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Integrating traditional games with teaching games for understanding to stimulating game understanding among elementary students

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Abstract

Students' academic ability can be improved through integrated learning activities of physical activity and actual gameplay. However, many teachers still have difficulties implementing it in physical education learning. The study investigates the effectiveness of the Teaching Games for Understanding (TGfU) model, implemented through modified Kasti games, in enhancing game understanding among elementary students. Conducted as a pre-experimental study with a one-group pretest-posttest design, it involved 48 fifth-grade students in West Kalimantan, Indonesia. The intervention spanned five sessions and assessed game understanding through the Games Understanding Assessment Instrument (GPAI), focusing on decision-making, skill execution, and covering. Results showed a significant improvement in post-test and post-test scores, with marked progress in each assessed component. The study highlights TGfU's potential in fostering tactical and cognitive skills in physical education for young learners, suggesting that traditional games adapted within this model offer a culturally relevant and effective approach to increasing students' engagement and understanding. Limitations include the absence of a control group and a small sample size, recommending further research to confirm these findings in diverse educational settings.

Keywords: Teaching games for understanding, modified traditional games, game understanding, primary school students.

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INTRODUCTION

Traditionally taught in a manner of command instruction centered on sport-based material, physical education (PE) is changing to be taught with decontextualized sports tactics (Kirk, 2016). As a result, many students find it difficult to perform in class and struggle to participate during games (Harvey et al., 2018). They proposed an alternative model for teaching team games in physical education that facilitates student learning through an

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emphasis on understanding gameplay and skill development, referred to as TgfU (Papagiannopoulos et al., 2023). TGfU is also referred to as an alternative to the content-oriented learning paradigm, which employs an actual gameplay approach during the implementation process (Memmert et al., 2015). TGFU is a game-based coaching model that, despite its pedagogical challenges, is advocated as an effective method for enhancing motor abilities (Dania & Harvey, 2020). TGFU can enhance kids' low motivation to engage in physical education classes (García-González et al., 2020). TGFU serves as a paradigm applicable to the teaching and learning process in physical education (Ab Rahman et al., 2020).

TGFU has advantages that teachers can take into consideration when implementing PE learning. This is because TGFU simultaneously develops the student across various learning domains (i.e., psychomotor, cognitive, and affective) (Harvey et al., 2016). Another opinion supports that TGfU increases students' cognitive abilities and tactical thinking by encouraging them to evaluate game situations (Harvey et al., 2020), promoting and improving the development of critical thinking skills in kids (Barnabè et al., 2023). Additionally, the implementation of TGFU in physical education facilitates students' understanding of the rules, the fundamental nature of the game, and the essential skills and tactics necessary to enhance their performance (Papagiannopoulos et al., 2023). TGFU is more suitable than direct instruction for enhancing light physical activity levels during sessions (Sierra-Ríos et al., 2020). TGFU prioritizes game play in the learning process to foster satisfaction among students (Batez et al., 2021). TGFU highlights the essential principles of the game to enhance the capacity to recognize tactical issues that emerge during play and to react suitably (Mitchell et al., 2020).

PE learning using the TGFU model is one model that is effectively applied in elementary schools García-López et al., (2019) Students are in the process of acquiring essential movement abilities, and engaging in games provides an exhilarating method for their learning (Goodway et al., 2019). Many studies conducted by using TGFU in PE education in primary

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schools have shown to increase students' enjoyment, thereby enabling teachers to carry out PE learning by means of skill variations and enhancement of students' motor abilities (M. Wang & Wang, 2018). Application of TGFU also enhanced decision-making, skill execution, successful game performance, number of decisions made, number of game involvements, and intention to be physically active (Barquero-Ruiz et al., 2021). Still, PE teachers have trouble using the plan or face obstacles (Harvey, 2016). Furthermore limited is the practice of using TGFU, which has to be modified to fit the PE program that school offers (Harvey, 2016) therefore should be developed in line with the context and fit the nature of the students and the classroom (Morales-Belando et al., 2022).

The problems found related to the implementation of TGFU are important to be addressed. For this reason, an effort is needed to overcome these problems. Using games that are played by students or that are similar to their environment, such as modified traditional games, is one way to apply learning with the TGFU model because the most efficient, simple, and affordable method to shape communication is through the use of ball games (Ibrahim et al., 2021). Research related to the application of the TGFU model with traditional games is still limited to the aim of improving motor skills and has not yet covered the improvement of game understanding (Gipit Charles et al., 2017; Martínez-Santos et al., 2020; O'Leary, 2016; Ribas et al., 2023).

