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Original Article

The effectiveness of a tactical games approach in the teaching of invasion games

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Abstract:
Purpose: The main purposes of this study were (a) to assess the effectiveness of the tactical games approach on students' invasion game performance when compared to the technique-oriented approach, and (b) to investigate whether there was a difference in motor engagement time (MET) between the both pedagogical approaches. Method: The sample consisted of 79 students (13-16 years), allocated to the Intervention Group (IG) following the tactical games protocol, or to the Control Group (CG) following the technique-oriented approach. Psychomotor performance was assessed by the Game Performance Assessment Instrument. MET was assessed by direct observation. Results: Both pedagogical approaches promoted off- and on-the-ball movement over eight consecutive weeks. Comparing the effectiveness of these two teaching approaches, no difference was found. However, collapsed across the two time points, students had better on-the-ball decision-making in the tactical games approach, as well as more MET. Conclusion: Continued replication of this research including long term follow-up is necessary to further strengthen the generalizability of these findings across alternative school contexts.
Key Words*:* physical education; motor engagement time; games centred approach; tactical decision-making

Introduction

Invasion games (soccer, handball and basketball) are key topics in the Portuguese physical education (PE) curriculum, absorbing about one-quarter of its syllabus (Ministério da Educação [ME], 2001). Given this substantial part in the curriculum and the potential impact on the student's engagement in physical activity (PA) over the life course, research on the effectiveness of teaching games approaches is necessary (Harvey & Jarrett, 2014). In addition, it is important to have in mind that many PE teachers have methodological problems linking skills and tactics (Mitchel, Oslin, & Griffin, 2013). That corroborates the existence of a gap between theory and practice, which has led to a dominance of the technique-oriented approach in PE (Butler, 2014). In other words, skills have persistently been taught in isolation, out of the game context. This dominant technique-oriented pedagogical approach advocates the teaching of skill execution before addressing the tactical elements of the game (Metzler, 2005). As argued by Oslin and Mitchell (2006), this model is founded on the principle of 'technical proficiency'. It means that games are being broken down and techniques are repeated in decontextualized conditions. As a consequence, this pedagogical approach has been linked to a low achievement and to the development of inflexible techniques that limit students in the response to various game situations (Bunker & Thorpe, 1982; Holt, Ward, & Wallhead, 2006). In addition, it can lead to higher levels of student inactivity on the PE (Harvey, Song, Baek, and van der Mars, 2016; Miller et al., 2016; Smith et al., 2015), as well as, to little opportunities for empowerment and creativity (Roberts & Fairclough, 2011).
Moreover, didactic units have traditionally been planned separately, in blocks, disregarding the tactical similarities among invasion games. From this perspective, the principle of transfer that enables students to understand the common principles across games (Holt, Strean, & Bengoechea, 2002; López, Jordán, Penney,

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2009) is not potentiated, therefore, making the pedagogical process in PE less profitable. To the best of our knowledge, limited research has been conducted to better understand the effectiveness of didactic units that address similar tactical problems across different invasion games at the same time.

In a tactical games approach, game performance is more than simply executing motor skills. This pedagogical approach focuses on improving the students' game performance by combining tactical awareness (i.e., the ability to identify tactical problems that emerge from the game) and skill execution (Gutierrez, 2016). As result, this would help the students to become more competent and confident performers, as well as, it could improve cognitive outcomes related to decision-making and response selection (Harvey & Jarrett, 2014). Additionally, students likely are provided with more motor engagement time (MET) in the class, meaning more opportunities to do PA (Harvey et al., 2016; Miller et al., 2016; Roberts & Fairclough, 2011; Smith et al., 2015). Furthermore, there is evidence that a tactical approach may aid students in reaching the recommended PA goals within PE lessons (Roberts & Fairclough, 2011). The rationale for a tactical games model is based on three important concepts: (a) interest and excitement of students: learning through games not about games (Gray & Sproule, 2011; Griffin & Butler, 2005; Mitchel et al., 2013); (b) creation of critical conditions with appropriate questions: the uniqueness of the games lies in decision making - deciding what to do in a specific game situation is critical to game performance (Griffin & Butler, 2005; Mitchel et al., 2013); and (c) transfer of tactical knowledge in games: most invasion games are tactically similar even though they require different skills (Gréhaigne, Richard, & Griffin, 2005; Holt et al., 2002; Spackman, 1983).

