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Original Article

Teaching physical education: the usefulness of the teaching games for understanding and the constraints-led approach

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Abstract
The physical education teaching is a process that should adjust with the students' potentialities and with the context. Therefore, in order to adapt the teaching practice to the students' motivations, as well as their capabilities, new ecological teaching models have emerged in order to encourage the students' practice and provide new tools to the physical education teacher. The main objective of this work is to analyze the Teaching Games for Understanding model and the Constraints-led Approach model creating a bridge between the two models in order to sustain the ecological teaching in physical education. Additionally will be analyzed the beneficial effects resulting from these ecological teaching models for learning and students' motivation on the physical education.
Keywords: Teaching Physical Education. Teaching Games for Understanding. Constraints-led Approach.

1. Introduction

For several years to this part, the perspective how teacher falls within the teaching-learning process, tends to adjust to the new research currents and social context. If we associate the one curriculum recommended in which the teacher have more opportunities to apply different teaching methods, with the theoretical assumptions on the ecological teaching models, an opportunity window opens to enhance students' learning of diverse ways, in order to adapt the didactic and pedagogical practice with the students context.

Therefore, ecological teaching models as Teaching Games for Understanding (*TGfU*) or Constraints-led Approach may allow new opportunities to the teacher provide for their students new sources of learning and motivation (Clemente & Mendes, 2011). Despite of recently researches based their works on two models relatively separate; the fact is that the Teaching Games for Understanding may benefit from a partnership with the Constraints-led Approach, in order to promote the effectiveness of ecological teaching models (Clemente, 2012).

Therefore, the present work proposes to analyze the range of the Teaching Games for Understanding and Constraints-led Approach to the quality of physical education. Additionally will be analyzed the pertinence of these kinds of teaching models to the learning and motivation of the students.

This paper will be organized as it follows: *i*) Internal Logic of Sports Invasion Games: The Real Importance of Sports Tactics (section 2), where will be discussed the essence of invasion sports games and the importance of strategy and tactics for student learning; *ii*) Teaching Games for Understanding (TGfU) (section 3) where will be descript the teaching model and their opportunities to improve the quality of didactic and pedagogical processes; *iii*) Constraints-led Approach (section 4), where will be analyzed how this model can complement the TGfU model; and *iv*) The effects of ecological teaching models for the students motivation (section 5), where will be analyzed the positive effects of ecological teaching models for the students motivation and self-determination.

2. Internal logic of sports games: The real importance of Sports Tactics

The essence of collective sports games is characterized for opposition rapport between two teams coordinated for retrieve, maintains and moves the ball until they reach the score zone and complete the respective finalization (Gréhaigne & Godbout, 1995). In line with the above, Metzler (1987) describes the essence of sports games such as the possibility of solving at action a set countless of unforeseen and simultaneous problems with relating order. This problem-solving happens simultaneously during offensive and defensive phases, depending of the ball possession. In fact, it is intended to emphasize the relational and dynamic nature of sports games where the complexity related to intra-and inter-team endures continuously over match, collectively adapting to the constraints imposed by time and opposition. Effectively, the game contains within itself a complex relationship dependent on the cooperation among teammates and opposition with

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opposite team (Gréhaigne, Godbout & Bouthier, 1999). Thus, the systematic observation of sports games will include two major dimensions: *i*) the game, as regard of power balance between teams; and *ii*) the team, related to the relationship ability of the teammates, *i.e.*, the network. (*e.g.*, Gréhaigne & Godbout, 1995; Gréhaigne, Bouthier & David, 1997; Gréhagine, Godbout & Bouthier, 1999).

Given the above, the dynamics of the game must be resolved through tactical and strategic processes in order to increase the proficiency of the internal team to solve the constraints imposed by the opposition (Clemente, Couceiro, Martins & Mendes, 2012). The strategy and the tactic have always had relevance to forms of opposition and cooperation of the human species (*e.g.*, fighting, war, games). However, strategy and tactics are two distinct terms that must be properly interpreted in order to emphasize its relevance in viewpoint of sports. To Bouthier (1988), the strategy refers to all plans, principles of game or action guidelines that let define the organization and team preparation for the game. On the other hand, tactic involves the direction of spontaneous voluntary operations performed during the game by the players in order to adjust the initial requirements for changing the game events related to the rapport of strength between teams, changing in this way, some parameters relating to the strategy.