This study was conducted to apply TGFU using modified traditional games in primary school students' PE learning, with a focus on students' game understanding. The traditional game used is Kasti (a field game), which has been modified and adapted to the school curriculum. The study aims to examine the effectiveness of using TGFU with a modified Kasti game to improve elementary school students' game understanding. Furthermore, the research hypothesis is that applying TGFU using modified traditional games can improve primary school students' game understanding. The results of this study are expected to enhance elementary school student's knowledge of the game, providing a reference

for teachers in implementing PE learning in schools, especially in upper elementary classes. Students in the upper elementary classes were the target population of the study since they are still developing their motor skills, particularly in fundamental movement (Goodway et al., 2019).

METHOD

A pre-experiment study using One Group Pre-test and Post-test Designs is employed as the methodology. There was no control group in the study, and there was just one experimental group. TGFU models were implemented in the research utilizing field games that were adjusted for normal PE instruction in elementary schools. The task assigned to the experiment was to play a game with fields changed so that children could participate in it and actively work on their motor abilities. Students take a game understanding assessment before to the game. Similarly, based on the planned stage of the study, shortly after the course of study has concluded.

The TGFU model flow in this study uses six flows (Barquero-Ruiz & Kirk, 2024). First, arrange a game for students to play; second, ensure that students understand and appreciate the game; third, encourage strategic thinking and tactical awareness; fourth, solve problems and make decisions about what to do and how to do it; and fifth, carrying out movements by the decisions that have been created.

The overall research was divided into four stages and eight sessions and was carried out in five meetings. The first stage, introduction, aims to explain the objectives and introduce the games played in one meeting, as shown in Table 1. All meetings last 80 minutes. The first stage is collecting data pre-test. The third stage is intervention, which consists of four sessions and is carried out in two meetings. The third stage is an essential stage of implementing learning. The fourth stage collects data post-test.

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Table 1. Course Schedule

Phase	Session	Scope	Stage	Meeting to -
Game Form Introduction	1	Introduction and explanation of learning objectives	Game Form Introduction	1
	2	Games Introduction	Game Form Introduction	1
Pre-test	3	Motor skill test	Performance Test	2
Intervention	4	Games Play	Understanding the Game Concept	3
	5	Games Play	Making Decision	3
	6	Games Play	Skill Execution	4
	7	Games Play	Games Performance	4
Post Test	8	Motor skill test	Performance Test	5

The participants involved in the study were fifth-grade elementary school students at a public elementary school in Batu Ampar sub-district, Kubu Raya district, West Kalimantan Province, Indonesia, with a total of forty-eight students. Determination of participants using stratified randomize technique. The targets in this study were fifth-grade students consisting of two classes with a total of fifty-six students. The criteria for determining participants are that students must have an ideal body, not experience physical or mental disabilities, and be in good shape. This aims to ensure that students can participate in learning well and follow the learning to completion. As a result, twenty-four fifth-grade elementary school students were obtained, consisting of eleven girls (45.83%) and thirteen boys (54.17%) with an age range of 10.6-11.4 years.

Game understanding was measured using the Games Understanding Assessment Instrument (GPAI) (Barquero-Ruiz & Kirk, 2024). The GPAI component comprises of skills execution (SE), decision-making (DM), and the capacity to guard the opponent's cover (CV). Of these three elements, accuracy in guarding the opponent, accuracy in applying skills, and accuracy in decision-making define the assessment criterion (covering). Two experts connected to TGFU and GPAI validated the instrument both qualitatively the elements and evaluation criteria intended according to the pedagogical features of TGfU and quantitatively the suitability of the instrument used (on a scale of 1 to 5). The experts gave every element a five—highly appropriate rating. After reading and contrasting the recommendations of the experts on the assessment elements and criteria, we operationalally wrote down the objectives to help us to enhance them.

We also altered the terminology used, rearranged the questions, and raised the count of them.

Using quantitative techniques and the SPSS 26 program, data analysis was done descriptively. GPAI form analysis by summing up each knowledge displayed by students who fit each component helped to ascertain how well pupils understood playing. To get the index, then, add the index values for every element and divide by the overall component. Moreover, by computing the index value for every element and then dividing it by the total number of components, one might ascertain how well pupils understood the changed baseball game. Dividing student outcomes into four categories—extremely practical, somewhat effective, moderately effective, and very effective—was the next phase. This classification helps us to find how well pupils develop their knowledge of the game via on-field participation. Data analysis with the t-test eventually revealed the variations between the pre-test and post-test evaluations of game knowledge. These results guide the evaluation of the TGFU model's performance in improving students' game knowledge.

