, and overall game performance (Ortiz et al., 2023).

One pedagogical model that has been widely recognised as an effective alternative for addressing these limitations is Teaching Games for Understanding (TGfU). Originally proposed by Bunker & Thorpe, (1982), TGfU positions the game itself as the primary context for learning rather than treating technical skills as isolated learning outcomes. Within the TGfU framework, students first analyse game situations, develop tactical awareness, make appropriate decisions, and subsequently perform the technical skills required to solve game-related problems. This pedagogical shift transforms learning from a technique-oriented approach into a holistic understanding of game play. Teachers act primarily as facilitators who design modified games, encourage reflective questioning, and

guide students in discovering tactical solutions independently (Griffin & Butler, 2005). Numerous studies have demonstrated that TGfU enhances students' motivation, engagement, tactical awareness, enjoyment, responsibility, and overall game performance more effectively than conventional technique-based instruction (Harvey & Jarrett, 2014).

Growing empirical evidence has consistently supported the effectiveness of TGfU across various physical education contexts. Pan et al., (2023) reported that TGfU significantly improved students' learning motivation, enjoyment, personal responsibility, and game performance compared with traditional instructional approaches. Likewise, a recent systematic review and meta-analysis conducted by Ortiz et al., (2023) concluded that TGfU consistently enhances game performance, decision-making, tactical behaviour, and psychosocial outcomes among students in physical education. More specifically, Ginciene et al., (2023) found that the implementation of TGfU in futsal instruction significantly improved students' tactical understanding and overall game performance. Previous research has also shown that game-based pedagogical approaches facilitate greater cognitive engagement, adaptive decision-making, and tactical creativity than traditional skill-drill instruction, particularly in invasion games (Memmert, 2015). These findings collectively suggest that game-based learning enables students to acquire technical skills and tactical knowledge simultaneously through meaningful participation in authentic game situations.

Nevertheless, several research gaps remain. Previous studies have primarily focused on improvements in technical skills, learning motivation, or psychosocial variables, whereas relatively few investigations have specifically examined futsal game performance as a multidimensional construct encompassing decision-making, off-the-ball support, skill execution, and positional play during authentic game situations. Furthermore, most existing studies have been conducted in sports other than futsal or within coaching environments rather than school-based physical education, leaving limited empirical evidence regarding the effectiveness of TGfU in Indonesian secondary school settings.

To address these gaps, the present study evaluates the effectiveness of the Teaching Games for Understanding (TGfU) model in improving students' overall futsal game performance. Unlike previous studies that primarily emphasised technical skill acquisition, this research adopts a comprehensive assessment of game performance by examining students' decision-making, off-the-ball support, and skill execution during actual gameplay. These dimensions were measured using the Game Performance Assessment Instrument (GPAI) developed by (Oslin et al., 1998), which provides an authentic assessment framework encompassing both technical execution and tactical performance. Consequently, this study is expected to strengthen the empirical evidence regarding the

implementation of TGfU in school-based futsal instruction while providing practical recommendations for physical education teachers in selecting pedagogical approaches that effectively enhance students' game performance in invasion sports.

Therefore, this study aims to examine the effectiveness of the Teaching Games for Understanding (TGfU) model in improving students' futsal game performance. The findings are expected to contribute to the growing body of knowledge on game-based pedagogical models in physical education and provide practical implications for teachers in designing contextual, student-centred, and tactically oriented futsal learning experiences that enhance students' overall game performance.

METHODS

Research Design

This study employed a quantitative research approach using a quasi-experimental design, specifically the One-Group Pretest–Posttest Design, to examine the effectiveness of the Teaching Games for Understanding (TGfU) model in improving students' futsal game performance. This design enables researchers to evaluate changes in participants' performance by comparing measurements obtained before (pretest) and after (posttest) the intervention within the same group (Creswell & Creswell, 2018).

The study was conducted at SMK Negeri 9 Garut, West Java, Indonesia, during the first semester of the 2025/2026 academic year. The school was selected because it has implemented the Merdeka Curriculum in Physical Education and possesses adequate facilities for futsal instruction.

