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# EFFECTS OF MODIFICATION OF TASK CONSTRAINTS IN 3-VERSUS-3 SMALL-SIDED SOCCER GAMES

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***ABSTRACT***

*In this study, the pedagogical principles of representation and exaggeration of Game-Centred Approaches (GCAs) as task constraints were examined. Youth soccer players' game performance was analysed according to tactical problems. Two different 3-versus-3 games were analysed using the Game Performance Evaluation Tool (GPET), namely a game modified by representation and a game modified by the pedagogical principles of representation and exaggeration that enhanced the problem of attacking the goal. It was found that there were a greater number of decision-making units for attacking during the modified game, which enhanced the problem of attacking the goal, although differences were not found to be significant. The players' tactical problem adaptation was significantly better in the game that was modified by representation with regard to maintaining possession of the ball ($p<0.01$) and advancing on the goal ($p<0.05$). Significant differences were also observed in getting-free decisions and executions ($p<0.05$ and $p<0.05$), and in kicking decisions and executions ($p<0.01$ and $p<0.01$). The findings suggest that a game focused on attacking the goal was more tactically complex than a game that was only modified by representation.*

**Key words**: Sports pedagogy; Complex skill acquisition; Contextual interference; Modified games.

## INTRODUCTION

Modern training methods have considered Small-Sided Games (SSGs) as a main tool to develop technical, tactical, and physiological performance in team sport. SSGs are modified forms of professional games, in which the structural elements of play (pitch dimensions, number of players or goals), are adapted in order to achieve the training objectives. However, while a theoretical framework of sport teaching provides ways to adapt SSGs (Oslin & Mitchell, 2006), few studies have provided justification to support the modification strategy in the design of games (Arias *et al*., 2011, 2012; Travassos *et al*., 2012). The question to be addressed is what the pedagogical consequences are of every modification that teachers and coaches make when they design a SSG. In relation to the performer-environment relationship,

the consequences may be explained by the non-linear understanding of sport behaviours (Dias *et al*., 2013). Non-linear pedagogy derived from ecological dynamics, highlights the relationship between the performer and the environmental and task constraints.

From the learning point of view, task constraints are based on four pedagogical principles known as sampling, task complexity, representation and exaggeration (Thorpe *et al*., 1986; Tan *et al*., 2012). Representation implies that SSGs have the same structure as the related professional games, but the size elements of play are reduced. For example, in a 7-a-side soccer game, the goals, the penalty areas, and the full pitch area are reduced so that the tactical complexity is more or less the same as an 11-a-side soccer game, with the game further adapted to suit the learners' size, age and ability. The principle of exaggeration involves the modification of certain game elements to allow learners to explore a tactical problem, while the primary rules of the game are maintained. For example, if the goal in soccer is changed from having to score into a net to the challenge of scoring by dribbling across a line, the tactical problem of how to advance with the ball will be enhanced.

In accordance with the non-linear pedagogy, previous researchers analysing decision-making in team sport have considered how modifying task constraints can influence different aspects of technical-tactical performance (Travassos *et al*., 2012; Dias *et al*., 2013). For example, the studies of Lapresa-Ajamil *et al*. (2006), Lapresa-Ajamil *et al*. (2008) and Lapresa-Ajamil *et al*. (2010) researched the impact of the representation pedagogical principle using an observational tool to analyse the number of players as a task constraint. Their main findings were that a 5-a-side soccer game presents difficulties for beginners (6 to 7 years old) in terms of adaptation to space and skills; a 3-a-side soccer game is more advantageous than a 5-a-side game for beginners (6 to 7 years old) with regards to understanding the tactical complexity of depth and width; while a 9-a-side soccer game should be considered as an intermediate level game, falling between a 7-a-side and 11-a-side soccer game for players aged 12 to 13 years.

