

Combining Physical Education and unstructured practice during school recess to improve the students' decision-making and execution

Combinando las clases de Educación Física con práctica no estructurada durante los recreos para aumentar la toma de decisiones y la ejecución de los alumnos

*Alba Práxedes, **Rafael González, ***Fernando del Villar, ***Alexander Gil-Arias

*University of Nebrija (España), **University of Extremadura (España), ***Rey Juan Carlos University (España)

Abstract: The purpose of this study was to analyze the effect of a unit of basketball based on Teaching Games for Understanding model combined with a program of unstructured practice based on small-sided games (experimental group), in comparison to the only application of the unit (control group), on the decision-making and execution in Physical Education students. Participants were 31 students with ages between 12 and 14. The intervention was conducted over four weeks, developing eight PE lessons and eight school recess to unstructured practice. The decision-making and the execution of the pass action were measured by systematic observation, using the Game Performance Evaluation Tool instrument. Results showed in the experimental group, significantly higher values in post-test with respect to pre-test, in both variables (decision-making, $p = .001$; execution, $p = .024$). Regarding to the control group, these differences were found only in the decision-making ($p = .021$). Findings demonstrated that the joined application of a unit with unstructured practice is more effective to improve decision-making and skill execution than if students are exposed only in the Physical Education lessons. Therefore, we recommend teachers promote opportunities to students to have experiences in school recess.

Key words: Unstructured Practice, school recess, decision-making, execution, TGfU, basketball.

Resumen: El propósito de este estudio fue analizar el efecto de una Unidad Didáctica de baloncesto basada en el modelo Enseñanza de los Juegos a través de la Comprensión, combinada con un programa de práctica no estructurada basado en juegos modificados (grupo experimental), en comparación con la aplicación únicamente de la Unidad Didáctica (grupo control), en la toma de decisiones y la ejecución en alumnos de Educación Física. Participaron 31 alumnos con edades entre 12 y 14 años. La intervención se realizó durante cuatro semanas, desarrollándose ocho clases de Educación Física y ocho recreos para la práctica no estructurada. La toma de decisiones y la ejecución fueron medidas a través de observación sistemática, usando el Instrumento de Evaluación del Rendimiento en el Juego. Los resultados mostraron en el grupo experimental, valores significativamente más altos en la evaluación final con respecto a la inicial, en ambas variables (toma de decisiones, $p = .001$; ejecución, $p = .024$). Con respecto al grupo control, estas diferencias se encontraron solo en la toma de decisiones ($p = .021$). Los resultados demostraron que la aplicación conjunta de una Unidad Didáctica con práctica no estructurada es más efectiva para mejorar tanto la toma de decisiones como la ejecución de las habilidades, en vez de exponer a los alumnos solo a las clases de Educación Física. Por tanto, se recomienda que los profesores promuevan oportunidades de práctica en los recreos para los alumnos.

Palabras clave: Práctica no estructurada, recreos, toma de decisiones, ejecución, TGfU, baloncesto.

Introduction

The greater the amount of time in which children have high-quality experiences in sport practice is, the greater the skill acquisition they achieve will be (Araújo & Davids, 2011; Phillips, Davids, Renshaw & Portus, 2010). Several authors have been proposed that the skills acquisition could be developed within two practices (Coutinho, Mesquita, Davids, Fonseca & Côté, 2016):

micro-structure or structured practice (organised, teacher-led practice or also known as deliberated practice) and macro-structure or unstructured practice (non-organized, peer-led sporting play or also known as deliberated play). In other words, structured practice means that each learning activity may be carefully monitored, with a focus on immediate correction (e.g. within Physical Education, PE; Côté, Baker & Abernethy, 2003), while unstructured practice represents fun-oriented learning activity without supervision (e.g. school recess; Côté, Baker & Abernethy, 2007).

Regarding the structured practice, an important challenge for physical educators is to design effective

learning tasks in preparation for the physical (i.e. the ability to perform skills in open settings), cognitive (i.e. the ability to use tactics and reflect on how to improve personal/team performance), social (i.e. positive interactions with classmates) and affective (i.e. satisfaction and enjoyment being physically active) (Kirk, 2013). In team sports, where there is a prevalence of open skills, there is constant uncertainty in the game environment where the athlete develops the cognitive process of decision-making (García-González, Moreno, Gil-Arias, Moreno & Del Villar, 2014), although the sport expertise level also depends on the skills execution (Práxedes, Moreno, Sevil, García-González & Del Villar, 2016a; Lex, Essing, Knoblauch & Schack, 2015).

Thus, within this structured practice and to improve the decision-making and execution skill, the Teaching Games for Understanding (TGfU) model, has received in the last decade, much support from practitioners and the research community alike, analyzing how this pedagogical approach can influence on different learning outcomes such as game performance (Harvey, Cushion, Wegis & Massa-Gonzalez, 2010; Morales-Belando & Arias-Estero, 2017), physical literacy (Mandigo, Lodewyk & Tredway, 2019), psycho-social variables (Harvey, Gil-Arias, Smith & Smith, 2017; Úbeda-Colomer, Monforte & Devís Devís, 2016). Through game-centered approaches (GCAs), such as TGfU, students learn the tactical aspects of the game by playing modified/conditioned versions of the game to develop game appreciation and tactical awareness (Harvey & Jarrett, 2014). In this sense, Bunker and Thorpe (1982) suggested that modified and simplified versions of games could be used to teach the main tactics of the sport, and therefore this pedagogical model requires the physical PE teacher to consider the students and to suit the game form to learners' developmental level (Harvey & Jarrett, 2014). This facilitates the development of game play strategy and tactical decision-making related to both the on-and off-the-ball concepts required for effective game play (Turner & Martinek, 1999). Moreover, and although the cognitive domain is prioritized (Metzler, 2011; Morales-Belando & Arias-Estero, 2019), technical skills are simultaneously developed alongside tactics in contextualized situations (Small Sided Games; SSG) using the pedagogical principles of modification representation, modification exaggeration, and tactical complexity (Tan, Chow & Davids, 2012). Also, questioning is applied to understand the game through tactical knowledge (Gréhaigne, Richard & Griffin, 2005).

