



# Teaching models in physical education: current and future perspectives

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## Abstract

The study of teaching models used during the discipline of physical education has been the object of analysis over the last few years. Even so, due to the increasing reduction in the levels of participation in sport, there is a need to reflect on the most effective pedagogy and teaching models to reverse this trend. For these reasons, this review has as main objective to synthesize the teaching methodologies present in the literature. The search strategy comprised search words that combined one of two primary keywords ("physical education", "teaching-learning process", and "teachers), with a second keyword ("model", "pedagogy", "competency") and a third keyword ("sports", "games"). After applying the inclusion and exclusion criteria, 28 articles were counted for analysis. The results indicate that there is a need to strengthen the relationship between pedagogical theory and practice through innovation, which can emerge from the experimentation of new models, strategies, and teaching contents so that the discipline of physical education, in order to contribute unequivocally to the training of children and young people, resulting in lifelong involvement in physical activity.

**Keywords:** *Teachers, Teaching Models, Physical Education, Children*



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## Introduction

Over the last five years, the professional training of Health and Physical Education (HPE) teachers has undergone changes (Ferry & Romar, 2020; Green et al., 2018; Winslade & Deborah, 2020). For example, in Australia, there appears to be a greater emphasis placed on personal, community and social health, while lacking adequate training of pre-service teachers to delivery physical education (PE) curriculum effectively (Varea, 2018). However, according to past investigations (Kirk, 2013;

Siedentop et al., 2011) the breadth of pre-service teacher training into PE has not be questioned, but the training of teaching models predominantly focused traditional approaches to teaching team sports has been a topic of contention. Examination of professional training of HPE teachers regarding effective pedagogy and teaching models is necessary considering that the global physical activity levels and participation in sport are decreasing amongst young people and needs to be reversed (Guthold et al., 2020; Vukelja et al., 2022).

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It is known, that through HPE, pedagogical approaches to teaching students the skills, tactics and movement strategies to participate competently continue to favor a traditionalist approach. Indeed, it seems necessary to resort to contemporary teaching models that adapt to the school context and increase students' motivation to get involved in the proposed activities (Donnelly et al., 2017; Metzler, 2017). Previous studies show that most HPE teachers continue to regularly use analytical models in the teaching-learning process (Kirk, 2013; Wang & Ha, 2009), although current scientific studies suggest the use of other approaches (Ferraz et al., 2021; Metzler, 2017).

The teaching of PE is a continuous process, which intrinsically depends on new theories evolving that support effective pedagogy to the teaching-learning process (Parra-González et al., 2021; Steinberg et al., 2020; Zach, 2020). Recently, and following the avant-garde theories that emphasize the reorganization of the process of motor development and performance in a school context, contemporary teaching models have been promoting innovative processes in the form of student development (Anderson, 2018; Gimazutdinov, 2020). Teaching models are characterized as long term development plans for teaching that convey a central idea and that must follow a unified theoretical structure (Casey & MacPhail, 2018). These models must use a technical language and use the most valid assessment method for learning, thus being a means of facilitating the teacher's decision making within a work structure (Dyson et al., 2004; Wallhead & Ntoumanis, 2004). Thus, and considering the needs of current generations, it seems important to carry out a review of the current state of knowledge about teaching models in HPE and their implications in the teaching-learning process in school context.

There is a wide range of teaching models, which vary in their approach between more teacher-centered models and those that allow more space for student discovery and initiative, so it is essential to find a balance between the needs of direction and support and the need to exercise autonomy, in order to create favorable conditions to encourage the practice of sports throughout life (Bayraktar, 2011). The literature reports the Sports Education Model (SEM); Direct Instruction Model

(DIM); Teaching Games for Understanding (TGfU); Non-linear Pedagogy (NLP); Progressive Approach to Game Model (PAGM); Developmental Model of Game Tasks (GMDT); Competency Model in Invasion Games (CMIG) as models that can be used in the teaching process. However, it is important to note that there is no model that is suitable for all learning involvements and therefore there are fundamental issues that must be taken into account by the teacher, in order to use the teaching models that best suit the needs of students (Rink, 2001). Furthermore, disproportionate comparisons were made over time between teaching models, without considering their implementation processes, which led to decontextualized generalizations of teaching processes (Metzler, 2017).