Similarly to Bouthier (1988) description, Gréhaigne Godbout (1995) describe a strategy as an elements previously discussed for the organization of own team. In fact, the strategy relates to the general order, *i.e.*, the players positioning on the field, as well, the occupied areas and position-specific missions (*e.g.*, Gréhaigne, 1994; Gréhaigne, Godbout & Bouthier, 1999). Regarding to the tactic, Gréhaigne and Godbout (1995) describe it as a timely adaptation to new game configurations depending on the movement of the ball and actions of their opponents. Effectively, the tactic relates to the positioning in response to the opponent in a given instant of the game situation, adapting the play conditions (Gréhaigne, 1994).

Consequently, given the above, there are substantial differences between strategy and tactic regarding to time and space. Effectively, the strategy is associated with cognitive processes more elaborate than properly with decision making, due to its higher performance time and lower frequency of constraints (Gréhaigne, Godbout & Bouthier, 1999). In fact, the substantial difference compared to the strategy, is that the tactic is directly related to constraints of space and time where the decision-making and adaptation is substantially higher. Consequently, during the game, especially for players near the ball, the tactic is prominent (Gréhaigne, Godbout & Bouthier, 1999).

The tactic is the interrelationship of the factors of the game (*e.g.*, space, time, teammate, ball, opponent) being directly dependent on the ultimate objective of the sport and their tactical objectives of general and specific action (Bayer, 1986), thus, the tactical knowledge is the knowledge of the students in action, which enables to the practitioner make tactical decisions depending to the context (Garganta, 2006). The tactical capability of the student is formed by the interaction of the processes leading to decision making, which aim the motor execution directed related to the intended goal (Matias & Greco, 2010). Therefore, in collective sports the cognitive component focused in the selection processes of response originates from the capability to 'reading the game' (Matias & Greco, 2010).

The tactical knowledge facilitates the selection and encoding of the relevant signals, and also making decision, reducing the time required for stimulus discrimination (McPherson, 1994; Williams, *et al.*, 2003). According to Greco (2006a) are identified two types of tactical knowledge: *i*) the declarative tactical knowledge; and *ii*) the procedural tactical knowledge. For these same authors, the declarative tactical knowledge refers to the ability of the student to know what to do, *i.e.*, the capability to declare verbally and/or writing the best decision to be made and why. Procedural tactical knowledge refers to how make, *i.e.*, the ability of the student perform their action, being closely related to motor action. However it is important to emphasize that the tactical efficiency of the student can relate to the ability to decide swiftly generating a set of possible answers to respond to a given problem (Gréhaigne, Godbout & Bouthier, 1999).

Indeed the opposition, although increase complexity for the players' action, provides a set of decision-making and reactions that enhance the development of the practitioner. In fact, the students' decisions relating to the opposition must be made regarding the continuation/breaks of a given play configuration, according to the state of ball possession (Gréhaigne & Godbout, 1995). Additionally, according to the authors, two aspects may be critical in the management of the action by players relating to the opposition: *i*) player take risks to gain advantage from the opponent in a sustained and cohesive defense; and *ii*) opt for defensive stability giving the initiative to play for the other teammates. Thus, the problem-solving of the game will be based on the reactive capacity of the player to interpret the play dynamics and make the appropriate action based on their ability and tactical knowledge.

In collective sports, the experienced players have a higher declarative and procedural tactical knowledge than the players with less experience, as well as a more structured and organized knowledge enabling an increase of the efficacy of the decision-making, verifying a positive relation between knowledge and performance (McPherson, 1994; Greco, 1995; Costa, *et al.*, 2002; Matias, *et al.*, 2004; Greco, 2006b). In experienced players, the levels of declarative and procedural knowledge have a greater proximity, while in less experienced players denotes a discrepancy between two knowledge's and performance (Matias & Greco, 2010).
Given the above, there are differences between experienced and inexperienced players as to the tactical action, due account being, among others, higher declarative and procedural knowledge, as well, a knowledge organized and structured; greater objectivity in the process of visual search, a better selection of relevant signals, a greater

capacity of tactical self-regulation or, a greater capacity to plan actions in advance (*e.g.*, Williams, 2000; Mann, *et al.*, 2007).

