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Determining and Comparing the Effectiveness of Teaching Game for Understanding, Sports Teaching and Their Combination on Decision-Making Performance in the Football Game of Students

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Keywords:
Teaching game for understanding, sports teaching, decision-making performance, students.

Purpose: One of the important functions in the football game is the decision-making function, which should be improved and promoted. Therefore, the current research was conducted with the aim of determining and comparing the effectiveness of teaching game for understanding, sports teaching and their combination on the decision-making performance in the football game of students.

Methodology: The present research method was semi-experimental with a pre-test and post-test design without a control group. The statistical population of this study was all male students aged 10 to 12 years in Tehran city in the fourth to sixth grades. The sample of the research was 60 people who were selected by the purposive sampling method and randomly replaced in three experimental groups. The research tool was game performance evaluation tool (G-PET), which evaluates game performance from different aspects including decision-making (passing, dribbling and shooting). The first experimental group was trained with the method of teaching game for understanding, the second experimental group was trained with the method of sports teaching 15 sessions, and the third experimental group was trained with their combination method. The data were analyzed with the methods of paired t-test, one-way analysis of variance and LSD post hoc test in SPSS version 25 software at a significance level of 0.05.

Findings: The results showed that all three methods of teaching game for understanding, sports teaching and their combination improved the decision-making performance in the football game of students ($P<0.001$). Also, there was a significant difference between the three groups in terms of decision-making performance; So that the effectiveness of teaching game for understanding was higher in compared to sports teaching and their combination, and in addition, the effectiveness of combined teaching was higher in compared to sports teaching ($P<0.001$).

Conclusion: According to the results of the present research, to improve the decision-making performance in the football game of students can use the method of teaching game for understanding, method of combining teaching game for understanding and sports teaching, and finally, the method of sports teaching.

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1. Introduction

Individual performance in games and sports is the result of an interactive process between knowledge, tactical awareness, decision-making ability, and the execution of individual skills. The selection and execution of movements, both with and without the ball, reflect the two dimensions of technique and tactics (Maleki, Allahvaisi, & Gholami, 2018). Decision-making is one of the most important cognitive processes in human life and plays a significant role in sports-related activities, directly linking to either the success or failure in sports (Shams, Tahmasebi Boroujeni, & Bohloul, 2021). Games and sports impact psychological capacities, including decision-making. High psychological capacity enables individuals to maintain their lives at an optimal level (Fortes, Lima-Junior, Nascimento-Junior, Costa, Matta, & Ferreira, 2019). Decision-making is the ability to quickly and accurately select a desired response from available options (Larkin, Mesagno, Berry, & Spittle, 2014). It arises from the interaction between the individual and the environment, recognized as a momentary process that results from the interaction among various biological, environmental, and task constraints (Bennett, Novak, Pluss, Coutts, & Fransen, 2019). Decision-making involves selecting a series of actions from a specific class of options towards a particular goal, encompassing three components: the options or series of actions, beliefs and expectations about the options in achieving the goal, and the expectations of positive or negative outcomes. Thus, the goal of decision-making is to increase outcomes or expectations from results and to use information to achieve objectives (Navarro, Vander Kamp, Schor, & Savelsbergh, 2018). In sports, a complex interaction exists between knowledge and the selection of actions and movements by athletes. This issue becomes more challenging in team sports like football, where athletes face multiple choices at any moment, making response selection more difficult. Athletes must cope with high levels of variability and unpredictability to achieve success. Consequently, the capacity for decision-making in a short time frame is of great importance (Shahbazi, Vazini Taher, & Rezaei, 2019). Correct decision-making in sports is a factor that can lead to success, and awareness of the psychological and behavioral characteristics of players can assist in player selection, determining sports strategies, and team formation (Owens & Roach, 2018).

