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## Mediating Peer Teaching for Learning Games: An Action Research Intervention Across Three Consecutive Sport Education Seasons

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### ABSTRACT

**Purpose:** The purpose of this study was to provide an integrated analysis of a teacher's peer-teaching mediation strategies, the student-coaches' instruction, and the students' gameplay development across 3 consecutive seasons of sport education. **Method:** Twenty-six 7th-grade students participated in 3 consecutive sport education seasons of invasion games (basketball, handball, and soccer). The research involved 3 action research cycles, 1 per season, and each cycle included the processes of planning, acting and monitoring, reflecting, and fact finding. Data collection consisted of videotape and audiotape records of all 47 lessons, a reflective field diary kept by the first author in the role of teacher-researcher, and a total of 24 semistructured focus-group interviews. Trustworthiness criteria for assuring the quality of qualitative research included extensive data triangulation, stakeholders' crosschecking, and collaborative interpretational analysis. **Results:** Through the application of systematic preparation strategies, student-coaches were able to successfully conduct team instruction that resulted in students' tactical development and improved performance. Aspects such as the study of predominant configurations of players' gameplay and similar tactical principles across games within the same category prevented a setback in the complexity of the learning content addressed at the beginning of each season. Players also showed an increasing ability to adapt gameplay to game conditions. **Conclusions:** While sport education has the capacity to develop competent players, different levels of teacher guidance and learners' instructional responsibility are necessary when teaching tactics.

### ARTICLE HISTORY

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### KEYWORDS

Instructional strategies; student-coaches' preparation; tactical development; transfer of knowledge

A significant part of the physical education curriculum is dedicated to teaching and learning games and sports. However, developing competent game players involves complex processes, which is particularly true in invasion games where players face intricate and rapidly changing problematic settings and constantly need to adapt tactical decision making and consequent actions to dynamic configurations of play (e.g., opponents' changing positioning [Gréhaigne, Godbout, & Bouthier, 1999]). Researchers have further highlighted the need to progressively stimulate the development of goal-oriented and action-oriented sense of play. This development includes understanding the links between specific sets of circumstances and the deployment of appropriate tactical solutions, reflecting on the techniques actually available to them, and conceiving of tactical skills as clusters of cue perception, strategies, and techniques that occur simultaneously in varying game situations (Kirk & MacPhail, 2002).

With a strong focus on the teaching and learning of games, the sport education model aims to promote

enhanced authenticity of the learning experiences of sport in physical education by including key features derived from how sport is conducted in community and interschool contexts (Siedentop, 1998). As units are presented as "seasons" and students are affiliated into persistent teams, students assume significant ownership of the curriculum through managerial roles such as team managers and instructional roles such as coaches. Consequently, knowledge and skill development occurs predominantly within a peer-teaching format of instruction.

Within such a learning context, the core goal of sport education is that students will develop as competent, literate, and enthusiastic sport players (Siedentop, 1998), and extensive research has highlighted the success of sport education in developing learners' literacy (e.g., inclusion, equity, and social values) and enthusiasm (e.g., motivation, membership, and sporting culture; Hastie, Martínez De Ojeda, & Calderón, 2011; Wallhead & O'Sullivan, 2005). However, although there is growing research demonstrating success in

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developing competence in gameplay following seasons of sport education, some researchers have suggested that student-coaches may lack the specialized content knowledge (considered as the ability to identify common errors affecting students' gameplay and to design appropriate learning tasks; Ward & Ayvazo, 2016) and the ability to address higher-order content development (Wallhead & O'Sullivan, 2007).

As Ward and Lee (2005) noted, "[M]erely placing students in groups is insufficient to ensure that learning will occur" (p. 205). In the specific case of games and sports, peer instructors are required to have or develop not only an increased understanding of the sports content (rules, tactics, and identification of tactical problems), but also a beginning knowledge of instructional strategies, such as pausing the game and conducting explanatory instruction to help teammates test solutions to gameplay problems. Teachers then will choose between using guidance-based instruction or more discovery-based strategies. For example, strategies that use peers as a component of direct instruction, such as task cards and modeling gameplay behaviors, enable student-coaches to offer preestablished solutions to simple game elements. Conversely, sharing with the teacher the engagement of players in the development of reasoning, adaptable and independent gameplay requires the structuring of peer interactions through student-coaches' training of instructional skills, particularly those related to questioning (Ward & Lee, 2005). The level of direct or indirect instruction will depend on a number of factors. Some of these factors include the complexity of the learning content, the time point in the season, the student-coaches' and teammates' current level of awareness and ongoing progress, and the intended level of student ownership of the learning experience.

Despite claims that the use of peer-coaching preparation programs develop quality of peer instruction, no research to date has identified the extent to which teaching/coaching responsibilities have been distributed between the teacher and student-coaches. By consequence, the extent to which student-coaches are engaging teammates in effective instruction leading to tactical learning and improved gameplay is unclear (Hastie et al., 2011). More importantly, there is a void of research related to the effective pedagogies through which teachers can prepare student-coaches to navigate the demands of instructional leadership (Hastie et al., 2011; Wallhead & O'Sullivan, 2005).

### **Purpose of the study**

We argue in this study that to advance knowledge on sport education's potential for developing tactically

competent players, some underdeveloped facets of the research base need to be tackled. First, given the student curriculum ownership facet of sport education, there is a need for research that explicitly informs teachers and researchers on how instructional and peer-teaching mediation processes can be effectively developed within the model. It is particularly the case for those processes that lead to learners' empowerment in the construction of their own learning experience.