In this sense, SSG (commonly used modified games

that take place in tight spaces, involving small numbers of players and with modified rules of the game) have been proposed to be an effective methodological tool to the skills acquisition such as decision-making (Davids, Araújo, Correia & Vilar, 2013; Harvey & Jarrett, 2014); Práxedes, et al., 2016a). These games, with active defenders presence, facilitate transfer of actions, perception and cognitions of athletes from training simulations to performance environments. Practising passing with a teammate, shooting in the absence of a defender or dribbling around cones, are all basketball activities with reduced levels of specifying information needed to regulate functional behaviours in real contexts (González-Espinosa, Feu, García-Rubio, Antúnez & García-Santos, 2017; Práxedes, Del Villar, Moreno, Gil-Arias & Davids, 2019). To achieve learners make intelligent decisions based on their own, teammates' and opponent' action capabilities, these practices should be more dynamic (e.g. 2 vs. 1 with the objective to shoot to the basket with the lowest level of opposition) (Fajen, Riley & Turvey, 2009). On the other hand, when the TGfU model is applied, it is necessary to highlight the use of questioning as a cognitive tool that permits focusing attention on specific technical-tactical aspects by means of questions that the teacher asks the students (Vickers, 2007). In this regard, Webb and Pearson (2008) indicate the usefulness of applying questioning to favour cognitive development and thus create a critical and reflexive attitude in students (Gréhaigne, et al., 2005), consequently improving the decision-making (García-González, et al., 2014) and the execution (Gil-Arias & del Villar, 2014).

Regarding the unstructured practice, this is less organized. In those activities there are not a coach, but which emerge from the interactions of individuals who organise their own activities and games for the purposes of learning (Davids, Güllich, Shuttleworth, & Araújo, 2016). Thus, these activities allow them to explore their independence and enhance their organization and leadership skills (Côté et al., 2007; Côté & Erickson, 2015; Côté, Erickson, & Abernethy 2013), promoting the formation of smart and creative players (Côté et al., 2007, Côté et al., 2013). Also, the absence of an adult, and consequently, the absence of a feedback, it contributes to enhance the level of autonomy for the children to perceive and solve problems that emerge in the game context (Machado, Barreira, Galatti, Chow, Garganta & Scaglia, 2018). In contrast to the original definition of deliberate play (Côté, et al., 2003, 2007), unstructured practice may also include spontaneous fun

activities but with the goal of improving skills or performance (e.g. students playing handball in the school recess to improve the skills that they are learning in PE lessons) (Côté, et al., 2013). In this regard, unstructured play, which it can be developed in play environments like the school recess, has been related with the development of sport expertise (Ford & Williams, 2012). Nevertheless, little attention has been given to these practices (Coutinho, et al., 2016; Forsman, et al., 2016). On the contrary, in the scientific literature, we found systematic reviews have suggested that school recess could make a meaningful contribution to physical activity of children and adolescents (Ridgers, et al., 2012; Parrish, Okely, Stanley & Ridgers, 2013) and it is the most natural environment that children can find in the school, enjoying the freedom of organizing, establishing or modifying game rules and putting into practice different attitudes (Rodríguez-Fernández, Pereira, Pereira, & Condessa, 2019).

Although it is clear that structured and unstructured play and practice activities are not completely divergent, there is a need for more research to understand how the benefits of unstructured practice and play can be captured in principles for formalised development programmes, which are not directly conceptualized, planned and over-seen by coaches and teachers (Coutinho et al., 2016; Forsman et al., 2016). Specifically, in the scientist literature, there are no research that have sought to investigate the effects of intervention programs that combine the structured practice and the unstructured practice on the decision-making and execution variables. Therefore, the main objective of this study was to analyze the effect of a unit of basketball (structured practice) based on the TGfU model (developed in PE lessons) combined with a program based on unstructured practice (developed in school recess), in comparison to the only application of the unit, on the decision-making and execution of the pass action in PE students.

Method

Design and participants

A purposive sampling method was used to recruit participants for this study (Creswell, 2014). Participants were 31 students ($M_{age} = 12.39$, $SD_{age} = .57$), who were in their first year of secondary school and were members of two PE classes from one south-west Spanish public school. Students had not received formal basketball unit previously however, all participants had previous

experience in other team sports (e.g. handball), which they were taught through TGfU. 21 students from one class (identified such as experimental group) experienced a TGfU basketball unit combined with a program based on unstructured practice ($M_{age} = 12.23$, $SD_{age} = .436$; $n = 9$ female), while 10 students from another class (identified such as control group) experienced only the TGfU basketball unit ($M_{age} = 12.9$, $SD_{age} = .567$, $n = 3$ female), within a pre-test/post-test quasi-experimental design. Students who didn't participated in two or more lessons from the unit, didn't considered them as participants to this study (in total, 3 students from the experimental group and 8 students from de control group).

The teacher of both classes was a 25-year-old male who had two years of experience teaching PE. The teacher had not prior experience using TGfU. Consequently, he completed a training course in this pedagogical model, including the use of SSGs and questioning.

The research project was fully approved by the Ethics Research Committee of the University of Extremadura (Spain). The participants and their parents were informed of the study and an informed written consent was obtained from the parents/guardians. Participants were treated in agreement with the ethical guidelines of the American Psychological Association with respect to participant assent, parent/guardian consent, confidentiality and anonymity.