3. Teaching Games for Understanding (TGfU)

The Teaching Games for Understanding (TGfU) originates from Bunker and Thorpe that at 1982 published the scientific article *A Model for the Teaching of Games in Secondary Schools*. In fact, such an approach is generated in order to counteract certain trends potentially harmful to learning through the traditional educational approaches, highlighting: *i*) a great proportion of students obtained little success as result of technical emphasis; *ii*) students taught by analytical teaching models knew superficially the intrinsic dynamic of the game, showing a weak capability to act in the ecological context, *i.e.*, in the match; *iii*) students with high technical skills showed a reduced capability to decision-making in the match; and iv) in daily life, was possible to verify a lack of creativity and reflection on the sport by agents of the same (*e.g.*, Hopper, 2002; Araújo, 2006).

Contrasting with the authors' conclusions (*e.g.*, Hopper, 2002; Araújo, 2006) about the traditional physical education models, the goal of TGfU is to allow students to learn the tactical aspects of the practice through modified versions of the game (*e.g.*, simplified or constrained games) adapted to the needs of student proficiency (Araújo, 2006). Effectively, the authors argue that the TGfU model does not accept that tactical development must wait for the development and refinement of the technique, emphasizing that the games for understanding are focused on tactics, rules and modified equipment that promote students' interest for practical (Bunker & Thorpe, 1986). The basic justification of the model focuses on the fact that any student can participate in the game with technical limitations and, even with these limitations; it can be very competitive (Thorpe, 1990). Instead, mastering the technique does not mean that in a situation of formal game with constraints of various kinds, takes to the success. In fact, according to Tani (2005), although skill level it is inferred from performance in the absence of disturbance, there is no doubt that the ability to adapt to disturbances constitutes a decisive element in the evaluation.

This teaching model can be embedded in the perspective of the tactical work as essential support for learning. The TGfU can be defined by four pedagogical principles (Griffin & Butler, 2005): 1) the game type selection; 2) the game modification through representation; 3) the modification through overstatement; and 4) the adjustment to the tactical complexity.

The teaching sessions through TGfU starts with a game modified to encourage students to reflect on a specific tactical problem, defined previously by the teacher for this specific game (*cf.* Figure 1).

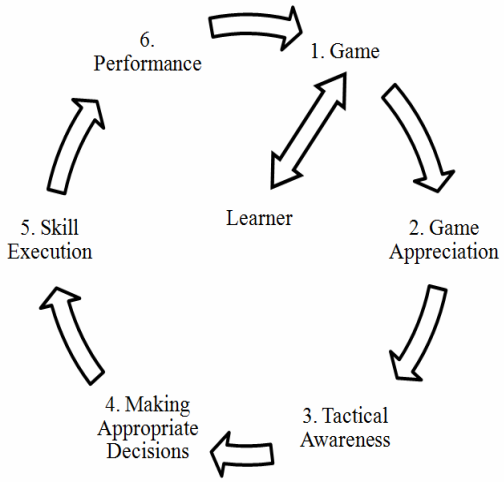

Figure 1. Teaching Games for Understanding model (adapted from Chow, Davids, Button, Shuttleworth, Renshaw & Araújo, 2007)

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After application of the modified game by the teacher it follows the verbal questionnaire to the students through guided or convergent discovery teaching style (*cf.* Mosston & Ashworth, 2008) about the tactical problem, followed by an explanation from the teacher about the tactical implications of the concept practiced.

In TGfU model, the game appreciation refers to the understanding of the nature and rules of the game by the students. For its part, the tactical awareness seeks to challenge students to solve problems caused by the game and hence increase the declarative knowledge to understand the game, either to can play him, as to observe him. Subsequently to the process of tactical awareness, it follows the process of decision making leading the student to know the ways of addressing the problem (*i.e.*, declarative knowledge) and ways to solve it (*i.e.*, procedural knowledge). Consequently the execution of technical skill and performance are evaluated by observing the results of decisions made by students during the game (*e.g.*, Turner & Martinek, 1999; Werner, Thorpe & Bunker, 1996; Araújo, 2006; Chow, Davids, Button, Shuttleworth, Renshaw & Araújo, 2007).

Given the above, in this model of education (*i.e.*, TGfU), the game, objectivated by a specific modified form, is the central reference for the learning process, giving coherence to all productive results arising from the physical education class (Graça & Mesquita, 2007). Thus, all moments of learning are centered on the game and its constituent aspects, such as tactical awareness or decision making. The TGfU model does not deny the necessity of teaching the technique, only claims that the specific technical work just arises after the game appreciation where will be analyzed the specific needs by the student in modified game situations through a diagnostic evaluation by the physical education teacher (Graça & Mesquita, 2007).