One educational approach related to games is Teaching Games for Understanding (TGfU), which is a form of real game with simplified rules (Ortiz, Merono, Morales-Belando, Vaquero-Cristobal, & Gonzalez-Galvez, 2020). TGfU is an alternative to the linear game-based skill approach for teaching sports skills, introducing simple game tactics first, then prioritizing skill practice (Mandigo, Lodewyk, & Tredway, 2018). This method prioritizes understanding what needs to be learned before teaching begins, establishing connections between tactics and techniques aimed at enhancing intelligent and skilled performance (Morales-Belando, Kirk, & Arias-Estero, 2022). TGfU enhances learners' problem-solving abilities and creativity, boosts their motivation and enthusiasm, and leads to improved performance and progress (Johnson & Walker, 2016). This method enables individuals to view games as opportunities for problem-solving and movement, shifting from a focus on individual skills outside real situations to a learner-centered, team-oriented approach. When an individual or player recognizes the need for a specific skill, the development and demonstration of that skill play a crucial role in education within this approach (Barba-Martín, Bores-Garcia, Hortiguela-Alcala, & Gonzalez-Calvo, 2020). TGfU, by involving individuals in all aspects of the game, creates literate, competent, and interested athletes and aims to improve performance in the game by creating a strong and precise connection between skills and tactics, which is formed by the learners' understanding of the values and skills in the game situation (Hortiguela Alcala & Hernando Garijo, 2017). The implementation stages of this method are as follows. The game and its educational program are designed and introduced to learners to fulfill their developmental needs and desired learning outcomes. Learners are taught the rules and structure of the game to fully understand it. Their understanding of tactics that contribute to more effective play will increase, and they will gain tactical awareness. Learners are taught the correct decision-making process regarding what should be done and how to do it. By demonstrating specific skills and movements, the skill is executed. Finally, by executing the skill in a real game situation, complete performance is achieved (Usra, Bayu, Solahuddin, & Octara, 2023).

Another educational method is exercise training, which focuses on learning through the following six characteristics. Objectives are organized, all children are committed members of a team, competition is created between teams in the form of a game, each individual in the team has a role, games and practices are recorded, and victories are celebrated (Puente-Maxera, Mendez-Gimenez, & De Ojeda, 2020). Exercise training enhances children's motivation and enthusiasm through play, creates social opportunities, decision-making, and enjoyment of the game (Putranto, Heriyanto, Achmad, & Kurniawan, 2023). This method includes simple body movements and exercises to integrate the brain's hemispheres, addressing learning difficulties and reducing psychological and emotional stress (Knijnik, Spaaij, & Jeanes, 2019). Exercise training gives individuals the opportunity to become aware of and utilize their mental and artistic creativity, revealing their hidden talents. Consequently, this method has attracted the attention of many specialists and experts (Casado-Robles, Mayorga-Vega, Guijarro-Romero, & Viciana, 2022). Exercise training is an educational model for transforming physical education programs to provide authentic and enjoyable sports experiences for children and adolescents (Nikravan, Safania, & Zarei, 2019). Moreover, combining the methods of TGfU and exercise training seems to increase their effectiveness compared to using each method separately, as the combined approach benefits from the advantages of both methods.

Few studies have been conducted on the effectiveness of TGfU and exercise training. Some research results are inconsistent, and no study has been found comparing the effectiveness of these two methods. Mohammadi, Solymani Balavi, Jahani, Shafiei Sarvestan, and Daryanoosh (2019) found that game-based learning for understanding improved learning of sports skills, including ball games, dribbling, three-person passing, shooting, advanced attack, and individual defense in students. Pizarro, Moreno Dominguez, Sevil Serrano, Garcia-Gonzalez, and Del Villar Alvarez (2017) concluded that a comprehensive teaching program for understanding improved decision-making skills and passing in football players after 22 sessions but did not significantly affect dribbling. Additionally, Abad Robles, Collado-Mateo, Fernandez-Espinola, Castillo Viera, and Gimenez Fuentes-Guerra (2020) found that sports game-based learning significantly improved decision-making but did not have a significant impact on skill execution. Nikravan et al. (2019) found that participating in exercise training, compared to traditional methods, enhanced planning processes and performance in educational program execution.