Furthermore, Costa *et al*. (2010) compared the tactical behaviours of youth soccer players in SSGs according to different goal sizes (6m x 2m and 3m x 2m), and concluded that there were no statistically significant differences in the tactical solutions performed for the two sized fields. Similar studies were performed in basketball by Arias *et al*. (2011) in which the effect of two different locations of the three-point line were measured, and by Arias *et al*. (2012) in which the effect of ball mass was analysed on dribbling, passing, and passing-reception in real-game situations.

The studies of González-Víllora *et al*. (2010) and González-Víllora *et al*. (2012), further analysed the decision-making process with their main conclusion being that decision-making was more influenced by tactical problems (in attack: keeping possession, advancing and attacking as defined by Bayer, 1992), than by any other structural elements of play. Serra-Olivares *et al*. (2011) further analysed these findings by comparing the game performance data of 21 soccer players, aged 8 to 9 years old, within a specific tactical context utilising two 3-versus-3 SSG's. For the study, one game was modified by representation and the second game was modified by exaggeration through the tactical problem of keeping possession of the ball. Serra-Olivares *et al*. (2011) found a significantly greater number of keeping-possession situations and improved tactical context-adaptation in the SSG that exaggerated this tactical

problem. However, they found that players made better decisions and thus improved execution in the SSG that was modified using the representation pedagogical principle.

## PURPOSE OF THE RESEARCH

Taking the above into account, it therefore seems important to research the pedagogical principles of the non-linear pedagogy in order to obtain data that informs of the real tactical difficulties of SSGs (Tan *et al*., 2012). This data could contribute to coaches' and teachers' efforts to design appropriate learning progressions. As a result, this research attempted to examine how youth soccer players' game performances (decision-making and execution variables) were influenced by the pedagogical principles of representation and exaggeration as task constraints in two different SSGs. The first game was modified only by representation and the second game was modified by both representation and exaggeration, focusing on the tactical problem of attacking the goal. It was expected that game performance would be different for the two games. Further, it was hypothesised that it would be easier for players to choose the tactical problem of attacking the goal in the SSG modified by pedagogical principles of representation and exaggeration.

## METHOD

### Participants and procedures

The study sample consisted of 21 skilled soccer players, aged 8 to 9 years old belonging to the youth academy of a 2nd division Spanish football team. They were selected on the basis of being classified as the best performers for their respective teams. All of the players had been participating in soccer for at least 1 year with more than 3 hours specific practice per week of, and all of them had experience in Soccer Federation competitions. This study was approved by a recognised ethics committee and the players' parents signed the relevant informed consent forms allowing their children to participate.

### Research design

A comparative design was conducted in which players were assessed in 2 different SSGs (designed by 2 experts with more than 10 years teaching in soccer and games). Both modified games lasted 8 minutes, divided into 2 halves separated by 2 minutes of rest. One game was modified by representation (Figure 1), and the second game was modified by representation and exaggeration (Thorpe *et al*., 1986), while the last game focused on attacking-the-goal tactical problem (Figure 2). This resulted in the analysis of both the effect of the modification of the exaggeration principle, as well as the tactical complexity principle of GCAs as task constraints (Tan *et al*., 2012).

In the ***SSG-R***, the playing rules were similar to the current rules of a game of soccer, except that there were no goalkeepers. The game was played in an area comprising 20 x 30m. The main objective was to score as many points as possible, with one point being scored when a player kicked the ball into the opposing team's goal. Each team defended its own goal and attacked the opposing team's goal which measured 140 x 105cm. Attackers were allowed to

control, pass, dribble, kick and to support (to get-free), their team-mates during the game, but they could not score from their own half of the field.