Second, there is the need to deepen the inferences drawn on tactical development through the inclusion of naturalistic descriptions of gameplay and the examination of how cognitive understanding guides the solution process during gameplay problem solving. Third, although sport education has an inclusive focus, there is little information on how peripheral students can achieve greater participation in gameplay through tactical development. Finally, due to the predominant research focus on children's experiences of a single and isolated season of sport education, there is a need for studies that can identify the challenges underlying the learning progression of games across time.

The main purpose of this study then was to examine in a naturalistically occurring school context the teaching and learning of invasion games across three consecutive seasons of sport education. Specifically, by drawing on a qualitative and interpretative analysis of players' tactical development and by focusing on the microlevel of instructional interactions (teacher/class, teacher/student-coaches, and student-coaches/peer players), the specific objectives were (a) to examine the effect of the different strategies used by the teacher to prepare student-coaches to conduct peer-led instructional interactions and learning activities conducive to the development of competence, (b) to examine the peer instruction interactions occurring in these activities, and (c) to examine the development of students' gameplay competence and understanding.

## **Method**

### **Setting and participants**

The participants in this study were 10 girls and 16 boys (aged 12 to 14 years old) enrolled in seventh grade at a school in Northern Portugal. Participants' sociobiographic information was collected prior to the project through informal meetings with the class director and the children's caretakers and a formal meeting with students in a classroom to collect information about their sporting experiences. While most of these students had been in this same cohort since fifth grade, 4 new students joined the class in seventh grade. Five of

the girls participated in basketball and dance outside the school, 6 of the boys played soccer, and another 4 boys played handball, tennis, and floor hockey. The remaining 5 girls and 6 boys were not participants in extracurricular physical activities. Although there was a positive class climate in general, there were different sets of relationships across the class apparently influenced by the disparity in students' sporting backgrounds, as well as their varying dispositions toward engaging in physical education.

In line with sport education benchmarks, students were allocated roles in addition to that of player in the first lesson of the school year. The key actors in this article are Sarah, Paul, and Will (pseudonyms), who were voted as team coaches in the first lesson and who continued in these roles following a consensus decision at the class level at the end of the first term. While Paul and Will had played community-based soccer for 3 years, Sarah was a proficient basketball and soccer player. The first author had 11 years of experience teaching physical education, and for the past 6 years, he has been using model-based approaches. The first author assumed the dual role of teacher-researcher. Ethical approval for the research project was granted by the host university after all participant students and respective legal guardians signed informed consent.

## **Context and taught curriculum**

### ***The sport education seasons***

This study took place over three consecutive seasons of sport education. Consistent with the school's program, included sports were basketball in the first term (19 45-min lessons) and handball (12 45-min lessons) and soccer (16 45-min lessons) in the second term. In the initial lesson of the first season, pupils were placed into three heterogeneous but balanced teams. The teams were named the Falcons, the Bears, and the Lions.

Based on video observation of every lesson, the research team and an expert on model-based practice external to the study agreed that all seasons included the core "non-negotiable" features that Hastie and Mesquita (2016) suggested must be contained in a sport education season to reflect a tactical focus. These features were that (a) the seasons spanned an extended period of time, (b) the teams were persistent, (c) there was developmentally appropriate competition consisting of modified versions of the formal sport, (d) the students took on roles and responsibilities other than that of player, and (e) the team practice of small-sided games was aligned to each season's modified main game form.

### ***Role-playing preparation***

A series of strategies was employed in each of the seasons to support the student roles, including that of peer coaching, which is the focus of this article. For each season, the student-coaches received a coaching handbook that contained task cards with schematic drawings, descriptions of the game conditions, and error detection feedback cues related to both the main game forms and to game-aligned practice tasks of increasing complexity. Additionally, although predominantly in Season 1, the teacher used guided practice in which he provided short demonstrations of the upcoming tasks to the entire class prior to the student-coaches establishing the tasks within their own teams.

During Seasons 2 (handball) and 3 (soccer), the three student-coaches participated in six coaching seminars (three per season) conducted in a private space in the school's library. The seminars lasted 35 min to 55 min and involved the student-coaches in a series of "debates-of-ideas" activities (Gréhaigne, Caty, & Godbout, 2010, p. 266) to support the development of coaching skills. The activities encompassed debate and reflection about the teams' game problems and discussion of potential tactical solutions and plans of action. Each debate was prompted either by video-based observation of the teams' gameplay or by probing questions such as, "What problems did you have in the last match?" or "What now?" The goal here was to focus on problems identified by the student-coaches themselves.

### ***The learning content***

Due to the school program's focus on invasion games, the learning tasks used were based on the invasion games competence model to address the specific nature of the tactical content, skills, and game problems of invasion games (Farias, Mesquita, & Hastie, 2015). In each season, the players were expected to develop proficient gameplay within a main game form (e.g., handball and soccer, 3 v 2 plus goalkeeper) through practice and competition matches. The students learned less complex tactics within small-sided games that assumed the format of partial game forms (tactics-focused) and gamelike tasks (skills-focused). These practice tasks functioned as the building blocks for competent gameplay of the main game form. Table 1 provides a summary description of the main game form, tactical principles, practice tasks, and content elements of the seasons.