While some studies have allowed a better overall understanding of game- centred approaches (Gray & Sproule, 2011; Harvey & Jarrett, 2014; Memmert & Harvey, 2010; Oslin & Mitchell, 2006), limited research on the tactical games approach model is available on school context, therefore, making it difficult to describe how effective this approach is in improving game performance variables (i.e., making decisions, moving appropriately, and executing skills). Hence, it seems an appealing question whether this approach facilitates the transfer of the learner's game competence across invasion games at PE settings. On the other hand, more recent papers on game-centred aproaches have identified the lack of research focused on expanding the contextual analysis, emphasizing the need of robust ecological research designs such as intact groups teaching experiments (Harvey & Jarrett, 2014). Finally, limited research explored the effectiveness of a tactical games approach on the MET (an indicator of PA level).

In this context, the main purposes of this study were (a) to assess the effectiveness of the tactical games approach on students' game performance scores (making decisions, moving appropriately, and executing skills) across the didactic unit (from pre-test to 8-week post-test), when compared to the technique-oriented approach, and (b) to investigate whether there was a significant difference in the mean MET between the tactical and the technique-oriented pedagogical approach.

Materials and Methods

Study Design

A quasi-experimental study with a non-equivalent control group pre-test-post- test design, based on intact groups, was conducted to compare the effectiveness of two teaching approaches (tactical games and technique-oriented approaches) in improving participants' game performance (making decisions, moving appropriately, and executing skills) and MET.

Participants

Participants were part of the research project entitled "Physical Education in Schools from the Autonomous Region of Madeira" (EFERAM-CIT). The study was conducted in an urban public middle school from the city of Funchal, Madeira, Portugal.

The sample consisted of 79 students (39 boys, 40 girls) aged 13-16 years from four classes (2 from the 7^{th} and 2 from the 8^{th} grade). Inclusion criteria were: (a) 7^{th} or 8^{th} grade classes; (b) PE lessons included in the curriculum; and (c) students with no limitation to participate in PE classes. Exclusion criteria were: (a) classes that focused on students with cognitive impairment or (b) students with any significant comorbidity (e.g., heart diseases) that would preclude participation.

Two classes (one of the 7^{th} and one of the 8^{th} grade) were allocated to the intervention group (IG) and the other two classes to the control group (CG). The IG classes were taught by two trainee students and accompanied by two expert teachers. The CG classes were taught by two experienced teachers, not involved in the tactical games teaching approach to invasion games.

The study received Ethical approval from the Scientific Committee of the Faculty of Physical Education and Sports at the University of Madeira (Reference: ACTA N.77 - 12.04.2016). This study was also approved by the Regional Secretary of Education and the school's headmaster. The research process complied with the ethical standards. All procedures were explained to each participant and written informed consent was granted by the parents or legal guardians before any assessment. All data collection and management procedures considered the participants' right to privacy and confidentiality.

