

If 'the medium is the message', what do students learn to do in NLP and GBAs within physical education?

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ABSTRACT



Building on the original work of Bunker and Thorpe and their Teaching Games for Understanding (TGfU) approach to physical education, there is now a proliferation of Game Based Approaches (GBA) in the research literature (Bunker & Thorpe, 1982, A model for the teaching of games in secondary schools. *Bulletin of Physical Education*, 18, 5–8, 1983). Unlike other approaches to games teaching and coaching which trace their roots to TGfU, Non Linear Pedagogy (NLP) has been defined as distinct from, and even an alternative to, TGfU (Renshaw et al., 2016, Why the constraints-led approach is not teaching games for understanding: A clarification. *Physical Education and Sport Pedagogy*, 21(5), 459–480. <https://doi.org/10.1080/17408989.2015.1095870>). Although comparisons between approaches have arisen at a theoretical level, there is no comparison of the influence that these approaches have on learners. Addressing this issue, we turn to Postman and Weingartner's (1971, *Teaching as a subversive activity*) pedagogical use of the famous aphorism of Marshall McLuhan, that 'the medium is the message'. Deploying this concept, we ask: what is the message that the use of these approaches sends? First, we identify the main features of NLP and TGfU. Second, we compare their media with reference to two empirical studies. Third, we identify and discuss questioning and decision-making as two key differences between these otherwise similar approaches. Finally, we consider the implications of these results for teaching and learning of games under McLuhan's aphorism.

KEYWORDS

TGfU; sport pedagogy; teaching-learning process; games learning

Introduction

Since the early work of Mauldon and Redfern (1969) and Bunker and Thorpe (1982), there has been a proliferation of approaches to teaching and learning to play games in physical education and sport contexts. For over a decade and a half from the early 1980s, Bunker and Thorpe's Teaching Games for Understanding (TGfU) was compared by researchers to 'traditional', multi-activity approaches to teaching and learning to play games in school physical education. By 2006, such was the development of additional

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alternative approaches, most of which owed a considerable debt to TGfU, Oslin and Mitchell (2006) in their comprehensive review were able to refer to these alternatives collectively as Game Based Approaches (GBAs).¹ In the 16 years since the publication of that review, further developments have taken place to the original TGfU model (e.g. Kirk, 2017) as well as further new approaches emerging, including the increasingly prominent Non Linear Pedagogy (NLP) (Chow et al., 2008).

While the extent of research interest in games teaching and learning is positive and encouraging, we are increasingly concerned that some of the debates in the field are not as productive as they might be, particularly in term of the benefits of this research for teachers (e.g. Harvey et al., 2018; Renshaw et al., 2016). The question of theory has often, indeed, been the touchpaper lighting debates about the benefits of approaches to games teaching and learning. Although TGfU in its original published form was not explicitly associated with any particular theory of learning (Harvey et al., 2018), the principles and guidelines based on many years of theoretically-informed practice provided by Bunker and Thorpe (1982) have typically been located within constructivist and situated learning theories (Dyson et al., 2004; Kirk & Macdonald, 1998). Thus most, if not all, GBAs, whether Game Sense (ASC, 1997), or the Tactical Games Model (TGM) (Griffin et al., 1997), or Play Practice (Lauder, 2001), share a feature of TGfU, that is, to play the modified or mini game as the central organising principle of lessons. Even though some were not directly influenced by TGfU, such as Play Practice, they were influenced by the same sources (e.g. Alan Wade) and the same problems (teaching games in secondary school physical education).

In contrast, although NLP also bases its implementation on modified games and the use of constraints, it is self-defined as an approach informed by the Ecological Dynamics perspective and Constraints Led Approach (Correia et al., 2019). It is perhaps worth exploring how approaches informed by ostensibly different learning theories manage to agree, as we will argue, on principles for practice in teaching and learning of games. The weight of research evidence does suggest that modifying games to match and then extend learner capabilities has the power to improve learning more effectively than traditional, technique-led, approaches (Harvey & Jarrett, 2014). Regardless of the theoretical position taken, there would seem to be widespread consensus on this point (Pill, 2021).

In view of the above, we think there is a gap to be filled. We know the positions of the authors of the different approaches to games teaching and learning. We know that all such approaches improve on traditional practice. But we do not know the implications or influence that the use of different approaches has on learners in the field. That means the implications of the practical application of, for example, NLP and GBAs in specific contexts, is unknown.