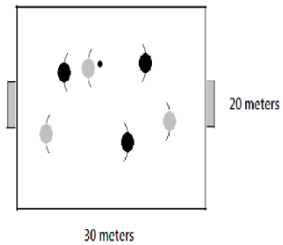


*FIGURE 1*. **3-VERSUS-3 SSG-R**

SSG-R= Small-Sided Game Representation

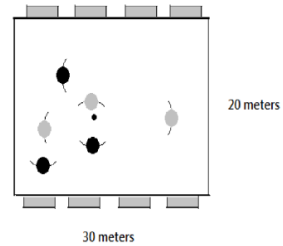


*FIGURE 2*. **3-VERSUS-3 SSG-R&E**

SSG-R&E= Small-Sided Game Representation & exaggeration

In the ***SSG-R&E***, the attacking-the-goal tactical problem was exaggerated. The game was played in an area comprising 20 x 30m, which contained 8 goal scoring areas. For this game, the shorter field length and greater numbers of separate goals served to increase the possibilities to score. There was also 1 goal more than there were players on each team (4 goals/3 players) for this same reason. The main objective was to score as many points as possible, with 1 point being scored when the ball entered any 1 of the 4 opposing team's goals which measured 140 x 105cm. Each team defended its own 4 goals and attacked the opposing team's 4 goals. Attackers were again allowed to control, pass, dribble, kick and support (to get-free), their team-mates during the game. Players were randomly organised into 7 teams of 3 players each, with seven 3-versus-3 matches randomly organised and video-recorded during 2 of the academy's training sessions for each of the 2, SSGs designed.

It is important to note that one team was required to play 2 matches for each SSG as a result of the uneven team numbers. As a result, the match-up for the 7$^{th}$ match, for each SSG, were randomly organised, but the data of only 1 of the teams was codified. The video-recording protocol included: (a) having a video camera in place; (b) having a similar warm-up prior to the 2 games; and (c) giving an explanation of the game rules. The game performances of the 21 young soccer players were compared between the SSG-R and the SSG-R&E modified games, in accordance with the 3 tactical problems proposed by Bayer (1992), which are, keeping possession of the ball, advancing towards the opposing goal and attacking the goal.

**Coding instrument**

The offensive game performances of players were codified for both SSGs using the Game Performance Evaluation Tool (GPET) (García-López *et al.*, 2013). The GPET differs from previous game-performance assessment instruments, such as the French and Thomas (1987) and the Nevett *et al.* (2001) tools in the context of adaptation in decision-making analysis. Decision-making in the GPET was categorised into 2 levels, with the first level assessing decision-making and execution related to technical-tactical skills, while the second level assessed tactical context-adaptation performance. For the second level, the tactical intentions of players are analysed with regard to the principal tactical problem in which the action is located (Bayer, 1992). These can include keeping possession of the ball, advancing towards

the opposing goal and attacking the goal. For both levels, decision-making was coded as 1 (correct) or 0 (incorrect). The execution component of game performance was coded as 1 (successful) or 0 (unsuccessful). Table 1 describes the coding categories for the 2 levels of decision-making, and the execution component of the game performance.

*TABLE 1*. **GAME PERFORMANCE CODING CATEGORIES IN GPET**

| **Level 1.** Technical-tactical skills | **Level 2.** Tactical context-adaptation performance |
|---|---|
| *Attacker, on the ball*:<br>Decision-making and Execution<br>Passing, Dribbling, Kicking<br><br>*Attacker, off the ball*:<br>Decision-making and Execution<br>Getting-free skills | *Tactical context-adaptation*:<br>Efficiency in selecting actions to keep the ball when the tactical problem is coded as "keeping-the-ball" context<br>*Tactical context-adaptation performance*:<br>Efficiency in selecting actions regarding advancing towards the opposing goal when the tactical problem is coded as "advancing-towards-the-opposing-goal" context<br>*Tactical context-adaptation performance*:<br>Efficiency in selecting actions to attempt to score when the tactical context is coded as "attacking-the-goal" context<br>*Observing players' behaviour*:<br>A player is coded as a "observing-player" when he or she does not show tactical intentions or involvement in the game |