Intervention

Intervention program based on structured practice (TGfU model). This program was conducted, in both groups, in a unit of eight lessons (four weeks). Each lesson had a length of 55 minutes. Learning tasks were modified to consider the students and to suit the game form to learners' developmental level using the pedagogical principles of TGfU (i.e. representation, exaggeration, and tactical complexity). For example, modification representation (i.e. smaller formats such as 2 vs. 2 and 3 vs. 3) was used to increase the students' game involvement. Modification exaggeration was used by PE teacher to change/modify game rules to emphasize specific tactical learning objectives (e.g. a maintaining possession game where the baskets were removed emphasized the use of different types of passes to move the ball between team members). And finally, tasks were presented in progressive 'layers' (i.e. numerical superiority in attack such as 2 vs. 1 and 3 vs. 2) so that tactical complexity was increased based on the tactical



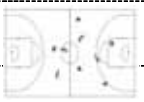
skill development of the students, by providing a greater time to make decisions and make it easier (Sampaio, Lago, Gonçalves, Maças & Leite, 2014). Through this teaching approach, game teaching promotes the learning of tactics and strategies of game play in tandem with technique development. Also, modified games allow to design tasks authentic and connected to the sport form (Kirk & McPhail, 2002). The objectives for the sessions were focused on the offensive skills, in which an integration of technical and tactical aspects was always sought, are displayed in Table 1.

Table 1.
Lessons objectives and lessons contents.

Lesson number	Lessons contents	Small-sided games
1	Pass and reception	Keep the ball possession: 4 vs. 2 Progression towards the opposite field: 2 vs. 1 and 3 vs. 2
2	Pass and mobility to create lines of pass	Keep the ball possession: 4 vs. 3 Progression towards the opposite field and shooting: 2 vs. 1 and 3 vs. 2
3	Space (width in attack)	Keep the ball possession: 3 vs. 3 Progression towards the opposite field and shooting: 3 vs. 2 and 4 vs. 3
4	Penetration (progress to the basket)	Keep the ball possession: 4 vs. 4 Progression towards the opposite field: 4 vs. 3 Representation of a real match: 3 vs. 3 + wildcard
5	Creation and occupation of free spaces	Keep the ball possession: 4 vs. 4 Progression towards the opposite field: 4 vs. 3 Representation of a real match: 3 vs. 3 + wildcard
6	Creation of lines of passes II Counterattack	Keep the ball possession: 4 vs. 4 Progression towards the opposite field: 4 vs. 3 Representation of a real match: 4 vs. 4 + wildcard
7	Creation and occupation of free spaces II	Keep the ball possession: 4 vs. 4 Progression towards the opposite field: 4 vs. 4 Representation of a real match: 4 vs. 4
8	Space (width in attack) II Penetration (progress to the basket) II	Keep the ball possession: 5 vs. 5 Progression towards the opposite field: 5 vs. 5 Representation of a real match: 5 vs. 5

In each lesson, three tasks of 15 minutes each one, and based on SSGs, were conducted. These were designed to be similar to the reality of the game and each referred to a offensive game principle (Bayer, 1992; Mitchell, Oslin & Griffin, 2006): (i) to keep the ball possession without the objective of progression towards the goal; (ii) to progress towards the goal beating a defence line and to be near from the opposite goal; and (iii) to shoot at goal with the lowest level of opposition. In almost all the tasks, the size of the field was reduced to 1/2 of the basketball court and the number of players was also reduced to 3-4 player per team. To further illustrate the lessons contents, Table 2 presents an example, specifically lesson 8 in which were represented all the tactical principles of play. In addition, it was developed questioning, as a cognitive tool (Vickers, 2007). In this sense in each task it was prepared some questions. The teacher asked to the group the questions after seven minutes of practice. After one minute asking some question, students returned to played in the same task (Pizarro, Práxedes, Travassos, Del Villar & Moreno 2019). Additionally, the teacher asked individualized questions to those players who did not solve the task.

Table 2.
Example of the lesson 8 of the TGFU unit (SSGs + questioning).

Objective	Explanation	Graphic
Space (width in attack)	<i>Organization:</i> 5 vs. 5 in 1/2 of the basketball court. <i>Game principle:</i> keep the ball possession. <i>Aim:</i> keep the ball possession (reward with 1 point when a team achieve 5 passes without the other team steal the ball). If one team achieve that, it can be achieve 2 points if score a basket in one of the four hoops.	
Questions	- <i>To the player with the ball:</i> Who teammate is better to pass the ball? Why? - <i>To the attack player off the ball:</i> Where do you have to be to receive the ball farther to the defenders? Why?	
Penetration (progress to the basket)	<i>Organization:</i> 5 vs. 5 in 1/2 of the basketball court. <i>Game principle:</i> progression towards the opposite field. <i>Aim:</i> achieve 3 passes and then receive a ball from another teammate in the second zone and try to receive, from a teammate, the ball in any of the squares. This achievement was reward with 1 point.	
Questions	- <i>To the player with the ball:</i> Who teammate do you have to decide to pass the ball in order to progress toward the basket? Why? - <i>To the attack player off the ball:</i> Toward which zone do you have to move in order to receive the ball? Why?	
Spacing and penetration	<i>Organization:</i> 5 vs. 5 in the basketball court. <i>Game principle:</i> representation of a real match. <i>Aim:</i> scored a basket was reward with 1 point.	
Questions	- <i>To remember:</i> - How is better to receive the ball? Why? - Have to be all teammate closed each other or separated? Why?	

Intervention program based on unstructured practice. This program was conducted in the school recess, in the same days in which the unit was being developed. Only the experimental group participated in this program. Specifically, participants played one small-sided game with a length of 8' per day. In the first two weeks (4 sessions) they play 2 vs. 2, and in the last two weeks (4 sessions), 4 vs. 4. It was a like a competition league in which each team played with the others. Participants organised their teams with the following rule: each team must have girls and boys. Regarding to the teacher, he didn't say any correction or feedback, he was there in case it was any problem. Players played with the rules that they were learning (i.e. not hitting or charging, not dribbling the ball with both hands at the same time, taking more than 3 steps without dribbling the ball, and once the attacker team has brought the ball across the mid-court line they cannot go back across the line). It was not necessary the presence of a teacher to be a referee.

Dependent variables

Decision-making and execution of the passing action were measured in the pre-test and post-test. Decision-making is defined as the process whereby learners select one type of game action from a series of alternatives to execute it at a specific moment and in a real game situation (Bar-Eli, Plessner & Raab, 2011). It was measured by the percentage of successful decision over the total number of decisions made. Execution is defined as the performance, outcome, or the final result of the motor execution (Bar-Eli et al., 2011). It was also measured by the percentage of successful execution over the total number of execution made.