Intervention Group: Tactical Games Model

Inspired by the "Teaching Sports Concepts and Skills: A Tactical Games Approach for ages 7 to 18" (Mitchel et al., 2013), we assumed that one instructional unit enables students to learn and to address similar tactical problems across different invasion games, such as soccer, handball and basketball. This means that, by learning the generic concepts, students more quickly understand what they need to do to play invasion games successfully. From this perspective and in agreement with the National Physical Education Program Content (ME, 2001), the off-the-ball movements and on-the-ball skills of soccer, handball and basketball could be taught together and at the same time. The contents of National Physical Education Program were organized in (a) relevant offensive (keeping possession of the ball, penetrating the defense and attacking the goal, and transition from defense to attack) and (b) defensive tactical problems (defending space, defending the goal, and winning the ball), as proposed by Mitchel et al. (2013). This group-based intervention was administered by two PE teachers. The teachers were trained and supported by the research team, through weekly meetings and class follow-up. A total of 24 sessions of 45 minutes each (1080 minutes in total) was delivered over eight consecutive weeks (i.e., an amount of 135 minutes per week) between October and December 2016. The setting was the school context. After the pre-assessment of game performance, students were grouped homogeneously according to their performance level. The planning and uniqueness of exercises for each sub-group into each class took into account the level of the game complexity described on Mitchel et al. (2013). These levels included the learning of concepts, movements, and skills across the three selected invasion games (soccer, handball and basketball). This provided a developmental scope and a sequence of invasion games teaching content. Teaching and training progressions started with small sized games (2 vs 2 players, 3 vs 3 players), progressing to a maximum of six players per team on the advanced level. To ensure an appropriate progression of learning and an environment leading to the understanding of invasion game play, the invasion games were modified (i.e., different conditions of achievement) with regard to the following features: (a) equipment, (b) playing areas, (c) game conditions; and (d) number of team players. Further explanation on the rationale for this type of teaching approach and a detailed description on the exercise components have been described elsewhere (Mitchel et al., 2013). Materials such as balls of different weight, size, and games (i.e., handball, basketball, soccer, and volleyball), cone floor marks, vests of different colors, and different sizes of goal marks were used in the training.

Control Group: Usual Practice - Technique-Oriented Approach

Two classes maintained their usual PE classes at school and the contact with the IG during PE classes was not possible. Following the content of the National Physical Education Program (ME, 2001), in the CG soccer and basketball were taught in two separate didactic units. To better describe the learning environment, scope, and sequence as well as teaching and training progressions, the research team did direct observations in the two CG classes during the teaching process. These direct observations allowed to conclude that all pedagogical strategies adopted by the two teachers were based on a technique-oriented approach to teaching games. The teaching focus was on skill acquisition before the game. Approximately, 60 to 70% of the entire teaching time was used for fundamental skill acquisition and improvement and all lessons finished with a formal game (i.e., 5 vs 5 or 6 vs 6 players). The teaching process was centered on the teacher, who had a role of command in all the actions and controlled the movements of the students. Each activity was prescribed at the beginning. Prescriptive and corrective feedback was the main strategy used throughout the lessons. In the CG, two consecutive didactical units of soccer and basketball, with 12 sessions each, were conducted over eight consecutive weeks (i.e., an amount of 135 minutes per week) between October and December 2016. Materials such as balls (basketball and soccer), cone floor marks, vests of different colors, and different sizes of goal marks were used.

Outcome Measures

The primary outcome was the psychomotor performance, assessed using the Game Performance Assessment Instrument (GPAI; Oslin, Mitchell, & Griffin, 1998). The psychomotor domain encompasses off-the-ball movement, such as support and on-the-ball skills, which includes skill selection and skills execution. The GPAI is an assessment tool that allows to observe and code performance behaviours (within the context of game playing). The GPAI includes behaviours that demonstrate the ability to solve tactical problems by making decisions, moving appropriately, and executing skills. For the invasions games 3 offensive components of the game performance were considered: (a) decision making: player attempts to pass to an open teammate and player attempts to shoot when appropriate; (b) skill execution: reception - control of pass and setup of the ball; passing - ball reaches target, and shooting - ball stays below head and is on target; and (c) support: player appears to support the ball carrier by being in or moving to an appropriate position to receive the pass.

Using a game playing situation [basketball (5x5) and soccer (5x5)], a tally system addressed the number of appropriate/efficient and inappropriate/ inefficient behaviours, on each game performance component. We recorded each student throughout 20 minutes of game playing. For the analysis of game, 10 minutes per student we considered. Three indexes were calculated: (a) the decision making index: number of appropriate decision made/ (number of appropriate decision made + number of inappropriate decision made); (b) the skill execution

227 index: number of efficient skill executions/(number of efficient skill executions + number of inefficient skill executions); and (c) the support index: number of appropriate supporting movements made/ (number of appropriate supporting movements + number of inappropriate supporting movements).