As a means to addressing this issue, we turn to Postman and Weingartner's (1971) pedagogical use of the famous aphorism of Marshall McLuhan, that 'the medium is the message'. Deploying this concept, we would ask of all approaches to games teaching and learning: what is the message that the use of these approaches sends? What do pupils learn, what perceptions do they develop, what attitudes are they enticed to assume, what sensitivities are they encouraged to foster? They learn because the medium sends them a message, because lessons are organised in a way that shapes their learning; in short, they *learn* what they *do* (Postman & Weingartner, 1971, p. 30). In general, we think we must ask ourselves what they learn through the use of

these approaches. In this regard, the aim of this paper is to decode, using the framework of McLuhan's aphorism, the messages that NLP and TGfU (in representation as main GBAs) send to pupils in school physical education.

We begin by identifying what we see as the main features of NLP and TGfU, as an exploration of the medium for learning in each case. Moving on from this general level of description, we drill down to a deeper level to compare the media of each approach, with reference to two empirical studies, one using NPL and the other TGfU, but with each paper sharing the same lead authors and contexts. In the third section, we identify and discuss questioning and decision-making as two key differences between the media of NPL and TGfU, in terms of what they require learners to do. We complete our analysis by returning to the concept of the medium is the message, to reinforce Postman and Weingartner's point (following Dewey) that *we learn what we do*, and to consider the implications for teaching and learning of games in school physical education and youth sport.

Main features of NLP and TGfU

In NLP, a key focus is the manipulation of constraints by the practitioner to facilitate learning (e.g. Correia et al., 2019). To do this, there is a list of principles that help to design situations with constraints: (a) representative learning design, which refers to the learning situations that stimulate key aspects to regulate learners' actions; (b) developing relevant information-movement couplings, which refers to the circular relationship between perception and action; (c) manipulation of constraints, where teachers facilitate learners' exploration by modification of tasks; (d) using exploratory learning to leverage functional variability, since it is necessary to work with various situations; (e) reducing control of movement, a role of attentional focus, focusing instructions on external movement effects rather than conscious control of movement (Correia et al., 2019).

These principles support NLP's self-characterisation as a Constraints Led Approach (CLA), and accordingly Renshaw et al. (2016) refer to NLP as a 'process-oriented approach' (Renshaw et al., 2016, 2019). Among its main features, NLP proponents consider perception and action as keys elements to achieve learning goals (Correia et al., 2019). In addition, NPL advocates highlight the importance of learning contexts that facilitate interactions to improve perception and action. The design of the learning context must be planned carefully by the practitioner, considered as the starting point of everyone (Brymer & Davids, 2014; Correia et al., 2019; Renshaw et al., 2010). Furthermore, this design should be based on scientific evidence and specific pedagogical content knowledge (Ward & Ayvazo, 2016). What illuminates the way forward is goal setting, what learners need to learn, a particular problem in a performance context that could be reached by task simplification with constraints manipulation (Correia et al., 2019; Renshaw et al., 2010). An example made by Correia et al. (2019) in tennis, illustrated that practice task designs should be viewed 'as dynamic, innovative and emergent, depending on the needs of each learner or group of learners' (p. 122). In this example, they constrain the height that the ball must be driven over the net and the spatial area of the court in which the ball should strike the ground, these constraints providing guidance to the learner's exploration of the amplitude of the backswing movement or the zone of contact of the ball and racquet.

Regarding the practitioners' instruction, this must be seen as a guide, and not as given examples of what to do or how to solve the situations they are faced with (Correia et al., 2019). However, instruction and feedback can involve the use of demonstrations understood as another instructional constraint to guide the activities of the learner (Araújo et al., 2017). In this regard, feedback should be used to help educate the attention of learners to perceive, and with this purpose, questioning is also welcome in NLP to aide learners' attentional focus (Chow et al., 2016). However, as it is claimed by authors, questions are considered as a type of constraint (Correia et al., 2019; Renshaw et al., 2020). For example, the teacher noting that one player, who has just made an unsuccessful shot against an opponent who recovers behind the base-line after every shot, would ask 'What position in the court was your opponent when they performed a shot?'. This feedback posed as a question after an unsuccessful shot (e.g. ball out or into the net) is guiding their attentional focus externally. In other words, this feedback would guide them to relate the position of the opponent on the court with a successful or unsuccessful shot.