Various educational approaches and methods exist, and selecting an approach that creates enjoyable moments while yielding the best results is of great importance. Undoubtedly, using these approaches and methods can significantly assist students in recognizing their strengths and weaknesses and providing effective and practical solutions for improving various characteristics. Two methods investigated in this study for determining their effectiveness are TGfU and exercise training. Researchers have shown that few studies have been conducted on the effectiveness of these two methods in decision-making performance, and, as mentioned above, the results of these studies have sometimes been inconsistent. Another important point is that no research has been conducted comparing the effectiveness of TGfU and exercise training on decision-making performance in football. Conducting this study can significantly assist specialists and planners in identifying the more effective educational method, and furthermore, this study goes a step further, attempting to compare the effectiveness of these two methods with a combined approach, i.e., combining TGfU and exercise training. Additionally, the results of this study can contribute to expanding the knowledge base in sports sciences and related fields regarding determining and comparing the effectiveness of TGfU and exercise training and the combination of these two methods. Consequently, one of the crucial performances in football is decision-making performance, and we should aim to improve and enhance it. Therefore, this study was conducted with the goal of determining and comparing the effectiveness of TGfU, exercise training, and their combination on decision-making performance in student football games.

2. Methodology

The present research employed a semi-experimental design with a pre-test and post-test approach, excluding a control group. The study's population comprised all male students aged 10 to 12 years in Tehran, studying in the fourth to sixth grades of primary school. The sample consisted of 60 students, selected through purposive sampling and randomly divided into three experimental groups. Given that the minimum sample size for intervention studies is 15 participants per group, this study considered 20 participants per group to ensure a robust sample size. Participants were chosen based on criteria including age (10 to 12 years), no continuous training history in football, no psychological disorders, and not taking psychiatric drugs like anti-anxiety or antidepressants. Additionally, exclusion criteria included withdrawal from participation and absence from more than two sessions.

The research tool was the performance assessment test developed by Gutierrez, Gonzalez, Garcia-Lopez, and Mitchell (2011), which evaluates game performance in various aspects, including decision-making (passing, dribbling, and shooting). This tool examines game performance on two levels: the appropriateness of actions with tactical behavior and the separation of cognitive components of decision-making from the motor components of skill. The first level refers to appropriate environmental performance, indicating effectiveness in the game by executing appropriate tactical actions during play. The results of this assessment represent situational behavior, i.e., the tactics displayed by the player at that moment in the game. The second level separates the cognitive components of decision-making from the motor components of skill. The usual sequence of football performance for a player with the ball involves the process of control, decision-making, and execution. At this level, control, passing, dribbling, shooting, and support are evaluated. It is important to note that this study utilized the second level of motor skill execution for the attacking player with the ball, focusing on decision-making with three components: passing, dribbling, and shooting. Maleki et al. (2018) estimated the content validity of the tool for offensive behaviors of players with and without the ball as 0.99, which was confirmed at a significance level of 0.05. Additionally, for the assessment of inter-observer reliability, a randomly selected game was filmed and observations by two observers of that film were analyzed and confirmed with a 2-week interval. Moreover, the correlation coefficient between them was estimated to be above 0.80, confirmed at a significance level of 0.001.

The first experimental group was trained using the Teaching Games for Understanding method, the second group with the exercise training method, and the third group with a combination of these methods, for 15 sessions each. For this purpose, each group was trained three times a week for 5 weeks under the intervention of the respective methods. The games were played on a football field measuring 25 x 35 meters in a 4 vs. 4 format without a goalkeeper, filmed from a 5-meter height above the ground, and evaluated by an experienced coach after the intervention. It is important to note that each training session consisted of eight 2-minute stages with a 1-minute rest between each stage. The games were recorded using an iPhone 13 smartphone from Apple, featuring a 12-megapixel ultra-wide camera with 2.5x zoom. The intervention in the Teaching Games for Understanding group is presented in Table 1, and in the exercise training group in Table 2.