In this study, nine researchers with experience in teaching of invasion games, composed the field team that assessed the students' game performance in the pre and post intervention. The training and the preparation of the field team began with 4 theoretical-practical sessions of 2 hours each, in which real situations were analyzed (videos of invasion games - basketball and soccer - were used) using GPAI. After this first training phase, a pilot study was carried out. In the pilot study, the field team observed eight players in a game-playing situation of basketball in PE context. Each player was observed for 10 minutes, by all observers, in the same timeframe. The intraclass correlation coefficients between all observers and the criterion evaluator were calculated. The intra class correlation coefficients between the independent observers and the criterion evaluator of GPAI varied between .99 for skill execution index and .45 for the decision-making index. In view of this result, the observer who recorded the lowest correlation was excluded from the application of this instrument.
Mean scores and mean change scores for the main outcome were analyzed in this research. The time points for assessment were at zero (pre-test) and 8 weeks (post-test). Players were assessed by independent assessors who was blinded to group assignment.

MET was assessed by direct observation, using a moderate to vigorous physical activity (MVPA) worksheet (Siedentop, Hastie, & van de Mars, 2004). All students were assessed over the didactic unit, for five different lessons, using the momentary time sampling observation strategy. For this observation, six students were selected and, within a time interval (e.g., between 90 and 120 seconds), a quick scan was done to determine whether the selected students were engaged in MVPA. At the end of each interval, the observer took a snapshot of what the six students were doing and made a yes-or-no decision. A student lying down, sitting, or standing would be scored as sedentary and the registration was "no". If students were engaged in activity that required energy expenditure (at least as brisk walking), the observer scored "yes", meaning engaged in MVPA (Siedentop et al., 2004).

Baseline Assessments

Anthropometry

Measurements were taken in the gymnasium of each school. Stature, body mass, and waist circumference were measured using a standardized protocol (Marfell, Olds, Stewart, & Carter, 2006). Body mass was measured with a weighing scale accurate to 0.1 kg (Seca alpha digital scales model 770, Germany) and standing height (cm) with a Holtain stadiometer (Holtain Ltd., Crymych, United Kingdom) accurate to 0.1 cm. Participants wore light, indoor clothing without shoes. Waist circumference was measured with a tape (Seca 201, Germany).

Physical fitness

Physical fitness was assessed by four selected tests from the EUROFIT battery (hand grip, explosive power, running speed-agility, and trunk strength) (Council of Europe Committee for the Development of Sport [CECDS], 1993); and three tests from the FITNESSGRAM (progressive aerobic cardiovascular endurance run test, bent arm hang, and sit and reach) (Meredith & Welk, 2010). A detailed description of the evaluation procedures, namely, equipment, procedures, scoring, and safety precautions can be found in the Handbook for the EUROFIT tests of Physical Fitness (CECDS, 1993), and the FitnessGram & ActivityGram test administration manual (Meredith & Welk, 2010).

Statistical analysis

Statistical analyses included descriptive statistics (percentages, mean and standardized deviation) and a mixed-ANOVA (between groups within subjects). This mixed between-within subjects ANOVA was conducted to compare the effectiveness of the two teaching approaches (the tactical games and the technique-oriented approaches) in increasing participants' game performance (making decisions, moving appropriately, and executing skills) across the didactic unit (from pre-test to 8-week post-test). An independent-samples t-test was used to identify mean differences between IG and CG on MET. Data analysis assumptions were verified. The level of confidence was set at 95%. Data analysis was performed using IBM SPSS Statistics version 24 (SPSS Inc., an IBM Company, Chicago, Illinois, U.S.A.)

Results

A total of 79 students were assessed for potential enrolment. Only 62 students completed all the assessments: IG n= 41 (12.9±.72 years old); CG n=21 (13.3±1.13 years old). Participants' characteristics at baseline and differences between the IG and CG are summarized in Table 1.

Table 1. Participants' characteristics at baseline.