Another highlight in the TGfU model relates to the learning transfer, *i.e.*, the influence that the learning of specific content have at another sport with similar skill or tactical content (Godinho, Mendes, Melo & Barreiros, 1999). The transfer has been analyzed prominently through the behavioral and cognitive approaches, however, trying to transfer the concept for an ecological approach, it may be said that the transfer can be descript, as the perceptive refinement in relation to game dynamics which occurred at a set of similar sports, thereby facilitating a faster identification of the information, as well as improving the events' triage.

Through the concept of transfer, Hopper and Bell (2001) refer to the grouping of games for its classification as structural similarities: 1) target games; 2) net/wall games; 3) striking/fielding games; and 4) territory/invasion games. Thus, the tactical contents for each group, is a key element for across learning of the students, promoting the transferability of skills for recognition of game' information. With this it is meant that in practicing, for example, of an invasion game, the students will acquire perceptive and knowledge skills for all kind of sports involving invasion.

The teacher's role in implementing this model (Turner & Martinek, 1999) is: a) the teacher establishes the form of play; b) the teacher observes the game or the exercitation; c) the teacher and students investigates the tactical problem and potential solutions; d) the teacher observes the game and intervenes to teach; and e) the teacher intervenes to improve the technical skills. Briefly, in addition to the establishment of the task in relation to the tactical content to explore, it may be noted that the teacher acts as a facilitator who uses the questioning as a main processes for the development of tactical capability of their students (*e.g.*, Griffin, *et al.*, 2003; Araújo, 2006). In this perspective, it is important that the teacher in selecting the appropriate form of play bother to submit forms which take into account the conceptions that students bring to the learning situation so that they interpret these tasks as credible and authentic forms of play (Graça & Mesquita, 2007). According to these authors, understanding the game emerges as an interface between the adopted form of play and game concept whose function is to focus attention of the teacher about the ways to help students make the connection between the assumptions of the game and the proposal modified form of game.

3.1 Research at TGfU

The TGfU model has met a set of empirical evidence in order to support its relevance. Using specific tests of declarative and procedural evaluation, it was measured students' knowledge and their performance at game with regard to decisions making and technical execution (Turner & Martinek, 1995) comparing TGfU model with analytic teaching models.

However, the typical strategy of comparing approaches (i.e., analytical and ecological), methods, styles, strategies, or teaching procedures has consistently carried to inconclusive results, promotion and unfair generalizations based on reductionist conceptions (Graça & Mesquita, 2007). In fact, commonly, the studies did not show statistically significant differences between groups developed through tactical and technical models in different outcome/product measures on different games (*e.g.*, Rink, French & Graham, 1996; Araújo, 2006). For instance, on Turner and Martinek (1999) study, there were no significant differences in the development of technical content in the students who were subject to education through tactical approach. Also in the previous study, Turner (1996) not found significant differences between the tactical and technical models in relation to learning and development of technical behaviors. Further studies (*e.g.*, Gabriele & Maxwell, 1995; Mitchell, Griffin & Olisn, 1995; Griffin, Oslin & Mitchell, 1995) comparing models tactical and technical education not found significant differences between them. Basically the reported studies demonstrate reduced empirical evidences supporting the beneficial effects of one model over another. Rink *et al* (1996) indicates variables such as the kind of sport, the participants' age, duration and type of intervention, as well as how to be gathered and analyzed the variables, to justify the no significant differentiation of the teaching models. In fact, it may be noted that different teaching models should not be compared, since they results in distinct effects due to different procedures and goals (Metzler, 2005). Thus, it is not appropriate compare different approaches, when their scopes are also different. Therefore, it is necessary to assess the real importance of each teaching approach, trying to fit their benefits with specific students' needs at a given context.

Only through assessment tools fitting with the TGfU specificities, as Game Performance Assessment Instrument (Oslin, Mitchell & Griffin, 1998) and *Team Sport Assessment Procedure* (Gréhaigne, Godbout & Bouthier, 1997), is can truly identify the prospects and potentialities for educational use of TGfU model (Graça & Mesquita, 2007).