Table 1. Teaching game for understanding intervention

Sessions	Stage	Sample exercise	Specific objectives	Training variables
1-2	Game	Tag and Chase, Barrier Break, Corner, Eliminator, and Pass to Empty Space	Positioning and creating space, changing running speed, maintaining distance, coordination and team decision-making, passing	Gradually limiting the play area, playing simultaneously with dribbling, maintaining and controlling the ball, placing stationary or moving blocker players in the area, non-verbal communication to strengthen eye contact and sign language

3-4	Game understanding	Using games from previous sessions	Gradual familiarity with football rules like field dimensions, time constraints, fouls and errors, applying secondary rules to emphasize specific game aspects	Changing the scoring system, players themselves declaring fouls or errors
5-7	Technical awareness	Bear in the Middle, Ring Pass, Challenge, and Zonal Defense	Awareness of game rules, feinting and passing, using non-verbal strategies, man-to-man defense, creating space, using peripheral vision, understanding counter-attack concepts, passing from different areas, and executing continuous passes	Game situations 2 vs 1, 3 vs 2, and 4 vs 4, applying time and space constraints for quick decision-making, changing the number of attackers and defenders, using zonal defense
8-10	Decision-making	Modified and Restricted Games	Developing skills related to predicting attack and defense timing, maintaining ball possession, changing positions, enhancing problem-solving, participating in related discussions, defending in various game situations	Restricted and modified games that simulate real football game situations
11-12	Skill Execution	Employing skill in simple to complex challenging situations	Ball control and mastery, dribbling and foot switching, changing direction, passing in the direction of the attacker's movement, receiving, shooting, bicycle kick, volley shot, instep shot	Static practice, gradually including multiple limiting factors such as executing skills while moving, creating stationary and moving obstacles, reviewing and employing skills in challenging situations
13-14	Performance	Restricted Games and Gradually Increasing Tactical Complexity	Employing technical and tactical skills suitable for conditions of restricted game situations	Restricted games with full game rules applied in 2 vs 2, 3 vs 2, and 4 vs 4 situations
15	Game	Modified Game	Employing technical and tactical skills in conditions similar to 11 vs 11 game situations	Practicing zonal defense, examining vulnerable areas, defensive formation, practicing attack systems where players stand, walk and eventually move at speed

Table 2. Exercise group intervention

Sessions	Processes	Main focus and objective
1-3	Exercise training concepts, roles, dependence, format, competition, fair play, record keeping, team responsibilities, and team practice	Passing, receiving, field awareness, maintaining ball possession
4-6	Team responsibilities and team practices	Passing, receiving, dribbling, movement and defense, maintaining ball possession, ball stealing, scoring points, defensive space and goalkeeper, initiating and restarting the game
7-9	Team responsibilities, team practices, playing and refereeing competitive games	All above contents and goals were practiced
10-12	Team responsibilities, team practices, playing and refereeing competitive games	All above contents and goals were practiced
13-15	Team responsibilities, team practices, playing, refereeing competitive games, award ceremony, and climax event	All above contents and goals were practiced

Notably, the combined teaching method used a blend of both Teaching Games for Understanding and exercise training methods for 15 sessions.

Data were analyzed using paired t-tests, one-way ANOVA, and LSD post hoc test in SPSS software version 25 at a significance level of 0.05.

3. Findings

No attrition occurred in the samples of any of the three experimental groups. Results comparing the age, height, and weight of the groups based on one-way ANOVA are presented in Table 3.

Table 3. Results of comparing age, height, and weight between groups based on one-way ANOVA

Variable	Teaching game for understanding		Exercise group		Combined training		p
	Mean	SD	Mean	SD	Mean	SD	
Age (Year)	85،10	74،0	80،10	76،0	80،10	76،0	972،0
Height (cm)	75،145	94،3	80،145	18،4	35،147	80،3	359،0
Weight (kg)	95،35	07،4	70،38	40،3	20،37	66،3	460،0

According to the one-way ANOVA results reported in Table 3, there was no significant difference between the groups regarding any of the variables of age, height, and weight ($P > 0.05$). The results of the mean and standard deviation of the pre-test and post-test decision-making performance of the groups are presented in Table 4.