	IG	CG	
	M(SD)	M(SD)	p
	n=41	n=21	
Boys (%)	56.1	42.9	.422
Girls (%)	43.9	57.1	.196
Decimal age (years)	12.9(0.7)	13.3(1.1)	.222
Decision Making	.71(.20)	.69(.22)	.709
Skill Execution	.59(.21)	.58(.21)	.878
Support	.50(.27)	.59(.27)	.223
Body mass (kg)	52.3(9.0)	51.0(9.3)	.597
Height (cm)	158.0(6.0)	155.8(8.5)	.312
Waist circumference (cm)	76.3(9.6)	75.9(9.7)	.898
SLJ (cm)	149.3(24.7)	137.5(20.7)	.069
SAR (cm)	23.8(6.5)	22.0(4.1)	.174
SHR (seg.)	21.1(1.8)	21.1(1.6)	.990
SUP (n)	22.1(4.5)	18.3(4.7)	.003
HGR (kg)	25.2(4.4)	23.2(6.2)	.137
BAH (seg.)	7.9(9.0)	8.2(11.3)	.908
PACER (n)	28.4(17.4)	24.4(16.4)	.397

IG, intervention group; CG, control group; M, mean; SD, standard deviation; SLJ, standing broad jump; SAR, sit and reach; SHR shuttle run; SUP, sit-ups; HGR, hand grip; BAH, bent arm hang; PACER, progressive aerobic cardiovascular endurance run test;

Baseline Characteristics Between Groups

With one exception - abdominal strength and endurance - no other differences were seen between groups. Changes on the Outcome Measures from Baseline to Post-Intervention by Group: Control and Intervention.

Descriptive statistics for the outcome measures at baseline and after the intervention are presented in Table 2.

Table 2. Descriptive statistics for the outcome measures at baseline and after the intervention by group: control and intervention.

	IG			CG		
	n	M	SD	n	M	SD
Decision Making Index						
Pre-intervention	41	.71	.20	21	.69	.22
Post-intervention	41	.85	.16	21	.73	.10
Skill Execution Index						
Pre-intervention	41	.59	.21	21	.58	.21
Post-intervention	41	.82	.15	21	.73	.11
Support Index						
Pre-intervention	41	.50	.27	21	.59	.27
Post-intervention	41	.39	.26	21	.40	.27

IG, intervention group; CG, control group; M, mean; SD, standard deviation

Decision making index. There was no significant interaction between program intervention and time, *Wilks' Lambda*= .95, $F(1, 60) = 2.93$, p= .092; *Partial Eta Squared* = .047. There was a main effect for time, *Wilks' Lambda*= .88, $F(1, 60) = 8.58$, p= .005; *Partial Eta Squared* = .125, with both interventions showing an increase in decision making index across the two time points (see Table 2). The main effect comparing the two types of intervention was significant, $F(1, 60) = 4.04$, p= .049, *Partial Eta Squared* = .063, showing that,

collapsed across the two time points, students had better decision making with the tactical games approach (Figure 1).

Skill execution index. There was no significant interaction between program intervention and time (*Wilks' Lambda*= .97, $F(1, 60) = 1.87$, p= .176; *Partial Eta Squared* = .030). There was a main effect for time (*Wilks' Lambda*= .61, $F(1, 60) = 39.23$, $p < .001$; *Partial Eta Squared* = .395), with both interventions showing an increase in skills execution index between the two time points (Table 2). The main effect comparing the two types of intervention was not significant ($F(1, 60) = 1.71$, p= .196, *Partial Eta Squared* = .028).

Support index. There was no significant interaction between program intervention and time, *Wilks' Lambda*= .96, $F(1, 60) = 2.25$, p= .139; *Partial Eta Squared* = .036. There was a significant main effect for time, *Wilks' Lambda*= .83, $F(1, 60) = 18.50$, p = .001; *Partial Eta Squared* = .172, with both interventions showing an increase in support actions across the two time points (see Table 2). The main effect comparing the two types of intervention was not significant, $F(1, 60) = .232$, p= .632, *Partial Eta Squared* = .004.

Motor engagement time (MET). An independent-samples t-test showed that students from the IG had significantly higher MET than students from the CG, 41.26±15.51 vs. 31.44±12.92; $t(59) = -2.44$, p= .018.