Data collection

In pre-test and post-test phases, students participated in a small-sided game (3 vs. 3) with a length of 10', divided in two parts of 5' with a recovery of 1'. The size was 20 x 12 meters (length x width). In both phases (pre-test and post-test, the teams were the same (i.e. participants played against the same classmates). Also, the teams that faced each other were composed by students with the same level of expertise. The main rules were the following: not hitting or charging, not dribbling the ball with both hands at the same time, taking more than 3 steps without dribbling the ball, and once the attacker team has brought the ball across the mid-court line they cannot go back across the line. There were not free throws, after a foul commit by one team, another team started a new play from the nearest place of the one bound. Moreover, the PE teacher had an extra ball to give participants if the ball goes far away, to avoid lose time, and was the referee, to guarantee the compliance of the rules.

The decision-making and execution assessment was based on indirect and external systematic observation, a methodology that had been used in previous studies to measure learners' decision-making and execution in real game situations in PE, which represents the influence of the environment on decision-making and execution (Travassos, et al., 2013). The Game Performance Evaluation Tool (GPET) observation instrument (García-López, González-Villora, Gutiérrez & Serra, 2013), was used to assess the decision-making and execution of the pass action. This instrument permitted evaluating the player's tactical problem-solving skills, by means of selecting and applying an appropriate technique, and evaluating both measurements (decision-making and execution) in real game situations, as it has had in previous studies (González-Espinosa, et al., 2017; Práxedes, et al., 2019).

Through this instrument, decision-making was coded as 1, if successful (e.g. passing to a teammate who is unmarked) or 0 if unsuccessful (passing to a player who is marked closely or there is a defensive player in a position to cut off the pass; passing to an area of the pitch where no team-mate is positioned). Likewise, execution was coded as 1, if successful (passing to a teammate: to his body if he is stationary, lead pass if he is running) or 0 if unsuccessful (the pass is too high, too far, behind or out of play).

Decision-making variable was assessed by means of the percentage of successful decisions referring to the student's capacity to take appropriate decisions under

specific conditions. Likewise, execution was assessed by means of the percentage of successful actions completed by students. To calculate the percentage of successful decisions and executions, the total number of decisions and executions were divided by the sum of the successful and unsuccessful decisions, and executions, and multiplied by 100 (Mitchell, Oslin, & Griffin, 2006).

A research observer was trained to analyze decision-making and the execution of passing action. This observer was trained by an expert in basketball (Level 1 by the Spanish Basketball Federation and Degree in Sport and Exercise Sciences), who has five years of experience in observational methodology (researcher with experience in research projects). The observer had to undergo a training process with an expert researcher, establishing a total of five 45-minute sessions in order to obtain suitable reliability in both variables.

As a preliminary step, the expert met with the observer to clarify possible doubts about the observation instrument and the coding criteria of each dependent variable (decision-making and execution). Subsequently, the observations were carried out with a sample of more than 10% of the total (Tabachnick & Fidell, 2007). Inter-observer reliability was calculated using the following formula: $\frac{\text{agreements}}{\text{agreements} + \text{disagreements}} \times 100$ measure. Once this value was calculated, the Cohen kappa index was used. All training values were observed to be above .90, surpassing the value .81 from which an adequate agreement is considered (Fleiss, Levi & Cho Paik, 2003), thus achieving the necessary reliability for the subsequent coding of the dependent variables. To guarantee the time reliability of the measurement, as it was developed in other studies (Pizarro, et al., 2019; Práxedes, et al., 2019) the same sample of matches was analyzed with a time difference of ten days, obtaining intraobserver reliability results of .91. These results reflected very good concordance, thus obtaining the necessary reliability for the subsequent coding of the dependent variable.

Procedures

In order to guarantee the correct application of the intervention program, the PE teacher was instructed by an expert. The expert was a professor in Sport and Exercise Sciences and has 12 years' experience in teaching methodologies in both contexts, educational and coaching. As in the previous studies (Gil-Arias, Harvey, Cárceles, Práxedes, & Del Villar, 2017; Harvey, et al., 2010; Práxedes, et al., 2019), the training program to instruct the teacher was developed over three weeks

before the intervention program was applied. In the first week, the teacher was required to read three TGfU model-related articles (Gil-Arias et al., 2017; Práxedes, García-González, Moreno-Cortés, Moreno & Moreno, 2016b; Tan, et al., 2012). For each article, the teacher met with the first author to discuss the contents. In the second week, the teacher designed learning tasks based on the principles of TGfU focusing on the application of small-sided games and questioning. Finally, in the third week a practical application of the tasks took place with a group of the same year of Secondary Education. In total, the PE teacher dedicated 5 hours per week. In this sense, it was assessed the intervention using the checklist developed to the structured practice (see Table 4).

Once the teacher training process was completed, pre-test data were obtained. After that, the intervention began, which was conducted over a period of four weeks. The experimental group experienced a TGfU basketball unit combined with a program based on unstructured practice, while the control group experienced only the TGfU basketball unit. Finally, and when the intervention phase was completed, the post-test data were obtained.

Instructional and Treatment Validity

To assess the fidelity of the intervention, a checklist was used for each practice (structured practice based on TGfU model and unstructured practice) (Hastie & Casey, 2014). To create both checklist, it has been followed the example of Gil-Arias, Claver, Práxedes, del Villar & Harvey (2020). Then, authors followed the scientist literature to identified the more relevant items for each intervention. In Table 3 are represented the items related to TGfU model and in Table 4, items which enabled researchers to measure the fidelity to unstructured practice. The fidelity assessment was based on direct and external systematic observation. The first

author and one additional observer (researcher with 15 years' experience supervising teaching methodologies) observed a sample of two lessons for each group, more than 10% the total sample (Tabachnick & Fidell, 2007). A 100% agreement was reached between the two observers, who confirmed that all key aspects included in the checklist with regard to the features of the TGfU model and to the unstructured practice were used in each observed-session.