The heterogeneity of learning groups presents a major challenge for PE teachers (Decristan et al., 2019; Parsons et al., 2018; van de Pol et al., 2010). Evidence indicates that it is critical for teachers to adapt their teaching to the diverse needs of their students (Goodyear & Dudley, 2015; Wibowo, 2020). Heterogeneity is a reality in all groups of students, regardless of the teaching model, since each individual has their individual characteristics and ideas (Rovegno & Dolly, 2006; Wibowo et al., 2014). Thus, to enhance their students' development, teachers must have a broad knowledge of the different existing teaching models (Darnis-Paraboschi et al., 2005; Metzler, 2017) and this seems to be one of the biggest challenges of teachers today where contexts are highly volatile due to uncertainty. For these reasons, exploring theoretical considerations, current issues and future perspectives can shed light on the current scientific landscape on this research topic. Thus, the objective of this review was to synthesize the published literature on teaching methodologies in HPE.

## Materials and Methods

### Search Strategy

The present review was conducted using the PRISMA guidelines (Moher et al., 2009). A search was performed in the Web of Science, Scopus and PubMed databases between January and June 2022 using a boolean operator. The detailed form used for the inclusion of articles is illustrated in Figure

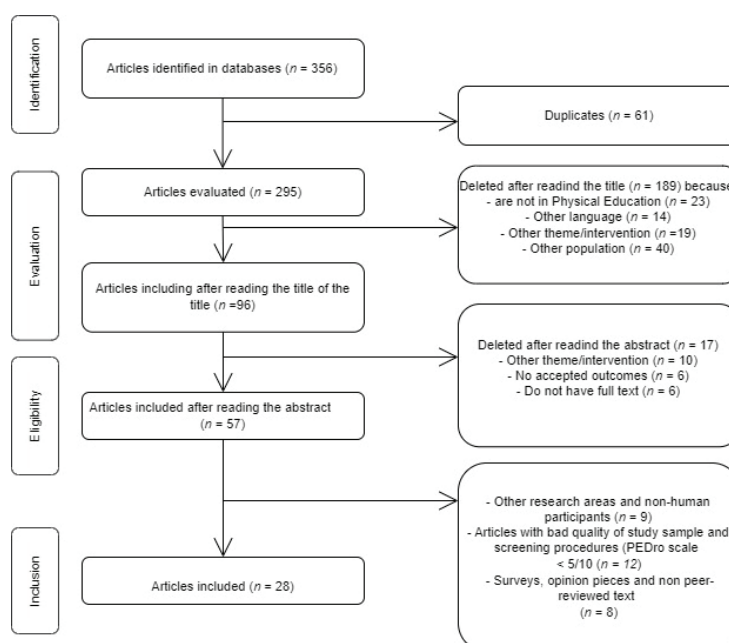


Figure 1. PRISMA flowchart of included studies

1. Overall, 295 studies were identified after removing the duplicates, and after this screening, 96 articles were included in this review. The search strategy comprised search words that combined one of two primary keywords (“physical education”, “teaching-learning process”, and “teachers”), with a second keyword (“model”, “pedagogy”, “competency”) and a third keyword (“sports”, “games”).

The articles were screened based on the evaluation of the title and abstract. All articles that did not focus on the investigation were excluded. In total, 57 articles were considered relevant for this review. All articles have been read in detail and assessed for relevance and quality by two senior researchers with experience and relevant publications in the field. Discrepancies between the authors in the study selection were solved with support a third reviewer. The authors did not prioritize authors or journals. All articles that did not meet the criteria were excluded. A total of 61 duplicate records were removed, and 29 articles were removed based on the full text content, different outcomes, unavailable of full text, PEDro Scale was used to inclusion and exclusion criteria. After this procedure, 28 articles remained for analysis (Figure 1).