The creators of TGfU for their part established a model consisting of six steps that outlines the procedure whereby teachers could help children to improve their game play, under the idea that every child is able to participate in decision-making based upon tactical awareness (Bunker & Thorpe, 1982). Those steps are sequential and cyclical and are based on the principle of modification of the game: (1) game form-learner; (2) game appreciation; (3) tactical awareness; (4) decision-making (what to do? how to do it?); (5) skill execution; (6) performance (Bunker & Thorpe, 1982). The principles that shape the implementation of TGfU are (a) sampling, regarding the differences and similarities between games, considering their internal logic (Thorpe et al., 1984; Thorpe & Bunker, 1989); (b) tactical complexity, which implies the adaptation of the design to the level of the learners' current capabilities (Thorpe & Bunker, 1989); (c) representation-modification, referring to the modification of the game adapted from but similar to the adult form (Kirk, 1983a); (d) exaggeration-modification, which is closely related to representation-modification but with the focus on highlighting through exaggeration the tactical problem that teachers want learners to solve (Bunker & Thorpe, 1982). Given these principles, TGfU is considered a student-centred approach (Thorpe & Bunker, 1986). In this regard, the practitioner is situated as a guide or facilitator in the teaching-learning process (Kinnerk et al., 2018). Consequently, feedback would be considered as a support for learners to reflect on the situations they face, based principally on question and answer (Harvey et al., 2016). For example, continuing with tennis, according to Hopper (2002), students could be asked: 'Where should you go after hitting the ball?' and the answer to this question could be 'opposite your partner's target-on the other side of the pylon' (p. 46). According to this author, this feedback allows learners to learn about placement in relation to a target and about anticipating and preparing for the next shot.

Later authors developed a guide to elaborate lessons under tactical perspectives that provided practical information to be more easily used by practitioners (Metzler, 2005). The structure proposed by Metzler (2005) for a handball game was: (1) Game form, which refers to the modified play but similar to the real game; (2) teaching for understanding, referring to collective questioning and feedback about the first task; (3) drills for skill development, specific tasks that permit learners to practise skills key to solving the tactical problem; (4) return to game form, similarly to the first task; and

finally, (5) review and closure, with a common reflection. As an example, following this structure in a football session with the principle of play of maintaining possession of the ball and to learn the technical-tactical contents of when and to whom to pass (game action after passing) and feet position to be accurate: (1) the game form with exaggeration in game design expecting that pass appears lots of times (e.g. 3 vs. 2; 20 × 15 m; double score if the attacker on-the-ball passes to a teammate, then progresses to goal and finally gets back the ball for a shot to the goal; compulsory player-to-player defence; forbidden to dribble) (2) the teaching for understanding questions prepared by teachers to help learners focus on passing and its relation with maintaining possession (e.g. ‘what should you do after passing to a teammate? Should you stand still, or should you move? Where? Why?’). Through the reflection around these questions it is expected that learners reach a solution like ‘I should move to a free space to be able to receive the ball again’; (3) drills for skill development could be based on passing the ball using the inside of the foot and the foot’s sole facing the target; (4) the return to game form with exaggeration in game design expecting that pass appears lots of times but not as close as in the first game form (e.g. 3 vs 2, in 25 × 20 m, triple score if the attacker on-the-ball passes to a teammate, then progress to goal and finally gets back the ball for a shot to the goal); (5) the final review and closure prepared by teachers to help learners focus on passing and its relation with maintaining possession (e.g. ‘when should you pass to a teammate? Why? How should your feet face the target? Why?’). Through the reflection around these questions, it is expected that learners reach a solution like ‘I should pass to a teammate if they are in a better position, free of opponents and closer to the goal and I should face the target with the inside part of the foot as that way I could direct it better and safer’.

Even though there are many different GBAs developed in the literature that acknowledge their foundation in TGfU, all of them as we noted in the introduction, shared the main idea of TGfU of the modified game as a central feature (e.g. Griffin et al., 1997; Launder, 2001). Consequently, although these GBAs are adapted to different contexts and situations in many different countries, they have common roots in their implementation. This is why, for the purposes of this paper, we use TGfU to compare with NLP rather than the many other GBAs.

If we are thinking of the enactment of TGfU and NLP, in contrast to their theoretical underpinnings, these approaches follow quite similar guiding principles, as has been highlighted in previous works (e.g. Renshaw et al., 2016). For instance, they share the main idea of modifying and adapting the game to the learners’ capabilities and environments (Bunker & Thorpe, 1982; Correia et al., 2019). Furthermore, they both situate the practitioner as a facilitator of the learning process and responsible for creating learning situations that allow learners to achieve their objectives, although TGfU is a student-centred approach while NLP is process-oriented approach, (Bunker & Thorpe, 1982; Correia et al., 2019). These apparent similarities and differences have led to some contradictions over time among NLP authors. While some NLP scholarly work links TGfU and NLP (e.g. Tan et al., 2012) others argue for a distinction (e.g. Renshaw et al., 2016).