Statistical analysis

The statistical program SPSS v21.0 (Chicago, IL) was used for the data analysis and processing. Data normality was examined through the Kolmogorov-Smirnov test (for samples of more than 30 subjects), indicated data did not follow a normal distribution ($p < .05$), which led to the use of non-parametric statistics. In addition, as a prior stage to the application of the intervention program, the homogeneity of variance through Levene's test was developed, determining that the groups were equivalent in all study variables (decision-making, Levene statistic = .505, $p = 483$; execution, Levene statistic = .704, $p = 408$).

Secondly, intergroup analysis through Mann-Whitney test for independent measures, was developed to compare the mean scores of each measure between both groups in each dependent variable. Finally, and in order to verify any differences between the different times in each dependent variable, it was developed Wilcoxon test for measures related to Bonferroni correction (significance level of $.05/2 = .025$). For the Mann-Whitney and Wilcoxon tests, effect sizes were calculated using the following equation $r = Z / \sqrt{N}$ (Rosenthal & DiMatteo, 2001). The effect size (ES) was classified as no effect ($ES < 0.04$), minimum effect ($0.04 < ES < 0.25$), moderate effect ($0.25 < ES < 0.64$), and strong effect ($ES > 0.64$) (Ferguson, 2009).

Results

Results according to each measure (intergroup analysis) are presented below in Table 5. With respect to the pre-test, no significant differences were obtained between both group in any of the variables (decision-making and execution). Regarding to the post-test, it can be seen the same results that in the pre-test.

Results according to the group (intragroup analysis) are presented below in Table 6. With respect to the experimental group, significantly higher values were

Table 3.

Instructional Checklist of structured practice (TGfU during PE sessions).

Date:	Present	Absent
1. All the tasks are related to small-sided games.		
2. All the tasks have different solutions.		
3. The teacher simply explains the task without providing solutions.		
4. The number of players per team is between 2 and 5.		
5. The pitch is reduced proportionally to the number of players.		
6. The time to maintain the ball possession without doing an action is not limited for any task.		
7. The teacher observed each student and used the questioning to provoke the reflection.		
8. Each group receives at least one question.		

Table 4.

Instructional Checklist of unstructured practice (during school recess).

Date:	Present	Absent
1. In the first two weeks, students play 2 vs. 2, and in the last two weeks, 4 vs. 4.		
2. The teacher supervises the practice without intervention or any feedback.		
3. Students organize their teams with the rule "each team has girls and boys".		
4. Students are independent (e.g. they know the rules, it is not necessary the presence of a teacher to be a referee).		

obtained in post-test with respect to pre-test, in the decision-making and execution of the passing action. Moreover, the effect size of the decision-making is greater than the execution. With respect to the control group, significantly higher values were obtained in post-test with respect to pre-test, in the decision-making of the passing but not in the execution of this action.

Table 5.
Descriptive statistics and pairwise comparison of the decision-making and execution in the pass action for intragroup analysis

Measure	Variable	Experimental		Control		Wilcoxon Z	p	ES
		M	SD	M	SD			
Pre-test	Decision-making	.384	.252	.414	.137	-.717	.474	.126
	Execution	.730	.241	.723	.151	-.638	.524	.112
Post-test	Decision-making	.628	.173	.678	.198	-.655	.512	.115
	Execution	.839	.127	.774	.178	-.283	.283	.050

Note. ES: effect size.

Table 6.
Descriptive statistics and pairwise comparison of the decision-making and execution in the pass action for intragroup analysis

Group	Variable	Pre-test		Post-test		Wilcoxon Z	p	ES
		M	SD	M	SD			
Experimental	Decision-making	.384	.252	.628	.173	-3.360	.001	.593
	Execution	.730	.241	.839	.127	-2.254	.024	.398
Control	Decision-making	.414	.137	.678	.198	-2.310	.021	.408
	Execution	.723	.151	.774	.178	-.764	.445	.135

Note. ES: effect size.

Discussion

The purpose of this study was to analyze the effect of a unit of basketball (structured practice) based on the TGfU model (developed in PE lessons) combined with a program based on unstructured practice (developed in school recess), in comparison to the only application of the unit, on the decision-making and execution of the pass action in PE students. In this regard, the experimental group participated in both programs (structured practice and unstructured practice) while the control group participated only in the structured practice.

In terms of the *decision-making*, results show no significant differences between both groups (experimental and control) in the post-test. However, and regarding the intragroup analysis, results show significantly higher values in the post-test, in comparison with the pre-test, in both groups. In this sense, learners from control group, who participated only in the structured practice (unit based on TGfU model), also improved the decision-making of the pass action. Thus, these findings seem to indicate that the basketball unit based on TGfU was effective to improve the decision-making of all the PE students.

There are a number of possible reasons for these outcomes. Firstly, the representativeness of the practice (provided with the task design based on the principles of the game) could have led to learners to make intelligent decisions based on their own, teammates' and opponent' action capabilities (Fajen, et al., 2009).

Additionally, the unit was designed based on the tactical contents present in the game, exposing learners to contextualized situations that occur normally in the game as required by TGfU (Calábria, Greco & Pérez-Morales, 2019; Gutiérrez, Fissette, García-López & Contreras, 2014). In this way, make decisions in terms of decide to pass the ball or when is the best moment to do this action, have led to learners a better adaptation to the competitive environments. Secondly, through the principle of exaggeration, the teacher could emphasize specific tactical learning objectives (provided with the modification of the game's rules) that guide players towards the task goals and to explore new solutions for the play (Passos, et al., 2008). For example, the rule «receive a ball from another teammate in a free zone to achieve one point» could guide the attention to occupy the free spaces. And finally, the modification of the tactical complexity permitted adapt task to students needs and level of competence (Práxedes, et al., 2019). As Pizarro et al. (2019) indicated, the numerical superiority in attack increases the number of passing possibilities of attacking team to maintain ball possession or to progress on the field. In this regard, modify the task complexity seems to be a good strategy to highlight passing lines and to guide players to explore information that sustain their passing decisions and actions. Therefore, the task design based on the pedagogical principles seems to be effective to developed decision making and skill execution (Tan, et al., 2012).