#### Selection Criteria

Papers were considered for inclusion in this review if they met the following criteria: (1) original articles about professional training of HPE; (2) studies current scientific overviews in the teaching-learning process; (3) studies which

addresses at least one of the following issues in the HPE such as SEM; DIM, TGFU; NLP; PAGM; GMDT and CMIG; (5) studies of human physical, reporting the Sports Sciences as scope; (6) original article published in a peer-review journal; (7) full text available in English; (8) article reported sample and screening procedures (e.g. data collection, study design, instruments, and the outcomes).

The exclusion criteria were: (1) others research areas and non-human participants; (2) articles with bad quality in the description of study sample and screening procedures (e.g., data collection, study design, instruments, and the measures) according to PEDro scale; and (3) surveys, opinion pieces, non-peer-reviewed text.

#### Quality Assessment

The methodological quality of the studies was assessed using, the PEDro. This scale developed to be used for randomized studies with variable control, non-randomized studies and observational studies (de Morton, 2009). Also, the narrative review was conducted using the based on the methodological quality by the Consolidated Standards of Reporting Trial (CONSORT) (Nunan et al., 2022).

A survey and narrative interpretation were subsequently carried out to scrutinize the theoretical considerations and future perspectives about multivariate training programs in PE classes. The studies present methodological quality with an arithmetic mean of 6.71 out of 10 on the PEDro scale (Table 1).

**Table 1.** Methodological quality of the studies included in the review, according the PEDro scale

Author(s)	PEDro scale score	Author(s)	PEDro scale score
(Siedentop et al., 2011)	5/10	(Webb et al., 2006)	7/10
(Wallhead & O'sullivan, 2005)	5/10	(Webb & Pearson, 2008)	8/10
(Harvey et al., 2020)	6/10	(Pill, 2011)	5/10
(Ratten & Jones, 2018)	7/10	(Díaz-Cueto et al., 2010)	6/10
(Casey & Kirk, 2020)	6/10	(Chow & Atencio, 2014)	7/10
(Casey & MacPhail, 2018)	7/10	(Rudd et al., 2020)	6/10
(Ratten & Jones, 2018)	5/10	(Renshaw et al., 2009)	7/10
(Rocamora et al., 2019)	7/10	(Moy et al., 2016)	6/10
(Brophy, 1979)	6/10	(Lee et al., 2017)	5/10
(Stolz & Pill, 2014)	7/10	(Mesquita et al., 2009)	5/10
(Pereira et al., 2014)	5/10	(Mesquita & Graça, 2011)	6/10
(Lardika & Tulyakul, 2020)	5/10	(Rink et al., 2016)	7/10
(Bunker & Thorpe, 1982)	5/10	(Farias et al., 2018)	5/10
(López et al., 2016)	6/10		

#### Study Information Extraction

The principal information that was considered relevant to the present review, was based on previous review articles (Silva et al., 2022; Teixeira et al., 2021). The data extraction was organized in a narrative manner in agreement in the subsequent alignment: (1) SEM; (2) DIM; (3) TGFU; (4) NLP; (5) PAGM; (6) DMGT; (7) CMID.

#### Results

Over the years, several teaching models have been evidenced in the literature as capable of being applied in the teaching-learning process of the discipline of PE (i.e., SEM, DIM, TGFU, Non-linear Pedagogy; PAGM; and CMIG (Quina, 2009)).

#### Sports Education Model

SEM was designed to provide authentic sport experiences in PE, and to develop skills, literacy and sports enthusiasts (Siedentop et al., 2011). Furthermore the literature shows that this is probably one of the world's most widely implemented and researched instructional approaches (Bessa et al., 2019; Ginanjar et al., 2019; Perlman & Karp, 2010; Siedentop et al., 2004; Wallhead & O'sullivan, 2005).