Having provided a general outline of the learning media provided by NLP and TGfU respectively, we now want to drill down to a deeper level, to consider the learning media of NLP and TGfU by focusing on two empirical investigations.

Comparison between an NLP and a TGfU intervention: the medium is the message, so you learn what you do

To be able to compare the enactment of these two perspectives, the first author carried out a literature review of NLP and TGfU interventions. The aim was to find similar works but under different perspectives to support the comparison. In this regard, two similar intervention studies were found, conducted by the same group of scholars, one from an NLP perspective and the other from a TGfU perspective (Práxedes et al., 2017, 2019, respectively). The aim of the NLP study was to analyse the effects of a training intervention on what Chow et al. (2007, p. 259) describe as ‘the decision-making behaviours’ and actions of young average-low skilled footballers, designed in accord with the principles of NLP (Práxedes et al., 2019). The aim of TGfU intervention was to analyse the effect of a comprehensive teaching program, comprised of 22 training sessions, on the decision-making and execution variables of U-12 youth footballers (Práxedes et al., 2017). Both studies were carried out by the same lead authors, published within a two-year period (2017–2019), in the same sport (football), in the same context (youth club sport), with the same ages (U-12) and similar time of training (one hour twice a week).

In both studies, there was a pre-intervention of six sessions based on the traditional, technique-led approach, which was described as a decontextualization and reproduction of the technical component of the execution of football skills without manipulating the conditions of the task (Práxedes et al., 2019). In both studies, there were also training programs for practitioners prior to the interventions to ensure both NLP and TGfU were faithfully enacted (Práxedes et al., 2017, 2019). Specifically, they claimed that the training sessions were supervised by a researcher with 15 years’ experience supervising NLP and TGfU methodology respectively and that he attended the training sessions of the intervention phase (Práxedes et al., 2017, 2019).

The aims of the sessions were in both studies related to attack and defence, informed by the principles of soccer. For example, in the NLP session 5, the aim was to learn the game principle ‘penetration by attacking the goal’; in TGfU session 3, the aim was to learn the same game principle of ‘penetration by attacking the goal’, although the tasks to work towards these objectives varied. In addition, evaluations were carried out in both cases using the instrument the Game Performance Evaluation Tool (GPET; García-López et al., 2013), which is an adaptation of the Game Performance Assessment Instrument (GPAI; Oslin et al., 1998). However, GPET differ from GPAI as it considers both on and off-the-ball movements key to tactical awareness specifically in football and frame these movements in a specific principle of the game.

Regarding the design of the NLP intervention, the task constraints were intended to simulate competitive contexts of play and each task referred to a tactical principle of play. There were four tasks in total and in all of them field dimensions were reduced according to the number of players, which were also reduced to increase player involvement. The last task for the session was a ‘small-sided game similar to the real context’ (Práxedes et al., 2019, p. 336). In contrast, in the TGfU intervention, each task had some determining factors modified. Concretely, the number of players was modified to progressively make the task more complicated, depending on player performance of the task (e.g. 3vs.1 and then 3vs.2; Práxedes et al., 2017). Each task had some determining

factors modified: attack game principles, number of players, opposition level: equal or unequal number of players per team, space, goal size and time. For example, in the TGfU session, the modifications made were: to the number of players and opposition level, 2vs.2 with a semi-active defence, size of the field reduced by 2 m each side (56 × 40 m); and limit the duration of a move to 15 s (Práxedes et al., 2017). While in the NLP session the number of players and opposition level was 3vs.4, the size of the field was the middle of F8 field (40 × 30 m). With the following instructions: ‘before throwing the ball into the goal, players must progress towards this giving a pass to a teammate who is located in one of the bands’ (Práxedes et al., 2019, p. 336).

In TGfU, they also included a ‘questioning’ task with the aim to engage the players cognitively, which required the development of their tactical selection capacity, which would, to a certain extent, benefit the quality of student’s decision-making. The protocol designed for questioning was: ‘(1) Questions were focused on a tactical principle to be dealt with during each task (e.g. Why did you decide to pass to player 1 or to player 2? What made you decide which was the best moment to pass?); (2) After the question there was a pause to let the athlete prepare a reflexive answer; (3) After the task completion, the players discussed the application of the tactical concept dealt with for a maximum of two minutes and (4) additionally, the coach asked personalized questions to those players who did not solve the task’ probably to make answering easier for them (p. 746; Práxedes et al., 2017).