RESULT

The results of measuring game understanding, as shown in Table 2, indicate an increase in the average scores between the post-test and pre-test for each measured variable. Specifically, the scores for SE increased from 0.65 to 0.69, DM from 0.57 to 0.62, CV from 0.60 to 0.69, and Game Understanding from 0.61 to 0.67. The improvements observed ranged from 0.04 to 0.09.

Table 2. Student games understanding measurement results

Measured Items		N	Minimum	Maximum	Mean		Std. Deviation
					Statistic	Std. Error	
Skill Execution	Pretest	24	.55	.80	.65	.01	.07
	Posttest	24	.60	.79	.69	.01	.05
Dicision Making	Pretest	24	.40	.75	.57	.02	.09
	Posttest	24	.40	.71	.62	.01	.07
Covering	Pretest	24	.43	.75	.60	.02	.08
	Posttest	24	.62	.75	.69	.01	.05
Game Understanding	Pretest	24	.51	.69	.61	.02	.04
	Posttest	24	.56	.73	.67	.01	.04

Based on the recapitulation data, the categorization of the results from measuring students' game understanding (see Table 3 and Graph 1) shows

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that the majority of students' pre-test scores fell within the 0.60-0.79 range, with 15 students, and the 0.40-0.59 range, with nine students. These results indicate that most students were in the Effective Performance category, followed by the Moderately Effective category. The post-test results show a similar pattern, with a dominant score range of 0.60-0.79. However, there was an increase of six students, raising the total to 21, while the number of students in the 0.40-0.59 range decreased to three. Students' game understanding abilities remained primarily in the Effective Performance category, followed by the Moderately Effective category, with no students reaching the Very Effective Performance category.

Table 3. Student games understanding recap

Games Performance Score	PreTest	Post Test	Descriptive Ratings
0.80-1.00	0	0	Very Effective Performance
0.60-0.79	15	21	Effective Performance
0.40-0.59	9	3	Moderately Effective
0.20-0.39	0	0	Weak Performance
0.00-0.19	0	0	Very Weak Performance
Total	24	24	

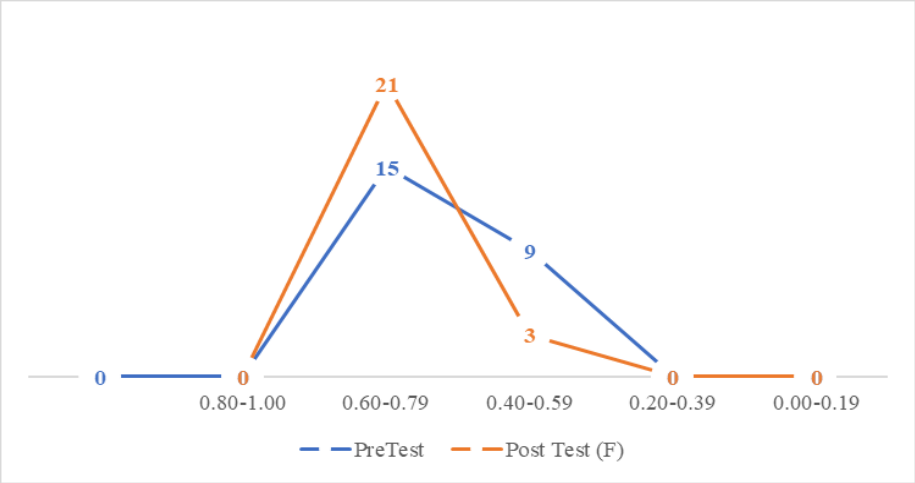

Figure 1. Student games understanding test result

Next, a difference test was conducted to measure the mean difference between the pre-test and post-test (see Table 4). However, a Homogeneity Test was carried out, which is the main requirement. As a result, the significance level of the Levene Statistics was 0.98. Because the significance value is 0.98 > 0.05, it can be concluded that the pre-test and post-test variance data from the game understanding measurement results

are homogeneous. Based on these results, the difference test uses the t-test.