GPET= Game Performance Evaluation Tool

For Level 1, game performance (decision-making and execution variables), was grouped according to the attacking player's role, which could be either the on-the-ball player or the off-the-ball player. For Level 2, tactical context-adaptation performance was analysed as a single variable, with regard to invasion-games tactical problems. The "observing players' behaviour" was also analysed in this category (Table 1). For coding purposes, playing time was divided into decision-making units (DMUs) (Nevett *et al*., 2001), as was done in previous research (Gutiérrez-Díaz *et al*., 2011; González-Víllora *et al*., 2012). A decision-making unit ends after 4 seconds of action, whenever the player performed a different technical-tactical skill, or when the tactical problem changes. The GPET was validated by García-López *et al*. (2013) when their study demonstrated appropriate intra-observer and inter-observer correlations for all categories of the instrument, and has been proven to be a reliable tool for game-performance assessments ($\alpha$=0.97). In addition, in the present study the observer was re-trained in the instrument showing similar intra-observer correlations ranging

from 0.77 to 1.00, as was found in the study of García-López *et al*. (2013) for all categories of the instrument.

### Statistical analysis

Means and standard deviations were calculated for all offensive game performance variables in each of the SSGs. Players' game performances were compared between the same groups of variables (for example, differences in decision-making and in dribbling to keep the possession of the ball, between the SSG-R and the SSG-R&E). The Kolgomorov-Smirnov test for assumption of normality and the Levene test for homogeneity of variance showed that the sample did not meet these assumptions for all variables. Therefore, the Wilcoxon test was conducted to analyse differences in game performances between the two SSGs. Effect size (r) was calculated using the following formula $r=Z/\sqrt{N}\sqrt{N}$, where N is the number of participants. Values of r=0.2, r=0.5 and r=0.8, were considered as small, moderate and large effect sizes, respectively.

## RESULTS

The tactical context-adaptation performance of players was significantly better in the SSG-R for 2 situations, keeping possession of the ball and advancing towards the opposing goal. Large and moderate values of the effect size were reported in each of these cases, respectively. These differences were not found in tactical context-adaptation to attacking the goal or in the observer-player behaviour.

In relation to the decision-making and execution components of the game performance, no significant differences were found between games for keeping-the-ball contexts. However, players scored significantly higher for getting-free decision-making for the execution of advancing towards the opposing goal and for kicking decision-making and execution in the SSG-R, while exhibiting moderate values of the effect size.

After the video recording process, 1.747 DMUs were analysed, 887 in the SSG-R (17.7% in keeping possession of the ball; 76.7% in advancing towards the opposing goal; and 5.5% in attacking-the-goal situations), and 860 DMUs in the SSG-R&E (12.9% in keeping possession of the ball; 79.18% in advancing-towards-the-opposing-goal situations; and 7.9% in attacking-the-goal contexts). No significant differences were found between games for the number of DMUs in each of the 3 tactical problems: keeping possession of the ball (Z= 0.65; p=0.51; r=0.14), advancing towards the opposing goal (Z=0.07. p=0.94, r=0.01), and attacking the goal (Z=1.42; p=0.15; r=0.30). Table 2 presents the summary of results for every modified game, which compares the decision making and execution components of the game performance within each tactical problem.

Finally, no significant differences were found in the remaining analysed variables between games, although it is important to highlight, that there were observed differences for decision-making with regard to dribbling, getting-free to keep the ball, and for the execution of dribbling and passing to advance towards the opposing goal (Table 2).