In this sense, studies about TGfU (*e.g.*, Laursen, 1996; Mitchell & Oslin, 1998; Wallhead & Deglau, 2004) show its real value as a teaching model. In the Mitchell and Oslin (1998) study, was shown the ability of learning transferability, noting that tactical understanding gained in the physical education class was transferred for other related games. In another study, Wallhead and Deglau (2004) investigated students' motivation when

subjected to the TGfU model. The results showed that the model provided a positive experience, not threatening to accept challenges, rewarding for the tactical competences acquisition and intrinsically motivating by the pleasure afforded by the games. Laursen (1996) gave, to the students of initial teachers' level, 48 sessions of 2 hours about the TGfU, having analyzed through qualitative methods that most students already had a structure consistent with the conceptual TGfU ideas and, in the end of the sessions, students showed identified with the formation.

Given the factors described will be possibly interesting analyze models that allow fitting the tasks with the students' needs, as well as the content proposed by the teacher in order to set the specific exercises or tasks. Thus, in order to explore specific tactical or technical content, is needed constrain the exercise in order to enhance the intended action. Consequently, Constraints-led Approach model (Newell, 1986) provides an important complement to the effectiveness of TGfU, thus it will be important analyze the relevance of managing constraints by the teacher.

4. Constraints-led Approach

The Constraints-led Approach is a theoretical perspective that aims understand the acquisition of coordination patterns in sport (*e.g.*, Davids, Button & Bennett, 2008; Araújo, *et al.*, 2004). In the genesis of this theoretical approach are the theories of ecological psychology and dynamical systems (Araújo, 2006).

Given the fact that the action in sport differs in relation to the constraints imposed on the practitioners, the Constraints-led Approach, emphasizes the study of coordination and changes in coordination with the evolution of learning, trying to categorize the diverse constraints of different sports, as well as individual differences that each student brings to physical education class (Davids & Araújo, 2005). Indeed this model contradicts the traditional approaches of teaching based on notion of an idealized and standard motor pattern (Araújo, 2006) where there is an ideal technique common to all individuals (*e.g.*, Brisson & Alain, 1996; Araújo, 2006). Inversely, Constraints-led Approach emphasizes the individualized nature of the movement solutions where the students trying to overtake the imposed constraints (Davids, *et al.*, 2001). In fact, this approach is based on the fact that the movement patterns' variation, exemplified by the stability fluctuations, allows adaptive behaviors to the contextual needs related to the game (Araújo, 2006).

In the Newell (1985) viewpoint, coordination is the way how individual constrains their degrees of freedom in coordinative structures, since it can be regarded as intra-practitioner, between practitioner and object, or between two or more practitioners (Davids & Araújo, 2005). The control refers to the manipulation of the parameters that are freed (Newell, 1985), being seen as the function parameter which constrains the free variables in a behavioral unit (Barreiros, Silva & Pereira, 1995). In this perspective, it is implied that the action systems evolutes through a autonomous process of self-organization of dynamic task constraints to solve a particular problem in a particular context (Duarte, 1995).

The constraints may limit or allow a diversity of behaviors that the system can adopt (Davids, Button & Bennett, 2008), should be understood as the contours or characteristics that limit an organism or, more correctly, their action (Barreiros, Silva & Pereira, 1995), being important to note that the constraints are not negative influences on behaviour that remove freedom of the system, but yes, the way how the system components are connected, forming a specific type of organization (Davids & Araújo, 2005).

Following this line, Newell (1986), argues that there are three broad categories of constraints: *i*) the organismic constraints (*i.e.*, inherent to the practitioner); *ii*) the environmental constraints (*i.e.*, inherent to the context); and *iii*) the task constraints (*i.e.*, inherent to the task specificity). Indeed, through the three constraints categories it is possible a coherent approach to understanding how coordination patterns emerge during intentional conduct. Additionally it should be noted that the constraints do not act in isolation but in constant interaction, influencing the individual performance (Araújo, 2006).

The organismic constraints inherent to the practitioner may be physical, emotional or mental (Handford, Davids, Bennett & Button, 1997). At this point, practitioners who easily adapt their coordination patterns to the multiple sources of information in changing environments can be at a more advanced learning level, which can vary their basic coordination pattern by changing circumstances (Davids & Araújo, 2005). It is the own practitioner who, through their own perception, generate action, and their same action will allow new perceptions, triggering a exploration cycle, emerging the decision making.

The environmental constraints are discovered in the context of action. They can be particularized in energy fluencies, such as visual or auditory information of the practitioner, or in social behavior contexts (Handford, Davids, Bennett & Button, 1997).