Finally, both studies compared each approach with the traditional approach and obtained differences that were statistically significant for passing in decision-making and skill execution tasks. However, they explained these improvements using different theories. In the case of NLP study, they suggested that the representativeness of the practice (provided with the design based on the principles of the game) could have led to enhanced adaptive behaviours of participants, facilitating their capacity to resolve different challenges of the performance environment by the variety of training tasks that provided a great diversity of performance situations and perception-action patterns (Práxedes et al., 2019; Tan et al., 2012). Furthermore, they affirmed that it is possible that the use of NLP pedagogical principles, through the manipulation of task constraints, may have promoted a constant exploration and creativity on the part of the participants (Práxedes et al., 2019; Ric et al., 2015). They concluded that the manipulation of task constraints, the representative practice designs and the variability of tasks requiring responses to different problems, situated the NLP approach as an appropriate theoretical framework to enhance acquisition of expertise in team sports (Práxedes et al., 2019).

In the case of the TGfU study, the authors pointed out that the application of questioning, as a formative assessment instrument, probably had a decisive influence on the results obtained, and concluded this was useful as a tool to improve decision-making and execution skills (García-González et al., 2014; Práxedes et al., 2017). In addition, they said that the pass skill obtains more favourable results in early sporting stages which underlines the need for extensive teaching programs to understand that predominantly tactical tasks, such as the pass action, must be applied to allow players to assimilate the decision-based tactical principles and apply them effectively to execution in a real game context (Práxedes et al., 2017). Obtaining favourable results in early sporting stages make sense as TGfU was created in a school physical education context, an environment with a diversity of learners who have to play together (Kirk, 2017).

To sum up, in both studies the researchers reported that the good results were due to the use of the principles of NLP or TGfU, respectively, and their enactment through intervention sessions (Práxedes et al., 2017, 2019). However, in both studies, the tasks of the sessions: (a) were related to a principle of play, (b) included modifications such as dimension of the field and number of players, (c) were representative of real game contexts and (d) started from less complexity to more complexity as a function of the learning performance of the players.

So, the principles that drove them to create good sessions to obtain success are quite similar between the two perspectives, something that was already pointed out by other authors (Harvey et al., 2018). In fact, there was only one big difference pointed out in these papers, in terms of implementation, the question-and-answer component, that appeared only in TGfU study, and the authors claimed this contributed to the good results (Práxedes et al., 2017), a finding consistent with other GBA interventions (e.g. Godbout & Gréhaigne, 2022). Similar results were found in the comparison between the pedagogies of Game Sense (as a GBA) and CLA perspective made by Pill (2021), in which there was a purposeful use of questioning in a specific task for Game Sense in contrast to the sporadic use of coach questioning to redirect the attentional focus in CLA. If the medium is the message and players learn what they do, what is the significance of question-answer and related practices on player learning?

Questioning linked to decision-making as a core difference between NLP and GBAs pedagogical practices

As has been reported in previous paragraphs, these two studies of NLP and TGfU respectively obtained an improvement in the execution of the ‘passing’ skill and decision-making in youth football, with session design and enactment based on similar pedagogical principles. These results matched with previous literature in which the use of NLP and TGfU has been demonstrated to improve decision-making in different games (e.g. Ribeiro et al., 2021). When TGfU emerged, a key feature of its implementation was that learners should face a tactical problem in relation to three processes. The first is the perception of the problem, second is the decision to be made, and then third the action itself (Endsley, 1995; Godbout & Gréhaigne, 2022; Kirk & MacPhail, 2002). Regarding the perception of the problem, within GBAs, a modified game would be planned to exaggerate the problem to solve, and the decision-making process could be improved by the debate of ideas planned by the practitioner, that invites learners to search for solutions collectively (in the case of the debate of ideas), and finally to perform the action experiencing these solutions (Kirk, 2017; Morales-Belando et al., 2022).

In NLP, it is suggested that these three processes take place at the same time. This suggestion places particular importance in practice on perception and action. This logic informs the requirement to repeat many different tasks with constraints, so that the learning of new movement patterns will emerge (Correia et al., 2019). However, in GBAs such as TGfU the focus is on the decision-making process (e.g. Gréhaigne & Godbout, 1995; Piaget, 1981; Vygotsky, 1978). In this respect, Ashford et al. (2021) pointed out three perspectives on decision-making in learners: information processing, naturalistic decision-making and ecological dynamics. In all three perspectives there is

a ‘situation awareness’, that is, the situation perceived by the learner that asks them to solve a problem. It is after the occurrence of situation awareness that decision-making occurs, following different processes depending on the perspective (Godbout & Gréhaigne, 2022).