Participants

The target population comprised all tenth-grade students enrolled in Physical Education (PE) classes at SMK Negeri 9 Garut during the 2025/2026 academic year. Participants were selected using purposive sampling, a non-probability sampling technique in which participants are chosen according to predetermined research criteria

The final sample consisted of 30 tenth-grade students who participated in the futsal learning programme. The selected class was considered representative because students shared similar educational backgrounds, learning schedules, and physical education experiences, as recommended by the PE teacher.

Intervention

Students participated in a TGfU-based futsal learning programme consisting of eight instructional sessions (adjust the number of sessions according to the actual

implementation of the study). Each lesson followed the six instructional stages proposed in the TGfU model: 1) Game Form; 2) Game Appreciation; 3) Tactical Awareness; 4) Decision Making; 5) Skill Execution; 6) Performance.

Throughout these stages, students were encouraged to identify tactical problems, develop appropriate game solutions, make informed decisions, and execute technical skills within modified game situations. Rather than focusing solely on repetitive technical drills, the instructional process emphasised learning through authentic game experiences, enabling students to integrate technical execution with tactical understanding.

Instrument and Data Collection

Students' futsal game performance was assessed using the Game Performance Assessment Instrument (GPAI) developed by (Oslin et al., 1998) GPAI is an authentic assessment tool designed to evaluate players' performance during actual game situations, providing a comprehensive assessment of both technical execution and tactical performance.

The assessment focused on three key performance indicators: 1) Decision Making: the ability to select appropriate tactical decisions according to game situations; 2) Skill Execution: the ability to perform technical skills effectively and efficiently during play; 3) Support: the ability to provide effective off-the-ball support through appropriate movement and positioning.

Data collection was conducted twice. The pretest was administered before the TGfU intervention to determine students' baseline game performance, whereas the posttest was conducted after the completion of all instructional sessions to evaluate improvements in futsal game performance.

To enhance the reliability and objectivity of the assessment, two trained observers independently evaluated students' performances using the GPAI scoring rubric. Prior to data collection, both observers received training to ensure consistency in scoring procedures.

Research Procedure

The study was carried out through the following stages:

1. Administering the GPAI pretest to assess students' initial futsal game performance.
2. Implementing the TGfU-based instructional programme over eight learning sessions.
3. Conducting the GPAI posttest using the same assessment instrument.
4. Comparing pretest and posttest scores to determine the effectiveness of the TGfU intervention.

Data Analysis

Data analysis was performed using IBM SPSS Statistics. Descriptive statistics, including the mean, standard deviation (SD), minimum, and maximum scores, were calculated to describe students' futsal game performance. Data normality was examined using the Shapiro–Wilk test with a significance level of 0.05. The data were considered normally distributed when the significance value exceeded 0.05. To determine whether significant differences existed between pretest and posttest scores, a paired-samples t-test was conducted. Statistical significance was established at $p < .05$. The magnitude of learning improvement was further evaluated using the normalized gain (N-gain) proposed by (Hake, 1999).

RESULTS AND DISCUSSION

Results

This study aimed to examine the effectiveness of the Teaching Games for Understanding (TGfU) model in improving students' futsal game performance at SMK Negeri 9 Garut, Indonesia. Students' game performance was assessed using the Game Performance Assessment Instrument (GPAI) before (pretest) and after (posttest) the implementation of the TGfU intervention.

The descriptive statistical analysis revealed a substantial improvement in students' futsal game performance following the implementation of the TGfU model. The mean pretest score was 62.47 (SD = 6.85), whereas the mean posttest score increased to 81.63 (SD = 5.74). This represents an average improvement of 19.16 points, indicating considerable enhancement in students' game performance after the intervention.

Table 1. Descriptive Statistics of Students' Futsal Game Performance

Variable	N	Mean	SD	Minimum	Maximum
Pretest	30	62.47.00	0,309	50	74
Posttest	30	81.63	0,259	72	91

To determine whether the TGfU intervention significantly improved students' futsal game performance, a paired-samples t-test was performed.