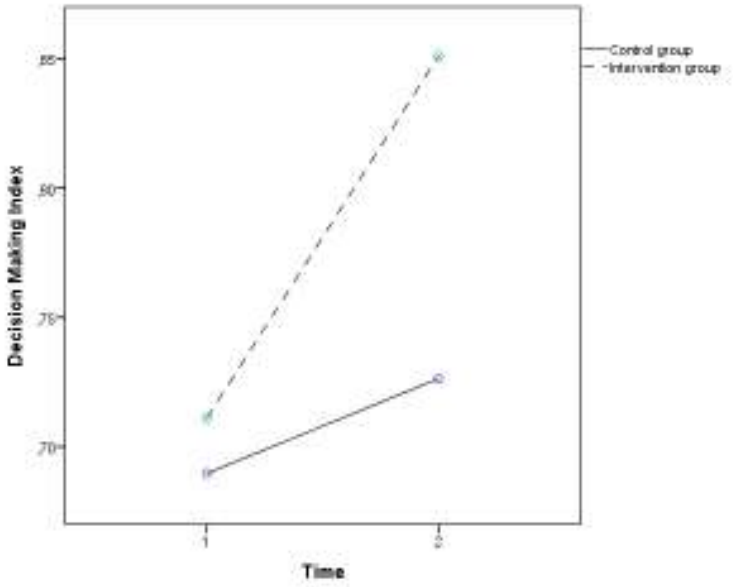

Figure 1. Graphic representation of the results from the mixed between-within subjects' analysis of variance (group*time), showing the change in decision making index mean score over time for the IG and the CG.

Discussion and Conclusion

This study showed that both tactical games and technique-oriented pedagogical approaches promote the learning on off-the-ball movement (support actions), as well as, on-the-ball skills (which includes skill selection and decision making) over eight consecutive weeks. However, no differences were found for the skill execution index and the support index. On the other hand, students had better decision making with the tactical games approach. Interestingly, the tactical games approach promoted more MET than the technique-oriented approach.
Both investigated pedagogical approaches demonstrated positive results on the participants' game performance after the 8-week-didactic-unit of invasion games. One interesting result was that overall, i.e. collapsed across the two time points, students had better tactical decision-making performance with the tactical games approach than those with the technique-oriented approach. This finding has a significant implication for the teaching, learning and assessing of invasion games within PE, since tactical decision-making and response selection is critical for invasion games performance (Harvey & Jarrett, 2014). An appropriate tactical decision-making is one of the most complex game abilities in invasion games (Harvey & Jarrett, 2014; Oslin & Mitchell, 2006). Gray and Sproule (2011) assessed the effect of a tactical teaching approach in a five-week block of basketball training on performance, compared with authentic teaching in a Scottish secondary school. This research observed that the group submitted to the tactical approach made significantly better decisions on and off-the-ball, when compared to the skill-focused group. Additionally, there were no significant differences between groups after the intervention in terms of on-the-ball skill execution. Similar results were seen on a girls' soccer unit, where the games group performed significantly better on decision-making and support than the technique approach group. Contrary results were seen for skill execution (Chatzopoulos, Drakou, Kotzamanidou, & Tsorbatzoudis, 2006). Also, Gréhaigne et al. (2005), in a 12-week intervention (Avallon Project), showed that a tactical teaching group had the greatest improvement in performance, when compared to other performers in a technical teaching group.

All together, these results seems to support that the tactical games approach has a greater cognitive impact (tactical knowledge), which is related to the students' ability to identify tactical problems that emerge from the game and select the most appropriate decision (Ford, Yates, & Williams, 2010; Gabbett, Jenkins, & Abernethy, 2009; Gutierrez, 2016; Turner & Martinek, 1999).

Besides that several studies have addressed different individual invasion games, limited attention has been given to the role of content organization (e.g., addressing similar tactical problems across different invasion games) within the tactical games approach. The present research addresses this particular issue. The scope and the sequence of invasion games' content were organized according with the problems associated to scoring, preventing scoring and starting or restarting play (Mitchel et al., 2013).