SEM emphasizes the socializing role of sport, through an active role of the practitioner in the organization of tasks that belong to the game and in the game itself (Siedentop et al., 2011). The same author adds that this model has as its principal objective to reduce barriers in the involvement of

sport, appealing to inclusion (i.e., sport for all and with all). In addition, it also promotes contextualized learning at a sports level, and students' competence, leading them to be enthusiastic and cultured from the point of view of learning (Harvey et al., 2020). In fact, in SEM, the enthusiastic student and the competent student are considered. The enthusiastic student actively participates in sport, through the sporting experiences he takes from that moment and develops the ability to make rational decisions about sports problems (Casey & Kirk, 2020; Harvey et al., 2020). The competent student has visible abilities to participate in the game satisfactorily, feels good in the various stages of learning the game, whether with the ball or without the ball, and works in groups to achieve common goals (Bessa et al., 2019). In a complementary way, other investigations (Casey & Kirk, 2020; Eldar & Ayzazo, 2009) reinforce that the SEM establishes the formation of the educated, competent, educated and enthusiastic sports student as a fundamental purpose. According to the same author, this model will provide students with an authentic and complete sporting experience, instituting the organization of the activity in sports seasons and the affiliation of students in teams. For this reason, and for the same author, this model values inclusion and equity in the participation of all students in the activity, mutual assistance in teamwork, autonomy and the performance of the various roles associated with the sports context (Wallhead & O'sullivan, 2005). SEM will foster the recreation of an authentic sports context (i.e., that students are part of a team), intrinsically value competition as a central element of the sporting experience, carefully take care of the formation of teams, distinguish the notions of training and competing, compete and strive to win, competition based on sports ethics, using forms of play suited to the abilities of students, developing autonomy, leadership, and shared responsibility.

In SEM, the teacher's role goes through several stages of intervention and assumes the role of supervisor of activities, which are student led and the teacher only intervenes in aspects that require explicit teaching and correction of teaching-learning activities (Casey & MacPhail, 2018; Ratten & Jones, 2018). However, for SEM to operate as an effective approach, it is necessary for the teacher to plan and have a good level of organization and developmental appropriate objectives relating to students' teamwork (Wallhead & O'sullivan, 2005). The role of questioning on the part of the teacher is crucial to develop students' critical inquiry skills that underpin understanding developed during his learning, that is, autonomy, problem-solving, decision-making by the students is one of the main objectives of SEM, essentially in the most advanced stages of its development (Casey & Kirk, 2020; Ginanjar et al., 2019; Harvey et al., 2020; Siedentop et al., 2011).

#### *Direct Instruction Model*

As with other instructional models, DIM was designed by teachers to facilitate learning and to promote the acquisition of basic skills and knowledge, which can be taught gradually (Rocamora et al., 2019). According to Brophy (Brophy, 1979), the concept of Direct Instruction is associated with an investigation carried out with regard to the process-product, which aims to recognize the relationships between the process of pedagogical interaction in the form of teacher behaviors and the learning benefits that it has in students. The DIM was emphasized for centralizing practically all decisions about the teaching-learning process on the teacher, mainly in prescribing the pattern of

student involvement in learning tasks (Stolz & Pill, 2014). In this domain, the teacher performs administrative control, delimiting the rules and routines of student management, to obtain maximum effectiveness in their teaching and learning activities (Lardika & Tulyakul, 2020; Pereira et al., 2014). The activities are organized in fractions of time, and in this way it is essential to use the class time effectively, performing a high motor practice time. It is crucial that students obtain a high sense of responsibility and commitment to the learning tasks, thus contributing to the indication of criteria for success in achieving them (Donnelly et al., 2017; Metzler, 2017).

#### *Teaching Games for Understanding*

TGFU, which has its roots in a reform movement in the teaching of games that began in the late 60s and 70s of the last century, at the English University of Loughborough (Butler, 2006). Bunker and Thorpe (Bunker & Thorpe, 1982) founded this teaching model with the aim of transposing the attention traditionally dedicated to the development of basic game skills, to the teaching of isolated techniques, to the development of game ability through the tactical understanding of the game. Another investigation states that the objective of the TGFU model is to allow students to learn the tactical aspects of the modalities through the practice of modified versions of the game, (e.g., conditioned, reduced and simplified games, thus adapted to the students' learning needs) (Chow et al., 2015). In the TGFU model, game analysis refers to students' understanding of the rules and nature of the game (López et al., 2016). In turn, tactical perception seeks to challenge students to solve problems posed by the game and, naturally, to increase knowledge in order to understand the game, to be able to play it or to allow it to observe (Stolz & Pill, 2014; Webb et al., 2006). The decision-making process follows the tactical perception, encouraging the student to know and identify ways to deal with the problem and consequently ways to solve it (Webb & Pearson, 2008). It is important to highlight that the model does not reject the need to teach the technique, it only contests that its development takes place after the understanding of current game situations by reinforcing intentional behavior, recognizing the situated nature of skills and their strategic use (Díaz-Cueto et al., 2010; Pill, 2011).