**Table 1.** Elements of the tactical content across the three seasons.

Season	Main game form	Tactical principles	Practice tasks	Content
Basketball 19 lessons (45 min)	Single-basket 3 v 3 played on a half-court	Score	Skills-drills	Dribbling
			2 v 0	Chest pass,
		1 v 1	Shooting	
		Attack the basket	Duel	
Handball 12 lessons (45 min)	3 v 2 plus goalkeeper Court: 20 m × 15 m with restrictive goal area	Defend space	3 v 1	Support(using spots)
			2 v 1	Give-and-go
		Create/use space in the attack	3 v 1	Control
		Soccer 16 lessons (45 min)	3 v 2 plus goalkeeper Court: 20 m × 15 m, no restrictive goal area	Create/use space in the attack
3 v 1	V-cut			
Defend space	3 v 2			Zone defense
Maintain ball possession	3 v 1			Pass-and-overlap
Soccer 16 lessons (45 min)	3 v 2 plus goalkeeper Court: 20 m × 15 m, no restrictive goal area	Defend space	2 v 0	Width/depth
			3 v 1	Progressing, freezing the defender, passing to open player
		Maintain ball possession	2 v goal keeper	Progressing, freezing the defender, passing to open player
		Attack the goal and score	3 v 0	Width/depth, keep open lane
Soccer 16 lessons (45 min)	3 v 2 plus goalkeeper Court: 20 m × 15 m, no restrictive goal area	Attack the goal and score	3 v 0	Offensive/defensive cover
			3 v 1	Crossing wide and shooting
		Attack the goal and score	3 v 1	Fast control and shooting
			3 v 1	Fast control and shooting

## Design

This study adopted an action research-based intervention method to reflect an epistemology capable of keeping pace with the dynamic and situated development of teaching and learning within student-centered curriculum models. The specific investment in developing the student-coaches' knowledge and instructional ability leading to the teams' more complete ownership of their learning experience and consequent tentative empowerment of students through proficient participation in games sought to achieve the concrete transformation of real educational situations and to afford students the opportunity to raise their own questions and develop independence from the teacher (Carr, 2006).

The project involved three action research cycles, with each cycle including the processes of planning, acting and monitoring, reflecting, and fact finding (McTaggart, 1991). All processes were centered on the events emerging within three consecutive tactically focused sport education seasons of basketball, handball, and soccer. Season 1 (basketball) served as a diagnosis of the preliminary problems encountered related to the teaching and learning of games, a process termed by McTaggart (1991) as the reconnaissance of the circumstances of the field and fact finding about them. Guided by the objectives of the study, Seasons 2 (handball) and 3 (soccer) represented consciously directed interventions. At the end of each season, the reflections and fact finding about the unsolved problems in those lessons informed the action steps and planning for the following season. It should be stressed, however, that although the

purpose of this study was to examine the teaching and learning of games through a tactical perspective, it was not an attempt to verify how accurately the teacher and the student-coaches implemented any given predetermined tactical framework in particular. Inspired by the work of Rovegno, Nevett, and Babiarz (2001) as well as MacPhail, Kirk, and Griffin (2008), this study sought to explore the naturalistically emerging dilemmas experienced by the teacher and the student-coaches and the strategies used to overcome them.

## Data collection

The study relied on multiple sources of evidence to gain an exhaustive understanding of the pedagogical process from all participants' points of view.

### Lesson videotape records

To gain an in-depth access to the events occurring within the units, all 47 lessons were videotaped using two crossed-angle digital camcorders (Sony HDR) coupled with four audio-recording devices (Olympus VPN8600PC) worn by the student-coaches and the teacher.

### Field diary

Following each lesson, the teacher conducted a synchronized examination of the video and audio recordings to create a written field diary. Within this diary were detailed descriptions of the goals set for the lesson, the learning tasks and content progression, and the level of responsibility assigned to the student-coaches.



Also included were the teacher's reflections on what happened in the lessons and his subsequent teaching actions. Detailed transcriptions of the instructional interactions led both by the teacher and the student-coaches during pregame and postgame practice gatherings and during the monitoring of players' gameplay and performance of the practice tasks were also added.

A focus was placed on describing the problems encountered by the student-coaches and the strategies they used to overcome them. As such, analytic notes were added to capture the teacher's reflections of the student-coaches' ability to identify tactical problems hindering their teams' performance and to act on them by using appropriate instruction, as well as the extent to which their instruction stimulated teammates' understanding of problematic scenarios or established links between task selection and game problems.

Six lessons were selected in each season (two at the beginning, two at midterm, and two at the end) to evaluate the evolution of the students' gameplay during the main game forms. The primary sources for analyzing any learning progression were written narratives of each teams' gameplay. Within these narratives, focus was placed on the extent to which students enacted the learned tactical skills appropriately and on their ability to adapt their game actions to contextual circumstances. Consistent with MacPhail et al. (2008), the record of gameplay descriptions formed at the beginning of each season was used as reference for judgments made about progression in the quality of gameplay across the three points in the season.

### **Team focus-group interviews**

Eighteen focus-group interviews were conducted in total (two for each team in each season). Each interview was video-recorded, lasted approximately 90 min, and was transcribed verbatim. The interviews occurred at the beginning and end of each season and served two purposes. The first purpose was to explore students' perceptions of their ongoing experiences in sport education along with their perspective on their student-coaches' instruction. The second aim was to assess students' level of game understanding by cross-checking their responses about their decisions during particular game moments with their actual in-game actions. This second aim was achieved by having students watch video excerpts of critical moments in their gameplay and asking them to think aloud about their representations of game understanding.