The results of the present study sustain that, when using a tactical games approach for teaching generic invasion games, teachers could plan instructional units to enable students to address similar tactical problems across a variety of invasion games such as soccer, handball, and basketball. The concept of transfer underpins this tactical approach to invasion games teaching (López et al., 2009). This corroborates the results found by Memmert and Harvey's (2010), who also proposed the use of game-centred approaches to facilitate tactical transfer between different invasion games. The present study confirms also this idea, suggesting that the tactical games pedagogical approach may help students to transfer learning from one game to another, because they are tactically similar even though requiring different skills. In line with the theoretical conception, Mitchel et al. (2013) reinforce that, by learning the generic concepts, students more quickly understand what to do to play any invasion game successfully. The use of this approach could be an important to trigger the effectiveness of physical teaching in schools, allowing students to learn games in greater depth than in typical teaching (i.e., in blocks). Using this pedagogical approach, teachers could expand the set of content goals, as well as, deepen the coverage of relevant tactical problems.

The second purpose of this study was to investigate whether there was a significant difference in mean MET between the tactical games and the technique oriented pedagogical approach. In the present study, we considered the MET as measure of the time that student was on MVPA during the class. The present results showed that there was greater MET among students involved in the tactical games approach, when compared to those in the technique-oriented approach. This result corroborates previous evidence that the tactical games pedagogical approach can provide students with more MET opportunities for learning (Roberts & Fairclough, 2011). Using a similar observation technique (direct observation), besides the use of different assessment tools, our findings are aligned with those from previous studies that found an association between the traditional direct instruction approach and higher levels of student inactivity in the PE classes, when compared with tactical games approach interventions (Harvey et al., 2016; Miller et al., 2016; Smith et al., 2015).

As described in the methods section, a critical feature of the tactical games approach to teaching invasion games in this study was the use of different game conditions to increase the likelihood of students having to think about ways to overcome problems, in addition to the increase in the number of executing skills. This pedagogical strategy in teaching invasion games has been shown to be more profitable in the increase of the MVPA (Gabbett et al., 2009; Harvey et al., 2016), as well as in the empowerment of the entire teaching process (Butler, 2014; Harvey & Jarrett, 2014).

Finally, in the current study, although the tactical games approach promoted significantly higher MET (41.3%) than the technique-oriented (31.4%), both approaches failed to provide students with the sufficient PA opportunities that would be consistent with the achievement of the generic recommended PA (Association for Physical Education [APE], 2008; Institute of Medicine [IM], 2013). In the present study, global results on MET were lower than those reported by Miller et al. (2016) and Smith et al. (2015) in units of invasion games, and Harvey et al. (2016) in a soccer didactic unit. Many reasons could be explained these results. For instance, differences associated to demographic characteristics and culture, sport backgrounds, intervention length, teacher's experience and background, and students' motivation towards invasion games. Future research should consider the integration of these variables, as well as, to integrate more robust instruments to assess MET.

We can point out several strengths of the current study. First, this research was done in a real educational context, with intact groups. Second, both groups (IG and CG) had orientation from experienced teachers, in all units. Third, this experiment was coherent with the National Physical Education Program content (ME, 2001). Finally, this study supports the positive effect of one instructional didactic unit, that considers similar tactical problems across different invasion games, on the learning process. This information is relevant to help teachers in structuring invasion game units/lessons and offering a rich variety of game experiences. However, there are some difficulties in developing this type of research. It is difficult to make claims about the students' learning only after eight weeks of teaching. On the other hand, placed by the real context, the lack of randomization is a limitation of the research, which could introduce bias. However, no significant differences were identified at baseline on physical fitness (see Table 1). Lastly, in this study, there was a significant number of dropouts, especially in the CG. This was, in part, due to students changing classes or school during the study. On the other hand, it could also be indicative of lack of interest of students by PE in this Portuguese public school. Further research is needed to better explain the factors underlying these results.

Conclusion

In conclusion, the present study suggests that students involved in a tactical games pedagogical approach unit of generic invasion games present better on-the-ball decision making, when compared with a technique-oriented pedagogical group. Furthermore, this study provides evidence that the tactical games approach offers students with more MET opportunities. Continued replication of this research considering long term follow-ups is necessary to further strengthen the generalizability of these findings across other types of games and alternative school contexts.

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