First, in information processing, decision-making is a conscious process in which the learner selects the best solution considering the information he or she received from the environment and anticipating the changes that could occur (Ashford et al., 2021). In this case, learners make a mental representation called a ‘schema’ which has been formed in long term memory, by associating new information with elements from previous experience (Godbout & Gréhaigne, 2022). In summary, the more appropriate experience and knowledge the learner has will support better decision-making and increase capacity to distinguish more quickly the information in the environment that is crucial (Ashford et al., 2021).

Similarly, with naturalistic decision-making, the same two key features of perception and previous knowledge feature as aspects of a conscious process (Ashford et al., 2021). However, from this perspective, decision-making can occur at one of three levels (Ashford et al., 2021): (a) the learner identifies a situation as typical and an action response presents itself in an evident manner (e.g. the player is alone in front of the goal and immediately shoots between the posts as evidence of an appropriate response); (b) the information is not typical for the learner and through mental stimulation they need to clarify the situation through a process of diagnosis to restore typicality and come to a decision (e.g. the player is in possession of the ball with no opponents, he or she acknowledged that there are two possible actions, dribbling or pass, to decide which one is better he or she simulate other already acknowledged situations that assist them with the decision, by remembering that when there was a teammate in front of the goal is more probable to succeed by passing than dribbling); (c) the information available is recognised but a representative action does not immediately present itself, so a solution is to visualise consequences that will help to decide whether to disregard or select this decision (e.g. the player is in possession of the ball for the first time and imagines possible consequences to assist their decision, she or he decides not to pass because he or she realised that a possible consequence could be to lose the ball because of the proximity of an opponent).

Finally, with ecological dynamics, decision-making emerges from interaction between players and environment. This approach considers athletes and sports teams as complex adaptive systems and through their interactions, one can identify the coordination states that emerge in a complex system in nature (Renshaw et al., 2019). From this perspective, an interplay of perception and action occurs simultaneously with decisions while managing constraints (Araújo et al., 2006). Araújo et al. (2006) suggested that information is the key for learning as ‘cognition is conceived as the ability to use specifying information for controlling action’ (p. 6), in this sense, the decision-making is viewed as ‘a functional and emerged process’ (p. 7) which, according to the authors, ‘contrasts with traditional approaches in which humans have been modelled as rational decision makers, computing and selecting options from those represented in mental or neural models designed to maximize utility for performance’ (p. 7). In the same line, Gesbert and Hauw (2019) put the focus of the teaching-learning process in the information perceived as ‘by accessing the environmental information that players are sensitive to as they adjust their activity

and by understanding how this information shapes players' sense-making processes (i.e. phenomenological data) coaches would be better equipped to manipulate task constraints' (p. 3). According to Gibson (1979), the environment is indefinitely rich, so, although it is not possible to perceive all of it, the point is that by training our attentional focus we would have enough information to act on our environment by direct perception. In this regard, the final action performed is the result of the patterns or synergies formed, as 'the human body is composed of a multitude of interacting components (molecules or neurones, muscles, joints, limbs, bones), which form patterns or synergies to achieve task goals' (Renshaw et al., 2019, p. 2, Figure 2.1) having to adjust these patterns to what they perceived from the opponent(s) and the rest of elements that influence the environment (Rhoades & Hopper, 2019).

In conclusion, there are two perspectives that give specific importance to the cognitive process of making decisions (information processing and natural decision-making) and one, ecological dynamics, that refers to the spontaneous tendencies for adjustment and adaptation of system components to changes of the environment (Renshaw et al., 2019). Relating these perspectives to approaches to teaching and learning of games, NLP has been created under the constraints-led approach and ecological dynamics perspectives (Correia et al., 2019). This is largely confirmed by authors of NLP (e.g. Renshaw et al., 2016). However, TGfU emerged from modelling best practice in games teaching and coaching, following Bunker and Thorpe's observation that the traditional approach, focused on technique practice before game play, did not produce good games players (Bunker & Thorpe, 1982). Bunker and Thorpe put problem-solving at the centre of learning to play games. Although TGfU was not explicitly informed by a theory of learning in the very first moment, this observation could be made because they were in a teaching-research context, and they had enough knowledge to inform themselves about how to solve problems of learning to play games (Kirk, 1983a).