### **Coaching seminar focus-group interviews**

During Seasons 2 and 3, a coaching seminar diary was kept for the six coaching seminars. These diaries functioned simultaneously as a data source for the ongoing

progress of the student-coaches' ability to identify tactical problems hindering their team's gameplay and to suggest appropriate solutions to solve them and as a forum for developing their knowledge and coaching skills. All seminars were videotaped and audiotaped and transcribed verbatim. Analytic notes were added to provide a chronological account of the ongoing interpretation of the student-coaches' instructional progress.

### **Data analysis**

In keeping with the on-the-spot, iterative, and cyclical nature of action research, data collection and analysis were intertwined (Charmaz, 2014). For example, the debate of tactical problems and solutions in each coaching seminar was followed by an observation and evaluation of the student-coaches' ability to lead their teams' problem-solving processes during their peer-teaching interactions in the gym. In turn, this reflection informed the focus of intervention of the subsequent seminar and so forth. Nonetheless, a thematic analysis was used to evaluate the data from the field diary, interviews, and coaching seminar diary.

In the process suggested by Charmaz (2014), the first stage of this analysis involved repeated reading of the transcripts followed by line-by-line open coding of data to expose embedded thoughts, ideas, and meanings and search for patterns (e.g., "lacking error detection skills"). The attempt to uncover patterns in the data was guided by the degree of relevance to the problem under investigation, the prevalence of the occurrence, or the recurrence of participant commentaries (Corbin & Strauss, 2014). The focused coding involved analysis of the defined codes and the subsequent testing of possible combinations that led to formation of overarching themes and subthemes. This interpretative analysis sought to provide a deeper understanding of the findings by clarifying possible relationships between codes and themes.

As suggested by Corbin and Strauss (2014), a third level of analysis consisted of a process of working back and forth between data and theory. Facets related to learning conceptions (Gréhaigne et al., 1999), spectrum of teaching pedagogies (Slade, Webb, & Martin, 2015), and tactical frameworks for content development (Mitchell, Oslin, & Griffin, 2013) in team sports as well as theoretical perspectives on games learning (Gréhaigne et al., 2010; Kirk & MacPhail, 2002) were used to examine, clarify, and think about the data in a more sensitive way and to account for the complexities, conflicts, and contradictions identified during the analysis. Nonetheless, there was an explicit effort made to

not force data to fit the theory, but rather to use such theoretical insights to search for patterns and interpret intrinsic meanings in the data and to refine the substance of the themes and subthemes. The final stage involved the production of the written text.

### Trustworthiness

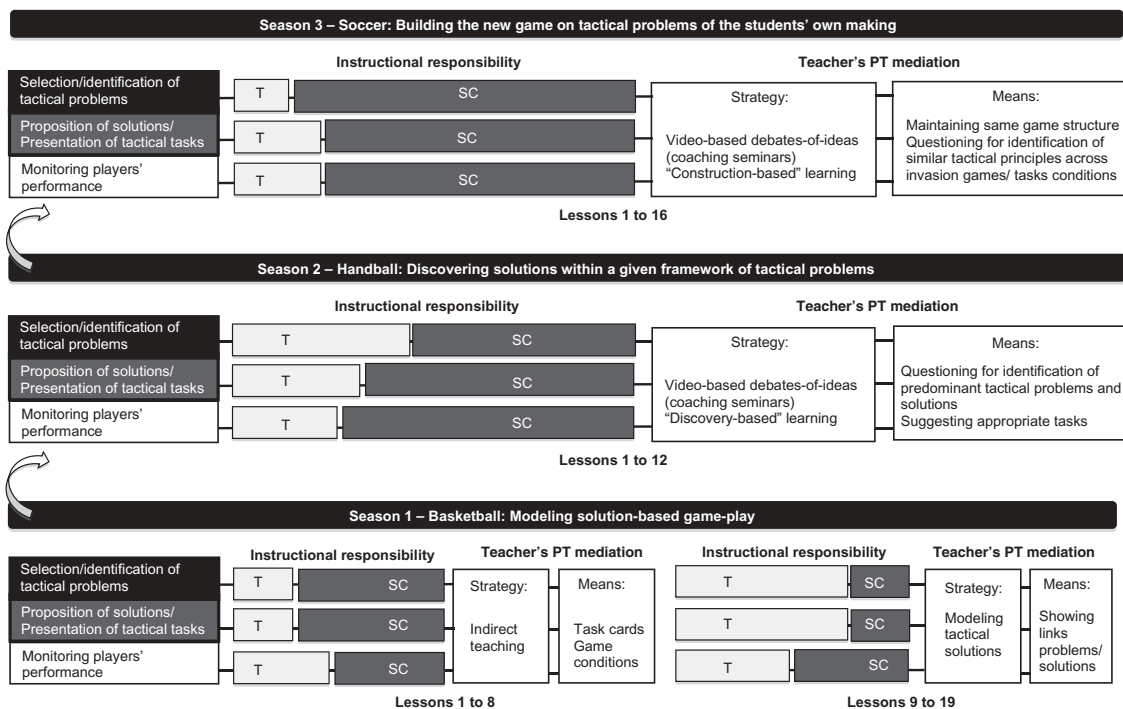
The teacher-researcher was an inside member of the organizational system in which the process of inquiry occurred. It was necessary for him to use methods that allowed for acknowledgement of the consequences of his presence and recognition of his situated self. The first author tried to deal with his critical subjectivity by listening to students' voices while showing fairness and sensitivity and by expressing in words and acts his genuine intention of developing a more just and meaningful learning experience to students.