On the other hand, the application of questioning, as a methodological tool, has probably had a decisive influence on the results obtained, favouring cognitive development (Gréhaigne, Richard & Griffin, 2005) and consequently improving the decision-making (García-González, et al., 2014; Práxedes, et al., 2016a). In line with our results, Gaspar, Del Villar, Práxedes, Moreno (2019) obtained that the students who received the questioning when developing SSG improved their decision-making compared to those who did not.

In terms of the *execution*, results show no significant differences between both groups in the post-test. However, and regarding the intragroup analysis, results show significantly higher values in post-test in the experimental group. These findings seem to indicate that the extra time, promoted by the unstructured practice in the school recess, led a significantly improvement of this variable. On the contrary, learners who were not exposed to the unstructured practice, did not improved the execution of the pass action. In the scientific literature, findings of some previous research are aligned with the

results obtained in our study. In this regard, in a study developed in an educational context, in which it was analysed the effect of a teaching program based on TGfU model, results showed significant differences in the decision-making but not in the execution (Práxedes, et al., 2016b). These findings indicated that the length of the program must be extensive to improve this variable, as determined by previous studies that indicated the need for programs to include more than 12 sessions (Harvey, et al., 2010; Turner & Martinek, 1999). In this regard, it seems that we should increase the length of the units to provoke improvements in the execution. However, in the educational context there is a limitation in the number of hours dedicated to the PE subject (specifically, two weekly sessions of 55-minutes). As some systematic reviews have suggested, school recess could make a meaningful contribution to physical activity of children and adolescents (Ridgers, et al., 2012; Parrish, et al., 2013). In this sense, combine structured and unstructured practice could be a solution to achieve the skills acquisition (Coutinho, et al., 2016).

The current study had several strengths. First, instruments with sound reliability and validity were utilized to collect the data (i.e. GPET instrument). Second, another strength could be the fidelity of the intervention (the PE lessons were supervised by a researcher using a 8-item checklist and the teacher was instructed by an expert such as in previous research Práxedes, et al., 2019; Gil-Arias, et al., 2017). And third, the novelty of this study, there are no research that have sought to investigate the effects of intervention programs that combine the structured practice and the unstructured practice on the decision-making and execution variables. Despite the aforementioned strengths, the study results should be treated with some caution due to the utilization of a small sample and only one teacher, which limits the capacity to extrapolate the results. In future studies, we recommend to instruct more teachers in order to increase the number of PE classes and finally, the participants. On other hand, it would be interesting a third group that participate only in the school recess, which would provide more power to detect significant differences.

Conclusions and practical implications

In the educational context, specifically in Spain, in which children have two weekly 55-minutes PE lessons, findings suggest the promotion of unstructured practices in order to increase the amount of time of play.

Developing this practices during the school recess could be a good strategy. It seems that with this extra time, learners will improve both the decision-making and the execution variables. Considering the potential contribution of unstructured practices for students, teachers should reflect on encouraging and creating more opportunities for such experiences (e.g enhance the school facilities during free time to encourage students play with specific material such as balls or baskets with less height).

Within the structured practice, TGfU model is considered effective to improve the decision-making. SSGs allow contextualized practices in which learners are the centre of the learning and then they really transfer tactical knowledge among those games to the real competition. Thus, teachers should consider it as a methodology in their PE lessons. Furthermore, we highlight the use of questioning to favour cognitive development and thus the decision-making.

References

- Araújo, D., & Davids, K. (2011). Talent development: from possessing gifts, to functional environmental interactions. *Talent Development & Executioncellence*, 3, 23–26.
- Bar-Eli, M., Plessner, H., & Raab M. (2011). *Judgement, decision-making and success in sport*. West Sussex: Wiley-Blackwell.
- Bayer, C. (1992). *La enseñanza de los juegos deportivos colectivos*. Barcelona: Hispano Europea.
- Bunker, D., & Thorpe, R. (1982). A model for the teaching of games in secondary schools. *Bulletin of Physical Education*, 18, 5–8.
- Calábria, M., Greco, P.J., & Pérez-Morales, J. C. (2019). Teaching Games for Understanding in basketball camp: the impact on process and product performance. *RICYDE. Revista Internacional de Ciencias del Deporte*, 15(56), 209-224. <https://doi.org/10.5232/ricyde2019.05606>
- Côté, J., & Erickson, K. (2015). Diversiúication and deliberate play during the sampling years. In J. Baker, & D. Farrow (Eds.), *Routledge handbook of sport expertise* (pp. 305-316). London: Routledge.
- Côté, J., Baker, J., & Abernethy, B. (2003). *From play to practice: a developmental framework for the acquisition of expertise in team sports*. In J. L. Starkes and K. A. Ericsson (Eds.), *Expert Performance in Sports: Advances in Research on Sport Expertise* (pp. 89-95). Champaign, IL: Human Kinetics.
- Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In G. Tenenbaum and R. C. Eklund (Eds.), *Handbook of Sport Psychology* (pp. 184–202). New York, EEUU: John Wiley & Sons Inc.
- Cote, J., Erickson, K., & Abernethy, B. (2013). Play and practice during childhood. In J. Cote, & R. Lidor (Eds.), *Conditions of children's talent development in sport* (pp. 9-20). Morgantown,