*TABLE 2.* **DIFFERENCES IN GAME PERFORMANCES BETWEEN SSG-R AND SSG-R&E MODIFIED GAMES (n=21)**

| **Variable** | **SSG-R** M±SD | **SSG-R&E** M±SD | Z | p | **Effect size (r)** |
|---|---|---|---|---|---|
| Tactical context-adaptation in keeping-the-ball problems | 84.00±18.63 | 62.72±27.48 | -3.91 | 0.00 | 0.85 |
| Tactical context-adaptation performance in advancing-towards-the-opposing-goal problems | 82.91±11.56 | 70.03±23.37 | -2.10 | 0.03 | 0.45 |
| Tactical context-adaptation performance in attacking-the-goal problems | 81.20±31.52 | 82.28±21.68 | -0.19 | 0.84 | - |
| Observing players' behaviour | 1.70±2.07 | 4.55± 8.33 | -0.90 | 0.36 | - |
| *Keeping possession of ball context* | | | | | |
| Ball control | 87.27±14.59 | 91.35±12.04 | 0.91 | 0.36 | - |
| Passing decision-making | 89.58±26.44 | 93.13±15.65 | 0.70 | 0.48 | - |
| Dribbling decision-making | 80.18±20.40 | 87.50±21.24 | 1.63 | 0.10 | - |
| Getting-free decision-making | 93.75±17.67 | 41.94±39.29 | 1.47 | 0.14 | - |
| Passing execution | 76.87±39.35 | 81.37±29.97 | 0.11 | 0.90 | - |
| Dribbling execution | 80.35±34.02 | 87.50±21.24 | 0.73 | 0.46 | - |
| Getting-free executions | 93.75±17.67 | 76.00±35.13 | 0.73 | 0.46 | - |
| *Advancing towards opposing goal context* | | | | | |
| Passing decision-making | 84.20±27.01 | 81.12±14.77 | 0.54 | 0.58 | - |
| Dribbling decision-making | 74.32±31.72 | 58.85±35.29 | 1.05 | 0.29 | - |
| Getting-free decision-making | 83.86±25.15 | 74.11±17.44 | 2.16 | 0.03 | 0.47 |
| Passing execution | 62.14±30.65 | 76.09±18.78 | 1.68 | 0.09 | - |
| Dribbling execution | 86.94±24.13 | 77.39±28.22 | 1.59 | 0.11 | - |
| Getting-free execution | 79.39±23.08 | 68.71±18.78 | 2.16 | 0.03 | 0.45 |
| *Attacking the goal context* | | | | | |
| Kicking decision-making | 100.00±00.00 | 68.99±28.17 | 2.81 | 0.005 | 0.61 |
| Kicking execution | 75.98±30.02 | 31.09±26.87 | 3.28 | 0.001 | 0.71 |

M= Mean SD= Standard Deviation

## DISCUSSION

The aim of this research study was to analyse how the exaggeration of the attacking-the-goal tactical problem influenced the game performance of youth soccer players in 3-versus-3 SSGs, thus indicating the manner in which game performance was influenced by the type of game modification. The 3-versus-3 SSG-R, which is similar in format to the professional game of soccer, was shown to be easier in terms of tactical context-adaptation than the 3-versus-3 SSG-R&E, where the attacking-the-goal tactical context was exaggerated. However,

improved results were found for certain variables of game performances, namely decision-making and execution for the 3-versus-3 SSG-R. For both SSGs, a similar total number of DMUs was found, with the DMUs analysed in relation to the tactical context in which they were made.

It is surmised that SSGs improve learning as they increase the number of opportunities for the players to practise the ability which is being focused on specifically (Serra-Olivares *et al*., 2011; Travassos *et al*., 2012). With this in mind and even though the SSG-R&E increased the number of advancing-towards-the-opposing goal and attacking-the-goal DMUs, the differences proved not to be significant. Despite the similar opportunities to practise advancing-towards-the-opposing-goal and attacking-the-goal tactical problems (quantitative view), significant differences were only observed for the tactical context adaptations of keeping-possession-of-the-ball and for advancing-towards-the-opposing-goal tactical problems (qualitatively).