Three additional procedures were undertaken. First, data triangulation involved cyclical and iterative data collection and analysis of different sources of data. The ongoing interpretations from class events were continuously crosschecked with additional data generation. Second, as recommended by Corbin and Strauss (2014), students were continually asked to verify the accuracy of the teacher-researcher's interpretations of the meanings implicit in their actions and verbal interventions. A third process seeking to minimize the risk

for individual researcher bias involved regular peer debriefings with the research team (the first researcher and coauthors) in a collaborative approach within the interpretational analysis (Patton, 2015).

### Results

The analysis of the data generated three main themes representative of the overarching teaching and learning perspectives found within each cycle/season. These themes were: "Season 1: Modeling solution-based game-play"; "Season 2: Discovering solutions within a given framework of tactical problems"; and "Season 3: Building the new game on tactical problems of the students' own making." Each theme presented in this analysis includes an initial section related to the teacher's mediation strategies for supporting the student-coaches' peer instruction, a second section centered around the student-coaches' instructional interactions with peers, and a third part reserved for observation of the students' game-play and perceptions of the events. As a focus is placed on the three student-coaches, Sarah, Paul, and Will, their teammates are identified by the initial letter of their name and by gender. Figure 1 provides a graphic representation of the core mediation strategies used by the teacher across the three seasons,



**Figure 1.** Representation of peer-teaching mediation strategies and levels of instructional responsibility. *Note.* PT = peer teaching; SC = student-coaches; T = teacher.

together with the level of instructional responsibility taken up by the student-coaches and teacher.

### **Season 1: Modeling solution-based gameplay**

In Season 1, the teacher adopted two different approaches to content development: (a) the use of indirect teaching from Lessons 1 to 8, which sought to diagnose the student-coaches' ability to lead their teams in problem-solving tasks; and (b) a teacher-led solution-based approach to learning basketball in Lessons 9 through 19.

During the diagnosis period, the teacher imposed a series of modifications to the 3-v-3 gameplay (e.g., individually adjusted "low-pressure" defense, no-interception area by the basket, etc.) to stimulate the players' use of particular movement patterns (e.g., immediate cutting/dribbling to the basket after ball reception). The instructional support provided to the student-coaches consisted of task cards that explained the expected motor responses and their relationship to the conditions imposed by the game. The student-coaches were responsible for reading the coaching cards to teammates before the teams' game practice sessions and were responsible for monitoring teammates' gameplay.

The lesson observations from this period showed low game involvement of several students (particularly the lower-skilled players) due to a "lack of awareness on how to take advantage of the opportunities for action offered by the game modifications" (e.g., use the "low-pressure" defense rule for creating shooting opportunities; field diary, Lesson 3, October). Concurrently, the student-coaches were inefficient in prompting the intended movement patterns:

*During the Bear's game practice ...*

Will and H. (male) grasped that the 3-sec low pressure defense affords pressure-free shooting attempts, hence, they constantly dribble into the area. While B. (female) runs randomly all over the court, C. (female) didn't grasp the free 'ticket' to the basket and systematically holds the ball blocking the attack setup. With so much going on, I understand why no feedback prompts are coming from Will. (Field diary, Lesson 4, October)

To counteract the shortcomings typical of those highlighted here, in Lessons 9 through 19, the teacher took over the responsibility of identifying the tactical problems common to the teams. Adopting what can be best described as a "solution-based pedagogy," he decided to add to the manipulation of the game conditions by explicitly stating the relationships existing between specific sets of information contained in particular game-problem situations and the tactical skills needed to overcome them. The following sequence

describes one such episode in which the teacher used direct instruction of the specific "what," "why," and "how to do" elements in the tasks (in this case a 3 v 1):

Teacher: Some of you were not using the spots, closing down teammates' passing lanes. Getting free, yet not getting the ball. Loudly, 'ask for the ball.' Watch. Sarah and Will, one in each of the opposing spots please. Start moving slowly towards the ball. See the space getting open near the basket as Sarah 'drags' J. (opponent male) out? Quick, cut back to the basket (v-cut). (*Sarah gets free, the ball is passed, and she scores.*) Remember to raise your target-hand while cutting. (Field diary, Lesson 9, November)

As a consequence of these changes, the lesson observations of students' gameplay showed more of them actively engaged in games. In the case of C., a previously less engaged student, she stated after the unit that "having a schema of play in mind helped organize the game and getting the ball more easily" (focus group, Bears, December). However, players did not always recognize when the game setting was appropriate for applying the specific tactical skills introduced by the teacher. As explained by Sarah, "[S]ometimes they cut to the basket instead of cutting to the spot (...) or the basket was open, they'd run to the spot." This statement was confirmed by J., who suggested he "got confused, forgot the right move" (focus group, Lions, December).

An additional key insight emerged postseason when aligning students' perceptions of their tactical development with the observation and reflection on the final championship matches. It became clear to the teacher that he needed to change his pedagogy:

*During the championship 3-v-3 match ...*

P. (male) 'pockets' the ball at the center and prompts for the movement (setting up the attack). A. (female) feints a support to the spot, and quickly cuts back to the basket getting open (v-cut). P. still holds the ball. Paul shouts, '[G]o back to the spot.' B. cuts again, and again. The pass comes, too late, she got marked, ball loss. Not using or using wrongly the target-hand dictated the success of many attacks. Many are leaving the unit without understanding why some game components are vital. And the coaches' erratic feedback? I've been offering solutions to problems they had no clue their teams had in first place. (Field diary, Lesson 18, December)

### **Season 2: Discovering solutions within a given framework of tactical problems**

The first season showed evidence of the students' inability to adjust game actions to game circumstances, a situation that reinforced the teacher's concern for developing the student-coaches' problem-solving skills



and their ability to identify tactical problems and select appropriate solutions. The principal mediating process of peer instruction consisted of three coaching seminars undertaken outside of the gym.