Table 2. Paired-Samples t-Test Results

Comparison	t	p
Pretest–Posttest	12.846	< .001

The paired-samples t-test revealed a statistically significant difference between the pretest and posttest scores ($t = 12.846$, $p < .001$). Therefore, the research hypothesis was

accepted, indicating that the Teaching Games for Understanding (TGfU) model significantly improved students' futsal game performance.

The magnitude of students' learning improvement was further analysed using the normalized gain (N-gain).

Table 3. N-Gain Analysis

Mean N-Gain	Category
00.58	Moderate

The average N-gain score of 0.58 falls within the moderate improvement category according to (Hake, 1999) classification, suggesting that the TGfU intervention produced a meaningful improvement in students' futsal game performance. In addition to statistical significance, the practical significance of the intervention was examined using Cohen's d.

Table 4. Effect Size Analysis

Cohen's d	Interpretation
1.52*	Large Effect

The effect size of 1.52 indicates a large practical effect, demonstrating that the TGfU model produced not only statistically significant improvements but also substantial educational benefits in students' futsal game performance (Cohen, 1988).

Discussion

The findings of this study demonstrate that the implementation of the Teaching Games for Understanding (TGfU) model significantly improved students' futsal game performance at SMK Negeri 9 Garut. This conclusion is supported by the increase in the mean GPAI score from 62.47 in the pretest to 81.63 in the posttest. Furthermore, the paired-samples t-test revealed a statistically significant difference ($p < .001$), indicating that the observed improvement resulted from the TGfU intervention rather than random variation.

The improvement in students' game performance can be explained by the fundamental principles of the TGfU model, which positions the game itself as the primary learning context. Unlike conventional drill-based instruction that primarily emphasises repetitive technical practice, TGfU encourages learners to analyse game situations, identify tactical problems, generate alternative solutions, make appropriate decisions, and subsequently execute technical skills within authentic game contexts. According to Bunker & Thorpe, (1982), this pedagogical approach promotes a comprehensive understanding of game play by integrating technical execution with tactical awareness. Consequently,

students learn not only how to perform a skill but also when, where, and why it should be applied during competition.

The present findings also support the constructivist learning perspective underpinning TGfU. During the intervention, students actively constructed knowledge through observation, discussion, tactical problem-solving, reflection, and decision-making in modified game situations. Such learning experiences encourage learners to become active participants rather than passive recipients of instruction. Harvey & Jarrett, (2014) similarly argued that game-centred pedagogies enhance student engagement because learning occurs through authentic game experiences that stimulate tactical thinking and reflective practice. Light, (2023) emphasised that game-based pedagogies promote meaningful learning by encouraging students to develop creativity, autonomy, and adaptive decision-making in dynamic sporting environments.

Beyond improving technical proficiency, the TGfU intervention also enhanced students' tactical thinking and decision-making abilities. Throughout the instructional programme, students were required to maintain appropriate positioning, provide effective off-the-ball support, select suitable technical actions according to changing game situations, and perform efficient transitions between attacking and defending phases. These competencies correspond directly to the dimensions assessed by the Game Performance Assessment Instrument (GPAI) developed by Oslin et al., (1998). Therefore, the observed improvement in GPAI scores indicates that the intervention enhanced students' overall game competence rather than isolated technical skills.

The findings are consistent with previous international research investigating the effectiveness of TGfU in physical education. Pan et al., (2023) reported significant improvements in students' motivation, personal responsibility, enjoyment, and game performance following TGfU instruction. Similarly, Ortiz et al., (2023), in their systematic review and meta-analysis, concluded that TGfU consistently produces positive effects on game performance, tactical decision-making, and psychosocial outcomes across a wide range of physical education contexts. In futsal-specific settings, Ginciene et al., (2023) demonstrated that TGfU significantly enhanced students' tactical understanding and overall game quality. More recently, reported that game-centred pedagogical approaches outperform traditional technique-based instruction in promoting tactical creativity, adaptive decision-making, and cognitive engagement in invasion games. Collectively, these studies reinforce the present findings and provide strong evidence supporting TGfU as an effective instructional model for futsal education.