These results are consistent with the study results of Serra-Olivares *et al*. (2011) who compared a 3-versus-3 SSG-R with a SSE-R&E in which the tactical problem of keeping-possession-of-the-ball was exaggerated. Here significant differences were found in the number of situations of the exaggerated tactical problem, and with players having a better tactical context adaptation. However, these results were observed because the exaggeration of the keeping-the-ball tactical problem eliminated the notion of attacking the goal. In this sense, the key purpose for this game was to not lose the ball, as there was no definitive purpose in advancing and attacking a goal. It should be stressed that the tactical problems of advancing and attacking the goal are closely connected. If players want to kick and score, they must have a previous success in advancing towards the opposing goal. In this sense, SSE-R&E did not provide kicking decisions and they did not allow a better tactical context-adaptation to advancing towards the opposing goal, although there were several goals and scoring options.

From the learning point of view, coaches should not consider the introduction of more goals in an SSG as a task constraint as it does not facilitate the tactical problems of learning how to advance towards the opposing goal nor how to attack the goal. On the other hand, in the SSG-R, players had better results in tactical context-adaptation to the tactical problems of keeping possession and of advancing towards the opposing goal. In this sense, if the main purpose is to facilitate the tactical problems of learning to keep possession of the ball and to advance towards the opposing goal, coaches might consider using a 3-versus-3 SSG in which elements of play are reduced (number of players, areas) as a method of teaching new programmes. This should be done before using a 3-versus-3 SSG in which the number of goals is augmented or where the field length is reduced and the field width is increased. These results differ from existing research in which other task constraints were altered to study players' behaviour in invasion games (Lapresa-Ajamil *et al*., 2006; 2008; Costa *et al*., 2010; Lapresa-Ajamil *et al*., 2010; Arias *et al*., 2011, 2012), or for other sport (Dias *et al*., 2013), in which only structural elements, such as the number of players or the goals and/or areas sizes were changed. This finding highlights the importance of studying the pedagogical principles for invasion games (Tan *et al*., 2012).

Related to game performance, players scored significantly higher in getting-free decision making and executions for advancing towards the opposing goal and for kicking decision-

making and executions in the SSG-R modified game. Previous research has shown that off-the-ball skills are especially relevant in the learning process during invasion games (González-Víllora *et al*., 2010; González-Víllora *et al*., 2011). Getting-free has a great impact on the achievement of high levels of tactical-context adaptation. Getting-free for keeping possession of the ball was shown to be more difficult than getting-free for advancing towards the opposing goal, as was observed in the studies of González-Víllora *et al*. (2010) who analysed under-10 players during a 3-versus-3 SSG-R (32 x 22 metres), and that of González-Víllora *et al*. (2012), which involved games with under-8 players in a 2-versus-2 SSG-R (20 x 10m). In this sense, coaches should consider that the exaggeration and representation of the pedagogical principles used in this study would have made it easier to strengthen some abilities but not others, such as the getting-free movements and kicking skills.

The SSG-R&E analysed in this study could increase the difficulty in getting-free and kicking decisions and executions because there were not as many free spaces for the attackers to use as there were in the SSG-R, because of the reduced length of the field. The study yielded no differences in tactical context-adaptation in the attacking-the-goal tactical problem between games. Furthermore the players showed significantly better decisions and executions in kicking ability in the SSG-R-modified game, even though for the SSG-R&E, there were more goals in which players could score. For this study, modifying the game by exaggerating the options for attacking the goal and increasing the number of goals and the width of the field did not facilitate improved kicking decisions and executions. Even so, if coaches want to decrease the tactical complexity in the attacking-the-goal tactical problem, they should bear in mind that the modification of key elements does not necessarily decrease the difficulty of the game.

It could be argued that perhaps the SSG-R&E should have been modified through increasing of the size of the goals or through lengthening the field. If the main purpose was to facilitate the application of the tactical problems of attacking the goal and the ability to kick, it could be recommended using an additional attacking-the-goal game, such as 2-versus-1 plus goalkeeper situations with greater goals than those used by SSG-R&E. As has been suggested in non-linear pedagogy, this kind of modification, based on the variability conditions and task constraints, could improve the self-organisation process and the emergence of new movement patterns under the associated constraints (Tan *et al*., 2012; Dias *et al*., 2013). This aspect must be studied as, when games are modified to improve learning, it is necessary to know the real effects of these modifications.