The teams participated in extensive practice of the main game form in Lessons 1 to 3. Based on postlesson video observations from this period, the teacher identified the predominant tactical problems hindering teams' gameplay and engaged the student-coaches in a video-based study of the tactical problems selected. The following excerpt illustrates the teacher's attempt to shift into a discovery-based learning approach to instruction. In a typical exchange, the student-coaches were stimulated to (a) identify the predominant patterns of tactical problems and (b) discover tactical skills appropriate to overcome the situations, and they (c) were advised of potential tactical tasks they could use to refine the specific tactical skills. The focus was placed on understanding the links between critical cues embedded in the problem scenarios and the tactical skills necessary in such scenarios. The example depicted in the following excerpt is focused on using and creating space in the attack for overcoming zone defense. The teacher supported the debate through probing questions and encouraged the joint generation of action plans:

- Teacher: What is happening here?  
 Paul: L. (male) is always passing to the side-line. My defense 'sticks close,' so it's easy to intercept.  
 Teacher: It's called zone defense. Why is it important here?  
 Sarah: For closing space and not taking a shot at goal.  
 Teacher: What if a pass is heading to J. (male)?  
 Paul: He's scoring.

*The video is set to run; the ball is intercepted.*

- Will: Bad pass.  
 Teacher: Hm. What's wrong with the pass?  
 Paul: It's too far away. The defense has time to intercept.  
 Teacher: How can you solve this in next games?  
 Will: By dribbling back, no?  
 Paul: Not anymore (risk of traveling fault).  
 Sarah: A different play. L. pass to J. and cuts wide (pass-and-overlap) ...  
 Paul: ... and when defenders come, they pass wide.  
 Teacher: It's called a 2-to-1. I've just the right task for you (we analyze a 2-v-1 video-based task). (Coaching Seminar 1, January)

In the lessons following the coaching seminars, the student-coaches improved in their frequency and

ability to identify and provide relevant instruction to teammates on problems related to the tactical principles studied. Two patterns were noticed in their instruction. First, the student-coaches encouraged teammates to base decision making on the "reading" of specific contextual information contained in the game scenarios. The following excerpt from the teacher's field diary supports this idea:

*After a sequence of poor supporting movements, Will stops practice and instructs teammates on how to create a 2-to-1 play.*

- Will: Stop. B. (female), in the side-lanes, keep wide open, why?  
 H. (male): Or else they will intercept.  
 Will: You two, keep a line, open wide, and wait, wait ...  
 B.: ... when the defender comes on you ...  
 Will: What then?  
 C. (female): They can pass us the ball. (Field diary, Lesson 25, January)

Second, there was also evidence of the student-coaches' ability to provide error detection feedback on the same tactical problems across different contexts, as seen in the following example:

*During a break in the game, Sarah adjusts the strategy.*

Guys, we're losing the game. Do as in the practice (2 v 1), dribble the ball, the 'wingers' keep open, and then you pass. (Field diary, Lesson 30, February)

The video-based analysis of the students' gameplay conducted at the end of the season showed a more pronounced intentional and action-oriented sense of play that was aligned to players' postunit justification of their decision making. For example, when asked, "Why did you cut (pass-and-overlap) to that specific spot at that specific moment?" A. (female), who had shown poor game performance in Season 1, replied, "H. (opponent male) kept leaving the (defensive) zone. As I was the closest one to the goal, they'd pass me the ball to score." Paul added, "[S]he saw the space and went for it" (Focus group, Falcons, February).

As the main unresolved issue in handball, there was the absence of any real goal-oriented selection of practice tasks by the student-coaches. Instead, although they prioritized the demonstration of the tactical skills (e.g., 2-to-1, progress and commit the defender) through instruction provided during gameplay or during group-processing breaks, they used the practice tasks for purposes that not always aligned to the respective teams' game problems:

- Teacher: Why did you (Paul) select the 4-v-4 score at the end zone?

- Paul: It's a fun game; they liked playing it the week before.
- Teacher: Hm. Yet, the Bears practiced the video-task (2 v 1), because Will sensed the problem.
- Will: Not a problem, just felt the team would get stronger with those tactics.
- Paul: Those (practice) tasks are complicated, we lose time. I prefer letting them play (the main game form) more and correct when it stops. (Coaching Seminar 3, January)

### **Season 3: Building the new game on tactical problems of the students' own making**

To increase the student-coaches' independent coaching and the teams' practice of game problem-related tactical tasks, the main goal set for the third season was to build content development on (a) problems identified by the student-coaches independently of the teacher and (b) their construction of problem-related tactical tasks. As a key change, the teacher did not select and point out the tactical problems to be worked on during the season. Rather, he used three strategies to sustain student-coaches' instruction. First, to promote the potential of knowledge transfer, the main game form from the previous handball season was retained (i.e., 3 v 2 plus dynamic goalkeeper). Second, in the first of the three coaching seminars, the student-coaches were encouraged to recognize play patterns and tactical principles previously learned during handball such as the need for using 2-to-1 situations for creating space. Third, due to the teacher's perception that gaps in students' knowledge of instructional tasks might have prevented goal-oriented task selection to occur in the previous season, two processes were encouraged. Based on gameplay problems identified by the student-coaches, (a) the teacher modeled the initial instructional tasks to be introduced by them and (b) encouraged awareness development of how specific game conditions influenced the tactics and set of skills to be used. The following excerpt showcases one of the interventions:

- Teacher: What problems will you be working on this week and why?
- Sarah: The wing players are standing too far down the court. I always need to be calling, 'come back.' We'll practice, two players, pass, and then shoot.
- Teacher: I see. Is that play likely to occur in the game?
- Will: One out of 20. (Laughs)
- Paul: The transition (defense/attack) is alike if she widens the court.