In this sense, we cannot set TGfU beginnings in a single or specific theory, but when we see the way that they give importance to decision-making by reflection, it is clearly situated within a perspective that considers decision-making as a conscious process. In this sense, these decision-making perspectives are coherent with such learning theories as cognitivism, constructivism and situated learning (e.g. Gréhaigne & Godbout, 1995; Kirk & MacPhail, 2002; Vygotsky, 1978). This is clear in the case of other GBAs that were developed following TGfU and situated themselves within these theories (e.g. TGM Gréhaigne et al., 2001). Conscious decision-making is consistent with these theories because they sustain the importance of *knowing how* presented by Ryle (1949) (see Kirk, 1983b) and are aligned with the holistic perspectives that reject the dualistic separation of mind from body (Light & Clarke, 2021).

Here is the key to what we have found when comparing the implementation of NLP and TGfU in two similar contexts. As decision-making in TGfU is a conscious process and in NLP decision-making is implicit and adaptative, it makes sense that the only different task we have noted between the two approaches was 'questioning' to make learning explicit. In GBAs, the questioning task is always included with the aim to cognitively engage the player who requires a greater selection capacity benefiting decision-making (Harvey et al., 2016; Práxedes et al., 2017). However, according to NLP principles, and in contrast with GBAs principles, questions do not require a specific task, as they are made in conjunction with the focus on perception, when the player fails to execute the response that the practitioner has

tried to elicit through practice design and the use of constraints or when a learner is adjusting to changes (Connor et al., 2020; Correia et al., 2019).

In this regard, while in GBAs interventions questioning tasks are pre-designed before the implementation of the program to encourage learners to actively seek and explore different solutions, in NLP, questions emerged to direct learners' attention to an external focus that give them information about the movement effects (Chow et al., 2007; Morales-Belando et al., 2022). Evidence of the specific question tasks as key part of the lessons in GBAs are widely found in the literature. For example, in Chow et al. (2007) they provided a structured Net-Volleyball lesson plan under TGfU in which appeared a specific question and answer task of two minutes with three questions and their possible answers: '(1) Where is it easiest to attack from? Answer: near the net; (2) How would you score a point? Answer: Execute an attack hit above the head; (3) What must your team do to prepare for an attack hit? Answer: Set up to attack' (p. 267). In relation to this, these authors pointed out that although the questioning process in GBAs strengthens the knowledge of strategy, under NLP perspectives the knowledge comes from the satisfaction of the interacting constraints (in this case there were two external constraints, the net and a small red ball court to aim at) and consequently, questions are used to redirect the learner's attentional focus according to the carefully designed constraints (Chow et al., 2007).

We can illustrate these differences within the context of a tennis lesson. On the one hand, according to Correia et al. (2019) from a NLP perspective a question would emerge after a specific moment, for example, when a player sends the ball out of the court. In response to that action, a question could be 'where does the ball go when you hit it underneath?' (Correia et al., 2019). On the other hand, from a GBAs perspective, according to Hopper (2002), the questions and possible answer are predefined to guide the reflection and learning. Consequently, questions could be 'how could you keep the ball going in a rally with your partner?' or 'Where should you go after hitting a ball into an opponent's court?' (Hopper, 2002, p. 45). The suggested answers from Hopper (2002) is that the players would realise they need to retreat behind the court back-line in order to see the target area for the ball landing in the court, and then to move forward to play their next shot.

The medium is the message

To summarise our argument, on the one hand we know that there are different approaches that improve decision-making in ways that the traditional, technique-led approach cannot. We cannot say whether one alternative approach increases decision-making more than the other. On the other hand, we realised that the major difference between NLP and TGfU (GBAs) is the role played by decision-making. In this regard, we found one difference in practical terms, in terms of what learners *do*, when enacting NLP and GBAs; that GBAs include a question-answer-based reflection task (Butler, 1997; Harvey et al., 2016). The 'questioning' task appears in TGfU, while other tasks such as debate of ideas appear in TGM, all of them with the aim to prompt learners to reflect on their learning, facilitating the emergence of procedural and declarative knowledge (e.g. Práxedes et al., 2017, 2019).