#### *Non-linear Pedagogy*

Non-linear pedagogy was developed and built on an ecological dynamics approach. At the base of this pedagogical framework is exploratory learning, with an emphasis on encouraging individualized movement solutions for individuals (Chow & Atencio, 2014). Based on these data, a perspective was advocated, that children should be given the freedom to explore a learning environment meticulously to leverage constraint-led synergies to generate functional movement solutions (Rudd et al., 2020). Consequently, non-linear pedagogy involves a child-centered approach to PE, where teachers direct learning based on modifying task constraints to improve linkage with task-determining skills (Renshaw et al., 2009).

In this sense, the teacher stands out for his preponderant role when selecting the tasks and constraints imposed. In fact, and according to the non-linear pedagogy model, one of the essential competences of the teacher lies in the identification and manipulation of essential constraints, which facilitate the emergence of functional actions and decision-making by students in different sports modalities or practices [45].



Several authors have proposed that non-linear pedagogy could support children's basic psychological needs for autonomy, relationship, and competence from a self-determination theory perspective, and therefore could lead to higher levels of motivation for engaging in PA, the which can positively affect AF levels. in children compared to traditional teaching approaches (Lee et al., 2017; Moy et al., 2016).

#### *Progressive Approach to Game Model*

The PAGM refers to an approach to the game based on the progressive development of the ability to play, subjecting the teaching of technical skills to the teaching of tactics, that is, technical skills are built from the context of the game and its understanding, in this way students are confronted with problems that challenge their ability to understand and act in the game (Mesquita et al., 2009; Metzler, 2017). It follows the idea of learning motor skills in a gradual progression and a progressive increase in the introduction of the complexity and contextualization of the game, in a process of continuous approximation to real game situations (Mesquita & Graça, 2011). This model is important to encourage players to understand the game and make their learning process a constant search for solutions (i.e., cognitive dimension), thus offering everyone opportunities for practice and equitable participation (i.e., social dimension), certifying the acquisition of tactical, technical and physical skills in playing the game (i.e., motor dimension) (Mesquita et al., 2009). It is a model of didactic approach strongly associated with learning the game of volleyball, matching the complexity of the game to concrete proposals for activities adapted to the students' level. This model arises from ideas transmitted by other teaching models of collective sports games, such as the TGfU (Bunker & Thorpe, 1982), the DMGT (Rink et al., 2016), as well as the aforementioned Sports Education Model (Siedentop et al., 2011). The influence of the TGfU model lies in the fact that the approach to the game is centered on the tactical dimension and on problem solving, using modified forms of the game, according to the student's level (Tan et al., 2012; Webb et al., 2006).

#### *Development Model of Game Tasks*

The GMDT (Rink et al., 2016) is based on the assumption that not only the mastery of the teaching subject is sufficient to structure the teaching-learning process, nor is the contribution of didactic techniques sufficient to effectively carry out this task. It is from the intersection of the teaching subject with the didactic principles that the effective structuring of the instruction process results, offering at this level a coherent and scientifically supported proposal (Mesquita & Graça, 2011). The GMDT envisages the teaching of sports games according to a progression of tasks of increasing complexity, without obeying a rigid hierarchy, nor passing through all levels, with the manipulation of tasks dictated by the particularities of learning (Mesquita, 1998; Mesquita & Graça, 2011). This model is based on three fundamental concepts that guide the curricular structure (i.e., progression, refinement and application), which are particularly relevant in the context of sports games, due to the fact that in this type of modality there are multiple choices in the search for solutions. In the progression, there is an establishment of relationships between content, objectives and the level of performance, given that the mastery of skills is essential in the initial phase of exercise to be recreated in more demanding situations. In the concept

of refinement, there is a definition of critical components to be observed, orientation in the focus of observations/corrections to be made to the student and the specification of a certain task, that is, the teacher's instruction and the use of keywords, which are fundamental in the transmission of the feedback to be given to the student. Finally, the concept of application emerges in competition and in carefully selected self-assessment tasks, serving as a self-regulatory and as a contextualize of learning.