- Teacher: Imagine you use a 3 v 1 where you delimit the side-lanes. What will the wing players need to do?
- Paul: They'll need to be wide open if they are to stay within the lane.
- Will: So that defense doesn't intercept.
- Teacher: Practicing 3-to-1 plays that actually happen in the game.
- Sarah: Then, three passing, get back, and shoot. (Coaching Seminar 5, February)

Regarding peer instruction developments, a key pattern noticed during soccer was the student-coaches' ability to sustain their independent identification of tactical problems on tactical principles worked previously in handball. In the next excerpt, Sarah provided instruction on defending space when outnumbered, a principle addressed in handball (zone defense). However, while adjusting to the different conditions of the new main game form (i.e., no restrictive area, hence more space to be covered) she added sophistication to the content by exploring the defensive cover principle:

- Sarah: Stop, what's wrong here? Imagine the ball is with J. (male). M. (female), myself, anyone, together at the center. J. pass to L. (male). Now, the attacker is far from the goal. I move to tackle L., but M. is not marking. She's moving to my back, closing space as we're always one short (3 v 2). (Field diary, Lesson 41, February)

Until approximately halfway through the season, the teacher suggested to the student-coaches the initial problem-related tactical tasks. As the season progressed, each student-coach built on similar task structures to present tactical tasks specifically tailored to their teams' game problems. Paul, in particular, tried to pass on to teammates a more elaborate conception of tactical skills. In the following instructional sequence, he stimulated teammates to adjust the selection of the execution movement based on their perceptions of their current ability level. The tactical skill was conveyed as a combination of the techniques available to teammates (e.g., shooting technique), perceptions on contextual information (e.g., anticipation of opponents' movements), and strategic thinking (e.g., adjust decision making to the flow of the game):

*Paul introduces the 2 v 1 plus goalkeeper to the Falcons ...*

- Paul: Last match, we always passed side-lines. They got it and scored on us. We shouldn't do the same play every time, it depends, 'read' and adjust. In this exercise, imagine we're losing, so fast shooting. We're winning, then carry

the ball a bit, pretend it's 'closed' (goal blocked), pull back and start over. (To A., female) I'd like you to shoot with power, but if you're not feeling strong enough, instead target that little (goal's) corner, doing like, a stronger pass. (Field diary, Lesson 44, March)

As a key finding, most players sensed there was a stronger relationship between game improvements and practice of tactical tasks closely aligned to their teams' game problems, as expressed by C. (female): "I've improved tons. Had troubles in the first matches, didn't have those skills, basically, knew nothing about soccer tactics. We transferred those moves to the game" (focus group, Bears, April). The breakthrough regarding the quality of gameplay was an increasing ability by several players to adjust procedures dynamically and independently to the changing conditions of the game. The next excerpt portrays a collective video-based reflection on the increasing tactical sophistication evidenced by D., a Bears female player:

- Teacher: You practiced the 'wing' players keeping width. But notice D.'s (female) moves. As the ball is passed to the 'wing,' she instantly ...
- Paul: Cuts on the P.'s (male) back to be square and score.
- Teacher: [These] are high complex moves they didn't do before.
- Will: I saw some of them doing that. They got to know the theory, understanding, and then improved gameplay. (Coaching Seminar 6, March)

However, insights surfacing by the end of the season exposed a downside of the teacher's decision to subordinate so much of the content selection to student-coaches. Ultimately, "although play aspects such as control, rotation and fast shooting, fit the difficulties also of average (skilled) students, the tendency was to work in reference to the lesser skilled needs" (field diary, March). Whether subsequent seasons may have overcome this issue was outside the scope of this study.

## Discussion

Given time and through the application of systematic preparation strategies, student-coaches were able to actively participate alongside the teacher in instructional processes that facilitated players' tactical understanding and gameplay. Instructionally, the student-coaches progressed from a starting point where they struggled to identify problems related to critical tactical elements in the game to an end point where they were able to transfer knowledge on tactical problems from

prior seasons to inform their instruction in a different game.

Improvements in the identification of particular patterns of tactical problems/gameplay were identified while relying on the teacher as the main knowledge source in Season 1 and while independently constructing team-specific tactical skills in subsequent seasons. The players progressed from rote repetition of tactical skills to the ability to respond and adjust tactical decision making to the changing conditions of gameplay. Further, the action research and immersion of the practitioner-researcher in the real-life context of this study allowed in-depth access to and keeping pace with the reshaping of the instructional interplays between the various actors and enabled the testing of the "educational theories" implicit in his own practice. The practitioner-researcher was also able to continuously adjust procedures to the dynamic nature of the teaching-learning process leading to improved understanding of such practices (Carr, 2006).