Physical education teachers and coaches must control the representation and exaggeration pedagogical principles of GCAs. It is therefore recommended that they ensure this by providing feedback to re-orientate the behaviours of players during sport. Even though previous pedagogical studies have indeed shown methods to modify games (Oslin & Mitchell, 2006; Arias *et al*., 2011, 2012), no scientific studies have yet provided any justification to explain these modifications.

The questions that arise are firstly, why would a coach or teacher choose one of these methods when teaching games, and secondly, how can the representation and exaggeration pedagogical principles be used to facilitate tactical learning? As there are several possibilities when modifying games, namely, increasing the number or players, altering the playing time,

or varying the kind of shot to score, the importance of manipulating key variables lies in confirming the representative task-constraint designs that induce player-context functional interactions in invasion-games training.

Regardless of this, the players observed in this study had acceptable game performance, and thus they made good decisions and executions in all tactical problems. This suggests that both analysed games could be used in soccer teaching/learning programmes for players at the same age and level of experience. The only question that remains is with regard to the method employed when modifying structural task constraints in terms of the size of the area or number of players, as this affects the creation of free spaces, and thus becomes important to modify in order to facilitate tactical learning.

**REFERENCES**

ARIAS, J.L.; ARGUDO, F.M. & ALONSO, J.I. (2011). Effect of two different forms of three-point line on game actions in girls' mini-basketball. *South African Journal for Research in Sport, Physical Education and Recreation*, 33(1): 9-22.

ARIAS, J.L.; ARGUDO, F.M. & ALONSO, J.I. (2012). Effect of ball mass on dribble, pass, and pass reception in 9-11-year-old boys' basketball. *Research Quarterly for Exercise and Sport*, 83(3): 407-412.

BAYER, C. (1992). *La enseñanza de los juegos deportivos colectivos (trans.*: The teaching of collective sports games). Barcelona (Spain): Hispano Europea.

COSTA, I.; GARGANTA, J.; GRECO, P.; MESQUITA, I.; SILVA, B.; MÜLLER, E.; CASTELÃO, D.; REBELO, A. & SEABRA, A. (2010). Analysis of tactical behaviours in small-sided soccer games: Comparative study between goalposts of society soccer and futsal. *Open Sports Sciences Journal*, 3: 10-12.

DIAS, C.; MARTINS, F.M.L.; COUCEIRO, M.S.; CLEMENTE, F.M. & MENDES, R. (2013). A non-linear understanding of golf putting. *South African Journal for Research in Sport, Physical Education and Recreation*, 36(1): 29-47.

FRENCH, K.E. & THOMAS, J.R. (1987). The relation of knowledge development to children's basketball performance. *Journal of Sport Psychology*, 9(1): 15-32.

GARCÍA-LÓPEZ, L.M.; GONZÁLEZ-VÍLLORA, S.; GUTIÉRREZ, D. & SERRA-OLIVARES, J. (2013). Development and validation of the Game Performance Evaluation Tool (GPET) in soccer. *Revista Euroamericana de Ciencias del Deporte*, 2(1): 89-99.

GONZÁLEZ-VÍLLORA, S.; GARCÍA-LÓPEZ, L.M.; CONTRERAS-JORDÁN, O.R. & GUTIÉRREZ-DÍAZ, D. (2010). Tactical awareness and decision making in youth football players 12 years: A descriptive study. *Journal for the Study of Education and Development*, 33(4): 489-501.

GONZÁLEZ-VÍLLORA, S.; GARCÍA-LÓPEZ, L.M.; GUTIÉRREZ-DÍAZ, D. & PASTOR-VICEDO, J.C. (2012). Football players' game performance (8 years) in 2 vs. 2 small-sided games. *Revista de Investigación en Educación*, 10(1): 115-126.