The N-gain value of 0.58, categorised as moderate, indicates that the intervention produced meaningful educational improvement. Although this value did not reach the high-gain category, it nevertheless demonstrates that TGfU effectively enhanced students' game performance within the duration of the intervention. Several factors may explain why the improvement remained moderate, including the relatively short intervention period, differences in students' initial ability levels, limited instructional frequency, and the time required for students to adapt to a learner-centred pedagogical approach. It is reasonable to assume that implementing TGfU over a longer period or across multiple academic semesters could produce even greater improvements in tactical and technical performance.

The large effect size observed in this study further demonstrates that the educational impact of TGfU extends beyond statistical significance. A large effect size indicates substantial practical significance, suggesting that TGfU has meaningful educational value for improving learning outcomes in school-based physical education. Therefore, TGfU should be viewed not only as an alternative instructional strategy but also as an evidence-based pedagogical model capable of enhancing students' comprehensive game competence.

From a practical perspective, these findings suggest that physical education teachers should gradually reduce their reliance on technique-oriented instruction and adopt game-centred pedagogical models such as TGfU. Within this approach, teachers function as facilitators who design representative learning tasks, modify game situations according to students' developmental levels, encourage tactical reflection through questioning, and guide students in solving game-related problems collaboratively. Such learning environments foster active participation, tactical awareness, communication, teamwork, and autonomous decision-making while creating more engaging and meaningful learning experiences. Consequently, the objectives of physical education extend beyond technical skill acquisition to include the development of higher-order cognitive, social, and tactical competencies essential for successful participation in invasion games.

Overall, the present findings strengthen the growing body of international evidence supporting TGfU as one of the most effective pedagogical models for teaching invasion games in school-based physical education. By integrating technical execution with tactical understanding within authentic game situations, TGfU promotes holistic game competence while simultaneously supporting students' cognitive, affective, social, and motor development.

Limitations

This study has several limitations that should be acknowledged. First, the use of a One-Group Pretest–Posttest Design without a control group limits the ability to establish causal relationships between the intervention and the observed improvements. Second, the relatively small sample size drawn from a single secondary school restricts the generalisability of the findings to broader educational contexts. Third, the intervention was conducted over a relatively short period, which may not fully capture the long-term effectiveness of the TGfU model on students' tactical development and game performance.

Future research should employ randomised controlled or quasi-experimental designs involving comparison groups, larger and more diverse samples from multiple schools, and longer intervention periods. In addition, future studies are encouraged to investigate the long-term effects of TGfU on students' tactical awareness, physical fitness, motivation, and psychological outcomes across different invasion sports and educational settings.

CONCLUSION

The findings of this study demonstrate that the Teaching Games for Understanding (TGfU) model is an effective pedagogical approach for improving students' futsal game performance in secondary school physical education. The intervention resulted in significant improvements in students' game performance, as evidenced by higher posttest scores, statistically significant paired-samples t-test results ($p < .001$), a moderate N-gain, and a large effect size. These findings indicate that TGfU enhances not only students' technical proficiency but also their tactical awareness, decision-making ability, skill execution, and teamwork during authentic game situations.

From a practical perspective, the findings provide empirical support for physical education teachers to adopt TGfU as a student-centred and game-based instructional model for futsal learning. By integrating technical and tactical learning through authentic game experiences, TGfU creates more engaging, meaningful, and educationally effective learning environments that foster students' holistic game competence.

Future studies should incorporate control groups, larger and more heterogeneous samples, longer intervention periods, and additional performance indicators to further strengthen the evidence regarding the effectiveness of TGfU across different educational contexts. Such investigations will contribute to the continued development of evidence-based pedagogical practices in physical education and sport.

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