It should be stressed, however, that the findings in this study would have been unachievable without strong teacher intervention in key processes of content development, proactive use of peer-teaching mediation strategies, and constant "internal negotiation" of the cost-to-benefit ratio of granting higher levels of curriculum ownership to students against adjusting learning expectations and pacing of progressions. In fact, the teacher's mediation strategies ranged in variety from more guidance-based to discovery-based teaching corroborating the advocacy that tactical frameworks for content development allow for "both ends of the constructivist continuum to be employed in game instruction" (Slade et al., 2015, p. 72). For example, in Season 1, students' game involvement increases were only visible after teacher-led identification of the teams' gameplay problems and proposition of solutions to them. The teacher's commitment to effectively include the student-coaches in the instructional process required the use of modeling and solution-based pedagogies against taking over the process of developing reasoning and tactical understanding at a class level. When many instructional processes are conducted by learners themselves, some temporary setbacks might be necessary before students can have a more active role in the construction of their learning experiences.

In Seasons 2 and 3, evidence emerged of student-coaches' progressive ability to lead critical instructional processes in their teams. When used after the student-coaches had already acquired a basic level of specialized content knowledge (e.g., ability to identify tactical problems and build practice tasks based on the teacher's modeling and comprehension of the relationships

between specific game conditions and tactical tasks; Ward & Ayvazo, 2016), a higher focus on cognitive understanding of the games was shown to be conducive to the development of creative problem setters and solvers. The combined engagement of student-coaches in the recall and verbalization exercises centered on video-based study of problematic scenarios, a process framed within a debates-of-ideas format and mediated by the teacher through reflective questioning (Gréhaigne et al., 2010). This process benefited their ability to identify their teams' gameplay problems and the individual needs of lesser-skilled teammates. This process was accompanied by teammates' adjustable gameplay decision making leading first to action-oriented game involvement and, later, to enhanced gameplay. The close interrelationship between student-coaches' development of basic specialized content knowledge and ability to share with the teacher the process of questioning, explaining, and practicing specific solutions in the problem-solving process has been shown to facilitate enhanced learning (Ward & Lee, 2005). Future research should delve into the microlevel of peer instruction to uncover the complex interplay between learners' common content knowledge (gained primarily from playing the sport) and the extent to which specialized and pedagogical content knowledge is enacted. While Sarah, an experienced basketball player, was instructionally inefficient in the first season (basketball), the sophistication peak of peer instruction was exhibited much later in soccer, a sport also mastered by the student-coaches.

From a tactical perspective, both structural and instructional factors appear to have been positively influential on the outcomes. First, the consecutive participation in games within the same category offered by this study's curriculum enabled the thematic grouping of the sports content. In line with the findings by Memmert and Harvey (2010), "getting the game right" was paramount to facilitating players' transfer of appropriate decision making during participation in similar tactical tasks across different invasion games. Indeed, players' participation in consecutive seasons of games that kept similar tactical structures prevented a setback in the complexity of the learning content addressed at the beginning of each season. Thus, it was possible to start building knowledge of the new game upon the understanding and performance previously learned, which in turn facilitated the increase of tactical sophistication from season to season (Mitchell et al., 2013). Furthermore, the process of studying predominant configurations of tactical problems and students' gameplay seemed to have sustained their progressive ability to identify emerging regularities in

teammates' play patterns and respective proposition of appropriate solutions to problems "in new, similar but not necessarily the same, real play situations" (Gréhaigne et al., 2010, p. 269). When both the student-coaches and their teammates developed a more refined understanding of the links between game conditions and tactical skills appropriate to such circumstances, players exhibited higher action-oriented and adaptive gameplay (Kirk & MacPhail, 2002).

## Conclusions

The findings in this study strongly reinforce the potential within sport education for the development of competent sports players and the critical importance of combining prolonged participation in games that share tactical similarities with specific coaching preparation protocols. Student-coaches successfully provided instruction that contributed to higher-order tactical development and improved gameplay. It is also recognized that in a structure such as sport education where learning activities are often student-driven, it might be unrealistic to consider the sole use of indirect teaching as an exclusive approach of instruction in every stage of student learning and skill development. Nonetheless, a commitment to enhanced curriculum ownership by the pupils may need to raise the consciousness of the teachers to both efficient peer-teaching mediation and the extended time necessary for the development of tactical competence in players.

If sport education is to evolve and in so doing confirm beyond reasonable doubt its potential to develop students as competent sports players, we are suggesting that the use of coaching preparation protocols for students embedded in the gym activities (e.g., through prelesson and postlesson briefings) are essential, as is the establishment of curricula with consecutive practice of games and team sports within the same category as a means of enhancing the transfer of knowledge across activities. In the case of sport education, where extra time needs to be allocated for students to learn the dynamics and routines inherent to role-play and peer-teaching demands, safeguarding these aspects may be even more critical.

## What does this article add?

This article is significant in that it was the first in the context of sport education to provide an integrated analysis of a teacher's peer-teaching mediation strategies, the student-coaches' peer teaching, and the qualitative analysis of players' gameplay through "day-by-day" examination of the internal pedagogies operating



in sport education. Moreover, previous work on coaching preparation has focused solely on the pedagogical and instructional skills development in one isolated season or within a single net game.

This study was also the first to explore the learning progression extended in time within consecutive units of different invasion games, and it also offers an exhaustive and integrated analysis of the teacher's and coaches' instruction by including video and audio recordings and analysis of all the instructional and relational interactions occurring. Additionally, multiple data sources were utilized to investigate the phenomena from different perspectives (focus-group interviews, field diaries, coaching seminars, and videotape and audiotape records).

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