GONZÁLEZ-VÍLLORA, S.; GARCÍA-LÓPEZ, L.M.; PASTOR-VICEDO, J.C. & CONTRERAS-JORDÁN, O.R. (2011). Tactical awareness and decision-making in 10 year old youth football players: A descriptive study. *Revista de Psicología del Deporte*, 20(1): 79-97.

GUTIÉRREZ-DÍAZ, D.; GONZÁLEZ-VÍLLORA, S., GARCÍA-LÓPEZ, L.M. & MITCHELL, S. (2011). Differences in decision making between experienced and inexperienced invasion games players. *Perceptual and Motor Skills*, 112(3): 871-888.

LAPRESA-AJAMIL, D.; AMATRIA-JIMÉNEZ, M.; EGÜÉN-GARCÍA, R.; ARANA-IDIÁKEZ, J. & GARZÓN ECHEVERRÍA, B. (2008). Análisis descriptivo y secuencial de la fase ofensiva en fútbol 5 en la categoría prebenjamín (*trans*.: Descriptive and sequential analysis of the 5 football game's offensive play for the age of 6 years old). *Cultura, Ciencia y Deporte*, 3: 107-118.

LAPRESA-AJAMIL, D.; ARANA-IDIÁKEZ, J. & GARZÓN-ECHEVERRÍA, B. (2006). El fútbol 9 como alternativa al fútbol 11, a partir del estudio de la utilización del espacio de juego (*trans.*: 9-football as an adjustment alternative for 11-football based on the control of the space). *Apunts. Educación Física y Deportes*, 86(4): 34-44.

LAPRESA-AJAMIL, D.; ARANA-IDIÁKEZ, J.; GARZÓN-ECHEVERRÍA, B.; EGÜÉN-GARCÍA, R. & AMATRIA-JIMÉNEZ, M. (2010). Adaptando la competición en la iniciación al fútbol: estudio comparativo de las modalidades de fútbol 3 y fútbol 5 en categoría prebenjamín (*trans*.: Adapting the competition for football beginners: A comparative study of the modalities 3-vs-3 and 5-vs.-5 football for U-8 players). *Apunts. Educación física y deportes*, 101, 43-56.

NEVETT, M.; ROVEGNO, I. & BABIARZ, M. (2001). Fourth-grade children's knowledge of cutting, pass and tactics in invasion games after a 12-lesson unit of instruction. *Journal of Teaching in Physical Education*, 20(4): 389-401.

OSLIN, J. & MITCHELL, S. (2006). Game-centred approaches to teaching Physical Education. In D. Kirk, D. MacDonald & M. O'Sullivan (Eds.), *The handbook of Physical Education* (pp.627–651). London, UK: Sage.

SERRA-OLIVARES, J.; GONZÁLEZ-VÍLLORA, S. & GARCÍA-LÓPEZ, L.M. (2011). Game performance differences between 8-9 years football players in two 3 vs. 3 small sided games. *Cuadernos de Psicología del Deporte*, 11(2): 77-91.

TAN, C.W.K.; CHOW, J.Y. & DAVIDS, K. (2012). How does TGfU work?' Examining the relationship between learning design in TGfU and a nonlinear pedagogy. *Physical Education and Sport Pedagogy*, 17(4): 331-348.

THORPE, R.; BUNKER, D. & ALMOND, L. (1986). A change in focus for the teaching of games. In M. Piéron, M. & K.C. Graham, *The 1984 Olympic Scientific Congress Proceedings, 6. Sport Pedagogy* (pp.163-169). Champaign, IL: Human Kinetics.

TRAVASSOS, B.; DUARTE, R.; VILAR, L.; DAVIDS, K. & ARAÚJO, D. (2012). Practice task design in team sports: Representativeness enhanced by increasing opportunities for action. *Journal of Sports Sciences*, 30(13): 1447-1454.

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