Table 4. Homogeneity test results

		Levene Statistic	df1	df2	Sig.
Result	Based on Mean	.000	1	46	.98

Values are expressed as means df=degree of freedom. Sig= Statistical significance

The t-test results (see Table 5) obtained a calculated t-result of 5,514. These results show that the computed t is greater than the t table (1.711). As for the criteria used, if the hypothesis is accepted (H_1) if t count>t table, then the result is that H_1 is accepted. These results show that statistically, there is an average difference between the post-test and pre-test scores. This means there has been an increase in the post-test mean compared to the pre-test score. These results show that students' game-understanding abilities are better after being given treatment than before. Furthermore, based on the results of calculating the significance value, the value obtained is less than 0.05 (<0.05). These results show that the increase that occurred was significant. For this reason, the use of TGFU is effective in increasing elementary school students' game understanding, and the improvements that occur are significant.

Table 5. Games understanding t-test results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Posttest - Pretest	.06	.05	.01	.04	.08	5.514	23	.000

Values are expressed as means *df=degree of freedom. Sig*= Statistical significance

DISCUSSION

The study aims to test the effectiveness of using TGFU with traditional games to increase elementary school students' game understanding. As a result, it can be used as a reference for teachers in implementing PE learning, especially in elementary schools. The results of the study show that there has been an increase in elementary school students' game-understanding abilities based on the mean pre-test and post-test. This study's results align with previous research, which states that there has

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been a significant increase in students' decision-making and execution capacity with the comprehensive application of the TGFU model (26, 27, 28, 29). These results are also supported by studies that state the TGfU model is a contextualized teaching approach based on modified games (MG), which are designed to improve athletes' motivation and decision-making (32; 33).

These results show that the use of TGFU is effective in increasing elementary school students' game understanding, and the improvements that occur are significant. The increase occurred because the TGfU Unit can improve the quality of students' tactical knowledge in evaluating game situations and developing their tactical reasoning (Harvey et al., 2020). In addition, TGFU develops the technique, understanding, tactical knowledge, and decision-making required in the game (32, 31, 33, 34). The increased understanding of the game is also due to the use of TGFU in enhancing a fun mood for students, thus improving the mood state and allowing them to engage more actively in physical activity (Nugraha et al., 2020).

Based on the results of this study, TGFU is an appropriate learning model to be applied to PE learning, especially in efforts to improve students' cognitive abilities. The TGfU model is implemented using games through understanding, developing tactical knowledge, and enhancing problem-solving through execution and decision-making skills (36, 37, 38, 39). The TGfU model is an alternative to direct sports teaching instruction. It encourages innovation in the teaching-learning process and prioritizes content to change the structure of functional and formal elements (Puente-Maxera et al., 2020). TGFU encourages to give importance to the player in their learning so that they can become the game's character. They empower better decision-making and execution. Developing the game's strategy enhances the young player's tactical intelligence (Sierra-Ríos et al., 2020).

PE teachers, in implementing their learning, can use TGFU as a pedagogical approach because it has various advantages so that it can maximize students' abilities. TGFU, which is implemented through playing a game, encourages students to learn about the required skills and allows

students to develop the ability to understand the game's tactics and strategies (Ribas et al., 2023). TGFU, which uses a play-a-game approach, can also make the students focus their attention on the logic of the game dynamics (Sierra-Ríos et al., 2019) so that integrated learning through games becomes important (Friskawati, 2023). Learning using TGFU also improves decision-making, skill execution, successful game performance, the number of decisions made, the number of game involvements, and the intention to be physically active when playing games (Barquero-Ruiz et al., 2021). TGFU serves as a positive pedagogical model in PE because it encourages learning to play by effectively stimulating the cognitive aspect of elementary school students (Gustian, 2021). Thus, students are intrinsically motivated (Barba-Martín et al., 2020).

CONCLUSION

The study successfully demonstrated the effectiveness of the Teaching Games for Understanding (TGfU) model, when integrated with modified traditional games like the Kasti Game, in enhancing game understanding among elementary school students. The results indicated significant improvements in the students' decision-making, skill execution, and covering abilities, leading to overall better game understanding. This suggests that TGfU, with its focus on gameplay and tactical knowledge, is a valuable pedagogical approach in physical education, particularly for younger students who are still developing their fundamental motor skills. Despite the positive outcomes, the study was limited by its small sample size and the lack of a control group, suggesting the need for further research with larger and more diverse participant groups to validate these findings. Nonetheless, the study provides strong evidence for the adoption of TGfU as an effective method to foster cognitive and tactical development in elementary PE programs. The limitation of the study was that it only involved one experimental group with a relatively small number of participants without involving a control group. Apart from that, the implementation of TGFU was only carried out in relatively short meetings, so the impact of the comments that occurred was relative. For this reason, it is recommended

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that further studies be implemented with a more massive and varied number of participants.

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