WV:FTT

- Coutinho, P., Mesquita, I., Davids, K., Fonseca, A. M., & Côté, J. (2016). How structured and unstructured sport activities aid the development of expertise in volleyball players. *Psychology of Sport & Exercise, 25*, 51–59.
- Creswell, J.W. (2014). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches* (4th ed.). Thousand Oaks, CA: Sage.
- Davids, K., Araújo, D., Correia, V., & Vilar, L. (2013). How small-sided and conditioned games enhance acquisition of movement and decision-making skills. *Exercise and Sport Sciences Reviews, 41*(3), 154–161. <https://doi.org/10.1097/JES.0b013e318292f3ec>
- Davids, K., Güllich, A., Shuttleworth, R., & Araújo, D. (2016). Understanding environmental and task constraints on talent development. Analysis of micro-structure of practice and macro-structure of development histories. In J. Baker, S. Coble, J. Schorer, & N. Wattie (Eds.), *Routledge Handbook of Talent Identification and Development in Sport*. New York, EEUU: Routledge.
- Fajen, B. R., Riley, M. A., & Turvey, M. T. (2009). Information, affordances, and the control of action in sport. *International Journal of Sport Psychology, 40*, 79–107.
- Ford, P.R., & Williams, A. M. (2012). The developmental activities engaged in by elite youth soccer players who progressed to professional status compared to those who did not. *Psychology of Sport and Exercise, 13*, 349–352.
- Fleiss, J. L., Levi, B., & Cho Paik, M. (2003). *Statistical methods for rates and proportions*. 3th edition. New York, EEUU: Wiley.
- Ferguson, C. J. (2009). An effect size primer: a guide for clinicians and researchers. *Professional Psychology: Research and Practice, 40*, 532–538. <https://doi.org/10.1037/a0015808>
- García-López, L. M., González-Villora, S., Gutiérrez, D., & Serra, J. (2013). Development and validation of the Game Performance Evaluation Tool (GPET) in soccer. *Revista Euroamericana de Ciencias Del Deporte, 2*, 89–99.
- García-González, L., Moreno, A., Gil-Arias, A., Moreno, M. P., & Del Villar, F. (2014). Effects of decision training on decision-making and performance in young tennis players: An applied research. *Journal of Applied Sport Psychology, 26*(4), 426–440. <https://doi.org/10.1080/10413200.2014.917441>
- Gaspar, V.M., Del Villar, F., Práxedes, A., & Moreno, A. (2019). El cuestionamiento como herramienta fundamental para el desarrollo de la toma de decisiones de los alumnos en Educación Física. *Movimiento, 25*, e25028. <https://doi.org/10.22456/1982-8918.86547>
- Gil, A., & del Villar, F. (2014). Aplicación de un programa de entrenamiento decisional, en tiempo real de juego, para la mejora de rendimiento táctico individual del deportista. En L. García-González and F. Del-Villar (Eds.), *Entrenamiento táctico y decisional en el deporte* (pp. 132–146). Madrid: Síntesis.
- Gil-Arias, A., Claver, F., Práxedes, A., del Villar, F., & Harvey, S. (2020). Autonomy, motivational climate, enjoyment and competence in physical education: Effect of a hybrid TGfU/SE unit. *European Physical Education Review, 26* (1), 36–53. <https://doi.org/10.1177/1356336X18816997>
- Gil-Arias, A., Harvey, S., Cárceles, A., Práxedes, A., & Del Villar, F. (2017). Impact of a hybrid TGfU-Sport Education unit on student motivation in physical education. *PLoS ONE, 12* (6), e0179876. <https://doi.org/10.1371/journal.pone.0179876>
- González-Espinosa, S., Feu, S., García-Rubio, J., Antúnez, A., & García-Santos, D. (2017). Diferencias en el aprendizaje según el método de enseñanza-aprendizaje en el baloncesto [Differences in learning according to the teaching method in basketball]. *Journal of Sport Psychology, 26*(1), 65–70.
- Gréhaigne, J.F., Richard, J., & Griffin, L. (2005). *Teaching and learning team sports and games*. New York: Routledge.
- Gutiérrez, D., Fiset, J., García-López, L. M. & Contreras, O. (2014). Assessment of secondary school students' game performance related to tactical contexts. *Journal of Human Kinetics, 42*, 223–234. <http://www.johk.pl/files/37gutierrez.pdf>
- Harvey, S., Cushion, C. J., Wegis, H. M., & Massa-González, A. N. (2010). Teaching games for understanding in American high-school soccer: a quantitative data analysis using the game performance assessment instrument. *Physical Education and Sport Pedagogy, 15*(1), 37–41. <https://doi.org/10.1080/17408980902729354>
- Harvey, S., Gil-Arias, A., Smith, M. L., & Smith, L. R. (2017). Middle and elementary school students' changes in self-determined motivation in a basketball unit taught using the Tactical Games model. *Journal of Human Kinetics, 59*, 39–53. <http://www.johk.pl/files/10078-59-2017-v59-2017-05.pdf>
- Harvey, S. & Jarrett, K. (2014). Review of the game-centred approaches to teaching and coaching literature since 2006. *Physical Education and Sport Pedagogy, 19*(3). <https://doi.org/10.1080/17408989.2012.754005>
- Hastie, P.A., & Casey, A. (2014) Fidelity in models-based practice research in sport pedagogy: A Guide for future investigations. *Journal of Teaching in Physical Education, 33*(3), 422–431. <https://doi.org/10.1123/jtpe.2013-0141>
- Kirk, D., & MacPhail, A. (2002). Teaching game for understanding and situated learning: rethinking the Bunker-Thorpe Model. *Journal of Teaching in Physical Education, 21*(2), 177–192. <https://doi.org/10.1123/jtpe.21.2.177>
- Kirk, D. (2013). Educational value and models-based practice in physical education. *Educational Philosophy and Theory, 45*(9), 973–986.
- Lex, H., Essing, K., Knoblauch, A., & Schack, T. (2015). Cognitive representations and cognitive processing of team-specific tactics in soccer. *PLOS ONE, 10*(2) :e0118219 <https://doi.org/10.1371/journal.pone.0118219>
- Machado, J. C., Barreira, D., Galatti, L., Chow, J.Y., Garganta, J. & Scaglia, A.J. (2018): Enhancing learning in the context of street football: a case for Nonlinear Pedagogy. *Physical Education and Sport Pedagogy, 24*(2). <https://doi.org/10.1080/17408989.2018.1552674>