Table 4. Results of mean and standard deviation of decision-making performance in pre-test and post-test stages for group

Stage	Status	teaching game for understanding		Exercise training		Combined training	
		Mean	SD	Mean	SD	Mean	SD
Pre-test	Right	10،45	05،6	30،46	86،2	50،46	17،3
	Wrong	15،35	87،3	55،32	79،5	50،35	16،4
Post-test	Right	19،57	24،6	23،51	82،4	69،53	55،3
	Wrong	78،27	43،3	83،29	31،4	40،31	98،3

According to the reported mean results in Table 4, the mean of the Teaching Games for Understanding group increased more in correct situations and decreased more in incorrect situations compared to the other two groups. The research assumptions indicated that the assumption of normality was not rejected due to significance greater than 0.05 based on the Kolmogorov-Smirnov test and the assumption of homogeneity of variances due to significance greater than 0.05 based on the Levene's test. Results determining the effectiveness of Teaching Games for Understanding, exercise training, and their combination on decision-making performance in student football games are presented in Table 5 based on the paired t-test.

Table 5. Results of examining the effectiveness of TGfU,exercise training, and combined training on the decision-making performance in students' football games based on paired t-test

Group	Status	df	t-value	p
Teaching game for understanding	Right	19	-87،23	001،0
	Wrong	19	42،18	001،0
Exercise training	Right	19	-46،8	001،0

	Wrong	19	48،8	001،0
Combined training	Right	19	-32،18	001،0
	Wrong	19	49،8	001،0

According to the paired t-test results reported in Table 5, all three methods of Teaching Games for Understanding, exercise training, and their combination improved decision-making performance in correct and incorrect situations in student football games ($P < 0.001$). Results comparing the effectiveness of Teaching Games for Understanding, exercise training, and their combination on decision-making performance in student football games are presented in Table 6 based on the LSD post hoc test.

Table 6. Results of examining the effectiveness of TGfU,exercise training, and combined training on the decision-making performance in students' football games based on LSD post hoc test

Group I	Group J	Status	Mean diff. (I-J)	SE	p
Teaching game for understanding	Exercise training	Right	10،19	83،0	001،0
		Wrong	-50،10	96،0	001،0
Teaching game for understanding	Combined training	Right	05،8	83،0	001،0
		Wrong	-65،6	96،0	001،0
Exercise training	Combined training	Right	-05،11	83،0	001،0
		Wrong	85،3	96،0	001،0

According to the LSD post hoc test results reported in Table 6, there was a significant difference between the three groups regarding decision-making performance; such that the effectiveness of Teaching Games for Understanding was greater compared to exercise training and their combination, and moreover, the effectiveness of the combined method was greater compared to exercise training alone ($P < 0.001$).

4. Conclusion

The development of sports is a crucial step towards national development and has garnered attention from the public and government due to its significant impact on individual and social life. Football can, in addition to physical and mental health benefits, enhance social interactions and academic performance for students. One important aspect of football is decision-making performance. Thus, the present research aimed to determine and compare the effectiveness of Teaching Games for Understanding, exercise training, and their combination on decision-making performance in student football games.

The first finding of the current research indicated that the Teaching Games for Understanding method improved decision-making performance in student football games. This finding is consistent with the research of Mohammadi et al. (2019) and Pizarro et al. (2017). It can be explained that Teaching Games for Understanding enables individuals to have a better understanding of the game, improve their tactical and technical skills, and strengthen coordination and cooperation with teammates. This method is an effective teaching approach for imparting football skills to students as it focuses on real game conditions and comprehensive understanding of football rather than technical training of movements. Students learn various skills like control, passing, dribbling, and shooting through small-sided games in real situations akin to actual football games. These factors contribute to the absorption of different skills, including decision-making, in a natural manner and in alignment with the real game environment, thereby resulting in the effectiveness of Teaching Games for Understanding in enhancing decision-making skills. Another important point is that Teaching Games for Understanding includes effective elements in improving football skills, such as increased tactical understanding, strengthened decision-making, promotion of inspiration and creativity, enhanced enjoyment and motivation, transfer of learned skills, and increased activity and dynamism of students, leading to improvement in football skills, including decision-making. Therefore, it seems logical that the Teaching

Games for Understanding method would lead to an increase in decision-making performance in student football games.