The task constraints relates to the sport rules, their utensils and tools, the fields specificities and respective brands. For Davids and Araújo (2005), the task constraints with more relevance to consider are those that allow promote information in the specific contexts of performance where the practitioners can use to coordinate their actions. The movement itself causes changes in power flows that provide information to the performer creating new actions and recreating the perception-action coupling advocated by Gibson (1979).

Thus, the practice is seen as a search for solutions to the problems of the movement cycle of perception-action by combining the organismic constraints with the task and the environment constraints (Handford, Davids, Bennett & Button, 1997), revealing these interactions as key influencers of the performance. Thus, the behavior is not linearly determined individually by each category, as it emerges from the constant interaction

between a several constraints (Davids & Araújo, 2005). Consequently, the constraints management must be carefully made by the teacher in order to promote the learning desired.

4.1 The usefulness of Constraints-led Approach for the Physical Education Teacher

The behavior is not stereotyped and rigid but yes flexible and adaptable (Warren, 2006). The variability should be seen as a benefit factor to the student and not a damaging factor, given the real context of sport where many events occurs without a previous plan and where the individual has to self-organize in order to adapt to the contextual constraints (*e.g.*, Clemente, Couceiro, Martins, Dias & Mendes, 2012a; Clemente, Couceiro, Martins, Dias & Mendes, 2012).

The essence of Constraints-led Approach is to understand the nature of interacting constraints for each learner, and according to this diagnosis manipulate the essential constraints, facilitating the emergence of learning and performance (Araújo, 2006). Thus, for the teacher, the proper management of constraints can allow to the learners focus their attention on the relevant sources of information, acting in order to use these information's to achieve the main objectives (Araújo, *et al.*, 2005), thus culminating in functional decisions made by the learner (Araújo, *et al.*, 2009).

The major role of the teacher must go through perceive, identify and manage the most important constraints that influence the system self-organizing and how the constraints interaction contributes to the emergence of game-specific behavior (Vilar, Castelo & Araújo, 2010). Thus, one possibility to explore the task constraints in the learning process is to simplify rules, reduce the number of players or reduce the play field (Figueira & Greco, 2008), focusing the practice on specifics objectives, while not altering the essential standards of the game (*i.e.*, maintaining the specificity and the ecology). In this sense, the exercises will be aimed at promoting an approach that invokes the opposition and the disorder management as the basis for didactic evolution (Gréhaigne, *et al.*, 1997). Adapt this methodology involves optimizing cognitive abilities from an early age, to suppress the division of the teaching-learning process on the technique and tactics, skills and capabilities (Figueira & Greco, 2008).

For a correct planning and implementation of teaching, a main factor to be made is the diagnostic evaluation of the students. Indeed, only by knowing the strengths and limitations inherent to the context, can adjust the task in order to enhance the tactical and technical skills of the students. Thus, the teacher' tasks will be: *i*) detect the level of students' specialization in the task; *ii*) define the objectives to be developed; and *iii*) define the constraints to be considered during the practice (Davids, Button & Bennett, 2008).

After a correct context diagnosis, it is the responsibility of the teacher, set the main goals for the pedagogical and didactic practice over a specific period. These goals should assume a sequential logic that allows to students learn, respecting their individual needs, and simultaneously preserving the overall of defined objectives for the class (Clemente, 2012). With the diagnostic evaluation performed and the main goals defined the teacher will be able to outline a set of exercises and tasks to guide the teaching at way dynamic and functional. It is in the teaching exercises that reside the potentialities of the constraints management. Therefore, understandably, the teachers, controlling the teaching process, keeping it directed to the students' progression, are alert to the process of task constraints management (Araújo, *et al.*, 2009), because are these that allow adapt the exercises' progression to the students. Particularly, a major challenge is to consider the functional representation of the teaching exercises (Araújo, *et al.*, 2007) preserving the main goals of the sport and their distinguishing characteristics, maintaining the practice context with the reality. Therefore, the Constraints-led Approach does not require the decomposition of the teaching as the analytical teaching models argues, but yes their simplification in relation to the sport ecology (Clemente & Rocha, 2012).

In fact, the task decomposition may run the risk of decoupling the information-movement, distorting the reality of the practice. Therefore, simplification maintains the sport integrity, referring to the process of creating contextual practical situations, simplifying the information detection process by the students and the respective coupling of the movement patterns (Davids & Araújo, 2005). The Constraints-led Approach indicates that the movements are not invariant and are produced from the interaction of constraints leading to the development of relevant information-movement couplings (*e.g.*, Davids, *et al.*, 2002; Araújo, *et al.*, 2004; Davids & Araújo, 2005). In this sense, the challenge of the Constraints-led Approach for the teacher is not limited to constraints management, but also the identification of determinants constraints for the specific student with specific potentialities (Araújo, 2006).