#### *Competency Model in Invasion Games*

CMIG, allows a choice of simplified forms of play, adapted to the abilities of the students, confrontation with real problems of the game, introduction of game skills in accordance with relevance to the form of play adopted, subordinating them to their tactical use in the game (i.e., decision making), the construction of an authentic sports context, fair-play and promotion of supporting and coordinating roles (Mesquita et al., 2012). In this model, the concept of learning to play follows, in a simpler than formal context, with active instruction from the teacher. This model was conceived to enable students to learn not only to participate in modified forms of collective invasive sports games successfully, but also to play other organizational roles in sports, distinguishing themselves into two complementary skill groups: student competence as a player in modified invasion games and competence as an autonomous exercise guidance function (Farias et al., 2018; Mesquita et al., 2012). Thus, the entire instructional process in the competency model in invasion games focuses on articulating of three categories of learning tasks (i.e., the basic forms of play, partial forms of play and game-based tasks) (Graça & Mesquita, 2002). These three categories are centered on game problems that players have to solve as a group or individually. In this way, the basic forms of play are modified versions of the formal game, adjusted to the level of play of the students and that allow them to update and exercise their motor, cognitive and social skills (Farias et al., 2018; Mesquita et al., 2012; Mesquita et al., 2009). Partial forms of play aim to create a favorable context, without decontextualizing their connection to the real situation of the game. The importance of one of the partial structures of the game allows students to focus on the problems of executing one of the parts of the basic form of the game. Finally, game-based tasks point to the means necessary to achieve solutions to game problems. These tasks thus limit the possibilities of schooling the solutions, or make the choices obvious, in order to give importance to the execution mechanisms in a very simplified context, but referring to the particular game situation (Mesquita & Graça, 2011). The assessment of students in this model always takes place in a real context and involves essential aspects of acting in the basic forms of play and the performance of supporting and coordinating roles (Anderson, 2018; Díaz-Cueto et al., 2010; Mesquita & Graça, 2011; Wallhead & O'sullivan, 2005). Through the use of checklists appropriate to the level of the basic form of play practiced, students and teachers will be able to observe and evaluate the different components of game performance (Mesquita & Graça, 2011).

The results of this work are not free of limitations and must be interpreted with consistency due to the variety of effects analyzed and methods used in the articles considered. In addition, few longitudinal studies were observed. Finally, it would have been interesting to consider the most appropriate

typology of teaching model in terms of contextual variables (e.g., cultural issues, geographic location), which can condition learning environments, and therefore a generalization should not be made.

## Conclusions

This literature review is evidenced by the attempt to synthesize the main characteristics of different teaching models in PE. It is important that in education, we can no longer accept that physical activity in PE alone will drive sufficient learning and development of students. Furthermore, at a time when deep and rapid transformations can occur in society (e.g., COVID-19 pandemic), teachers must be able to adapt to meet the needs of students. Therefore, there is a need to strengthen the relationship between pedagogical theory and practice through innovation, which can emerge from the crossing teaching models, experimentation of new teaching models, strategies, and contents so that the PE discipline continues to contribute unequivocally to the formation of children and youth, resulting in lifelong engagement in physical activity. The teaching model chosen or the resulting interaction model by each teacher needs to be based on the specific characteristics, stage of development and needs of individuals, as this is most likely to increase learning and achievement of PE curriculum outcomes. Yet teachers may use different strategies and characteristics of different models to meet the same type of needs based on the student's strengths and the learning environment. Future studies should focus on the use of quantitative methods to explain in detail the reasons for teachers' decision-making in relation to the teaching model adopted, verifying whether there are significant variations based on the historical and sociological points of view. This information seems to be even more important if we consider the results of a previous study that reported that PE teachers usually use teaching models different from those they think they use when they are asked about the topic (SueSee & Edwards, 2015).

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