- Mandigo, J., Lodewyk, K., & Tredway, J. (2019). Examining the impact of a Teaching Games for Understanding approach on the development of physical literacy using the passport for life assessment tool. *Journal of Teaching in Physical Education, 38*(2), 136-145. doi: 10.1123/jtpe.2018-0028 <https://doi.org/10.1123/jtpe.2018-0028>
- Metzler, M. W. (2011). *Instructional Models for Physical Education* (3rd ed.). Scottsdale, AZ: Holcomb Hathaway.
- Mitchell, S., Oslin, J., & Griffin L. (2006). *Teaching sport concepts and skills: a tactical games approach*. Champaign, IL: Human Kinetics.
- Morales-Belando, M. T., & Arias-Estero, J. L. (2019). Adaptación práctica del enfoque Teaching Games for Understanding para la enseñanza de la vela en iniciación (A practical proposal of Teaching Games for Understanding in sailing initiation). *Retos, 37*(37), 738-741. <https://doi.org/10.47197/retos.v37i37.72788>
- Morales-Belando, M.T., Calderón, A., & Arias-Estero, J.L. (2018). Improvement in game performance and adherence after an aligned TGfU floorball unit in physical education. *Physical Education & Sport Pedagogy, 23*(6), 657-671. <https://doi.org/10.1080/17408989.2018.1530747>
- Passos, P., Araújo, D., Davids, K., & Shuttleworth, R. (2008). Manipulating constraints to train decision making in rugby union. *International Journal of Sports Sciences and Coaching, 3*, 125-140. <https://doi.org/10.1260/174795408784089432>
- Parrish, A. M., Okely, A. D., Stanley, R. M., & Ridgers, N. D. (2013). The effect of school recess interventions on physical activity: a systematic review. *Sports Medicine, 43*, 287-299. <https://doi.org/10.1007/s40279-013-0024-2>
- Phillips, E., Davids, K., Renshaw, I., & Portus, M. (2010). Expert performance in sport and the dynamics of talent development. *Sports Medicine, 40*, 271-283.
- Pizarro, D., Práxedes, A., Travassos, B., DelVillar, F., & Moreno, A. (2019). The effects of a nonlinear pedagogy training program in the technical-tactical behaviour of youth futsal players. *International Journal of Sport Science & Coaching, 14*(1), 15-23. <https://doi.org/10.1177/1747954118812072>
- Práxedes, A., DelVillar, F., Moreno, A., Gil-Arias, A., & Davids, K. (2019). Effects of a nonlinear pedagogy intervention programme on the emergent tactical behaviours of youth footballers. *Physical Education and Sport Pedagogy, 24*(4), 332-343. <https://doi.org/10.1080/17408989.2019.1580689>
- Práxedes, A., García-González, L., Moreno-Cortés, A., Moreno, M. P., & Moreno, A. (2016a). Aplicación de un programa de intervención para la mejora de la comprensión táctica en fútbol sala. Un estudio en contexto educativo. *Movimiento, 22*(1), 51-62.
- Práxedes, A., Moreno, A. Sevil, J., García-González, L., & Del Villar, F. (2016b). A preliminary study of the effects of a comprehensive teaching program, based on questioning, to improve tactical actions in young footballers. *Perceptual & Motor Skills, 122* (3), 742-756. <https://doi.org/10.1177/0031512516649716>
- Renshaw, I. J., Chow, Y., Davids, K., & Hammond, J. (2010). A constraints-led perspective to understanding skill acquisition and game play: A basis for integration of motor learning theory and physical education praxis? *Physical Education and Sport Pedagogy, 15*(2), 117-137. <https://doi.org/10.1080/1740898902791586>
- Ridgers, N. D., Salmon, J., Parrish, A. M., Stanley, R. M., & Okely, A. D. (2012). Physical activity during school recess: a systematic review. *American Journal of Preventive Medicine, 43*(3), 320-328. <https://doi.org/10.1016/j.amepre.2012.05.019>
- Rodríguez-Fernández, J., Pereira, V., Pereira, B., & Condessa, I. (2019). Análisis de la interacción entre pares en los recreos de 1º ciclo de enseñanza básica en Portugal (Analysis of peer interaction during recess in 1st cycle of basic education in Portugal). *Retos, 36*(36), 97-102. <https://doi.org/10.47197/retos.v36i36.68566>
- Rosenthal, R., & DiMatteo, M. R. (2001). *Meta-Analysis: Recent developments in quantitative methods for literature reviews Annual Review of Psychology, 52*(1), 59-82. <https://doi.org/10.1146/annurev.psych.52.1.59>
- Sampaio, J. E., Lago, C., Gonçalves, B., Maças, V. M., & Leite, N. (2014). Effects of pacing, status and unbalance in time motion variables, heart rate and tactical behaviour when playing 5-a-side football small-sided games. *Journal of Sciences and Medicine in Sport, 17*, 229-233. <https://doi.org/10.1016/j.jsams.2013.04.005>
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston, MA: Allyn and Bacon.
- Tan, C., Chow, J.Y., & Davids, K. (2012). «How does TGfU work?»: examining the relationship between learning design in TGfU and a nonlinear pedagogy. *Physical Education & Sport Pedagogy, 17*(4), 331-348. <https://doi.org/10.1080/17408989.2011.582486>
- Travassos, B., Araújo, D., Davids, K., O'Hara, K., Leitão, J., & Cortinhas, A. (2013). Expertise effects on decision-making in sport are constrained by requisite response behaviours – A meta-analysis. *Psychology of Sport and Exercise, 14*(2), 211-219. <https://doi.org/10.1016/j.psychsport.2012.11.002>
- Turner, A., & Martinek, T. J. (1999). An investigation into Teaching Games for Understanding: Effects on skill, knowledge and game play. *Research Quarterly for Exercise and Sport, 70*(3), 286-296.
- Úbeda-Colomer, J., Monforte, J., & Devis Devis, J. (2016). Percepción del alumnado sobre una Unidad Didáctica de enseñanza comprensiva de los juegos deportivos de invasión en Educación Física. *Retos, 31*, 306-311. <https://doi.org/10.47197/retos.v0i31.53507>
- Vickers, J. N. (2007). *Perception, cognition, and decision training: The quiet eye in action*. Champaign, IL: Human Kinetics.
- Webb, P. I., & Pearson, P. J. (2008). An integrated approach to Teaching Games for Understanding (TGfU). En *1st Asia Pacific Sport in Education Conference* (pp. 1-11). Adelaide.