5. The Effects of Ecological Teaching Models for the Students' Motivation

As mentioned previously, the ecological teaching models as *TGfU* and Constraints-led Approach, generates constraints on specific game situation in order to enhance the tactical knowledge perceived by the physical education students. In fact, these kind of ecological games can promote a more enjoyable alternative to teaching that traditional and analytic teaching models (Mitchell, *et al.*, 2006). Thus, the enjoyment can increase the motivation levels of students to the practice (Ryan & Deci, 2000).

Therefore, in order to school agents promote successfully physical activity to the physical education students; a thorough understanding of student physical education motivation is crucial (Standage, Duda, & Ntoumanis, 2003). Thus, motivation constitutes as a key factor that can influence the levels of physical activity and willingness to participate during physical education by the students (Standage, *et al.*, 2005). In fact, if

teaching models promote enjoyment experiences, simultaneously can develop in students a more intrinsically feeling of motivation and, consequently, can develop an increase of control competence (*e.g.*, Wallhead & Ntoumanis, 2004; Smith, 2010).

In order to understand the main focus of motivation, the self-determination theory (*e.g.*, Deci & Ryan, 1985, 1991; Ryan & Deci, 2002; Standage, *et al.*, 2005) provide some evidences that allow improve the knowledge about the efficacy of teaching models and strategies. Thus, some results reveal that the level that students perceive that the teacher-created context supports their autonomy, competence, and relatedness, predicts their overall need satisfaction (Standage, *et al.*, 2005).

Traditional teaching models, during their education structure, focused his teaching on learning the technical skill, thus delaying the introduction of the game context. In order to reverse this situation, the teaching through ecological models proposes provide to the students an opportunity to learn tactical and technical skills in ecological context, *i.e.*, during the small-sided games and constrained games. Additionally, ecological models promote elements such as group work which could directly impact upon relatedness among students and, consequently, a direct determinant of self-determination (Butler, 2006).

Using the *TGfU* may create an increase of self-determined environment (Smith, 2010). Resulting this, some literature (Lonsdale, *et al.*, 2009) has shown that creating a more self-determined environment can increase physical activity levels. Corroborating this statement, Smith (2010) showed the positive impact of the *TGfU* intervention in promoting activity levels in physical education.

Additionally, the self-determined promote through physical education can be related to the continued participation of the students in physical activity in leisure time (*e.g.*, Taylor & Ntoumanis, 2007; Standage, *et al.*, 2005; Wallhead & Ntoumanis, 2004; Ntoumanis, 2001). According to this, it was found that physical education teachers who created perceptions of autonomy support for students had a positive impact on the level of autonomous leisure time and also on attitudes and intentions to carry out the desired behaviour (Hagger, *et al.*, 2009). In fact, the same authors showed a closer relation between autonomous motivation in leisure time and autonomous motivation in physical education.

Analyzing possible relations among *TGfU* and physical activity, Smith (2010), suggest a possible contribute of the teaching model to improve the activities done outside of physical education, however apparently just in the boys. In fact, Smith (2010) affirms that found that autonomy was significantly increased post intervention for boys in the *TGfU* condition. These results are in line to the studies done by Hagger *et al* (2009).

6. Conclusion

Teaching should not be a systematic practice of non-contextualized movements, analytical and little ecological, in fact, all sports have a dynamic and variable function. Therefore, the teaching should not be characterized as an association between stimuli and responses constrained by rules or verbalizations decorated by the learners, but yes the functional organization of practical activities (Araújo, *et al.*, 2009) contextualized and adapted to the students potentialities, promoting the acquisition and development of students' qualities.

The sport teaching organization should be a useful element to improve the performance of a particular student, a students' group or learning context of a particular task (Davids, Button & Bennett, 2008). Therefore, it be important adapt the teaching models to the students in order to enhance the learning of them, encouraging them also to the regular practice of sports games.

Through the analysis of two ecological teaching models was possible to describe its usefulness for the physical education teacher. However, it seems appropriate in future studies on the topic, assess the status of implementation of the ecological teaching models in the schools, verifying if indeed are a valid conception for physical education teachers (Clemente & Mendes, 2011).

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