The second finding of the current research showed that the exercise training method improved decision-making performance in student football games. This finding is in line with the research of Abad Robles et al. (2020) and Nikravan et al. (2019). It can be explained that the exercise training method emphasizes the use of diverse environments in the teaching process so that students can practice necessary skills in real situations. Additionally, exercise training significantly increases students' level of competence and physical readiness. In fact, the exercise training group, along with active participation of students in exercises, conducting class sessions in a competitive and active manner throughout the class duration without idle time, and ensuring adequate rest, led to the effectiveness of this method in improving students' decision-making. Furthermore, exercise training is a comprehensive educational model that facilitates improvement in students' football skills through practical experiences, collaboration, and competition. Another important point is that exercise training includes effective elements in improving football skills, such as extensive practical experience, cooperation and interaction, competition, technical and tactical exercises, and evaluation and feedback, helping students to improve their football skills and providing comprehensive and beneficial training. Given these points, it is expected that the exercise training method would play an effective role in improving decision-making performance in student football games.

The third finding of the current research revealed that the combined method of Teaching Games for Understanding and exercise training improved decision-making performance in student football games. No research was found regarding this finding, but it can be explained that the combined approach helps students understand game concepts and tactics related to football through real football games. Additionally, the combined method benefits from the advantages and elements of both methods. For example, in the Teaching Games for Understanding method, it utilizes elements such as increased tactical understanding, strengthened decision-making, promotion of inspiration and creativity, enhanced enjoyment and motivation, transfer of learned skills, and increased activity and dynamism, while in the exercise training method, it benefits from elements like extensive practical experience, cooperation and interaction, competition, technical and tactical exercises, and evaluation and feedback, contributing to the effectiveness of the combined method. Therefore, it seems logical that combining Teaching Games for Understanding and exercise training methods would lead to an increase in decision-making performance in student football games.

The fourth finding of the current research indicated that the effectiveness of the Teaching Games for Understanding (TGfU) approach was greater in comparison to traditional sports training and the combination of both methods. Furthermore, the effectiveness of the combined approach was found to be more significant than traditional sports training alone. While no specific research findings were identified to explain this phenomenon, it can be theorized that there is a significant difference in the effectiveness of these three methods in enhancing decision-making skills in football among students. This is noteworthy because TGfU showed the best performance in improving sports skills, primarily due to its focus on fundamental sports skills. Conversely, traditional sports training demonstrated lower performance compared to the other two methods, as it focuses more on the social aspects of sports than on sports skills. Another important point is that the combined method was expected to perform best, given its utilization of the advantages of both TGfU and traditional sports training, addressing both skill and social aspects of sports. However, this was not the case in practice, and it appears that the equal number of sessions for the combined method, in comparison to TGfU and traditional sports training, may have reduced its effectiveness relative to TGfU.

Limitations of this study include the use of purposive sampling, the absence of a control group due to ethical considerations, the single-gender composition of the research population, limited opportunities for the researcher to collect data, and the inability to control certain confounding and intervening variables, such as differing intelligence and talents of the students. Therefore, it is suggested that future studies include a control group and even a group receiving traditional training for comparison with the current study's results. If possible, random sampling should be employed to minimize sampling errors. Another recommendation is to

conduct this study on female students as well and compare the results. Finally, it is suggested that impactful confounding and intervening variables, such as intelligence and talent, be controlled. Based on the findings of this study, to improve decision-making performance in football among students, the TGfU approach, a combination of TGfU and traditional sports training, and finally, traditional sports training can be used in that order.

Ethical Considerations

In this study, ethical standards were observed and communicated to the students and their parents.

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Authors' Contributions

In this article, the student was responsible for data collection and analysis and the initial draft of the article, while the professors supervised the appropriate data analysis, the final writing of the article, and its submission and revisions.

Conflict of Interest

There were no conflicts of interest in this research.

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