At this point we should recall the McLuhan's aphorism that frames the perspective of this work; what is the message of NLP and TGfU? The medium of learning sends critical and dominant messages and controls the perceptions and attitudes of individuals. The

role they have in a specific environment, what he or she learns, is what he or she does. That is the reason why the medium is the message, because the message is the perception that learners are able to construct, the attitudes that they assume, the mindsets they are encouraged to develop. Particular learning occurs when the environment is organised in such a way that facilitates this learning. To know what is the message of a learning environment, the right question according to McLuhan was ‘In what ways does the structure or process of the medium environment manipulate our senses and attitudes?’ (Postman & Weingartner, 1971, p. 18).

If we think about a traditional approach in physical education, we can see that the message of the lessons could be quite similar of those pointed out by Postman and Weingartner (1971, p. 21); for example, ‘Passive acceptance is a more desirable response to ideas than active criticism’, ‘Recall is the highest form of intellectual achievement, and the collection of unrelated “facts” is the goal of education’, ‘The voice of authority is to be trusted and valued more than independent judgment’ and ‘There is always a single, unambiguous Right Answer to a question’, among others. But, what about NLP and GBAs approaches to games teaching and learning? Although we know that many things influence the medium, in the lessons developed using these approaches, the focus is on the students’ capacities and the environment is modified to present problems to be solved and so to bring them closer to learning. Lessons start simply and get more complicated little by little. Tasks are contextualised in real situations. Most of the tasks are representative of the reality of the full game. Tasks are individualised. That is what occurs in the medium of the physical education lessons according to the game principles shared by NPL and TGfU.

Therefore, the message that pupils receive from these lessons is quite different from those mentioned by Postman and Weingartner. In this case, the message is that: (1) there are problems that can be solved in a number of ways, (2) there are diverse abilities that can challenge each other, promoting learning (Hopper & Rhoades, 2022; e.g. a modification of the game in football in which dribbling is restricted to specific zones of the pitch foster all learners to use these zones during the game when dribbling no matter the ability in that specific skill), (3) that it is important to know ‘what to do’, ‘how to do it’, ‘where to do’ and ‘when to do it’, (4) that what I learn in lessons will help me to be better in the real context. This fits in with what other authors say, and we also advocate, that the use of pedagogical models in general could drive physical education to the development of learning media that send particular messages to pupils (e.g. Casey & Kirk, 2021; Kirk, 2013). In this sense, the message is an improvement with respect to the traditional approach by the use of both NLP and GBAs models.

Moreover, regarding GBAs, a specific reflection task is provided that may be useful to fight against the *devil of dualism* because it implies that mental and physical processes are interwoven (Light & Clarke, 2021) (e.g. question-answer and the debate of ideas; Bunker & Thorpe, 1982; Bunker & Thorpe, 1986; Godbout & Gréhaigne, 2022; Harvey et al., 2016). This is supported by the idea of enhancing *knowing how* (Ryle, 1949) and developing *intelligent players* (Kirk, 2017; Nyberg, 2014) which is deeply rooted in the work done from constructivist perspectives. Postman and Weingartner (1971) argued that McLuhan’s ideas showed that if a pupil learns to ask relevant, appropriate and substantial questions, he or she will have learned how to learn. According to this line of argument, in GBAs, to achieve learning there is a need to provide lesson-time for pupils to ask

questions, and to reflect on their own and their classmates' performances (Bunker & Thorpe, 1982; Kirk, 2017). In that way, physical education has the power to contribute to one of the most important intellectual abilities that can be developed, 'the art and science of asking questions' (Postman & Weingartner, 1971, p. 23). From this idea, a message emerges: in TGfU and GBAs, learners can construct their knowledge by questioning other opinions, questioning themselves, and reflecting on their own and others' ideas. Within this perspective, with a strong pedagogical role, critical thinking, provided by using the questioning task, could be key to the whole development of the student, not just in terms of game performance but in useful capabilities more broadly. This is in line with the international policy statements in education (e.g. European Commission, 2018; Nations United, 2015; UNESCO, 2019) where the importance of encouraging skills, such as problem solving, critical thinking or ability to cooperate is highlighted (e.g. European Commission, 2018).

In our view, the key to NLP is the way in which practitioners design tasks, as learning emerges from the information in practice that will be used to regulate players' decisions and actions (Renshaw et al., 2019). This situates the practitioner at the centre of the teaching-learning process, as it is the role of the practitioner to facilitate and encourage this process through the application of a CLA. In this regard, they must have the required sport-specific knowledge, as well as pedagogical and empirical knowledge, to provide learners with instabilities in practice environments to develop this coordinated organisation (Renshaw et al., 2019). From this idea a different message emerges compared to TGfU: as part of a complex system interacting with the environment, players learn to receive the right information from the environment, as this will help them to adapt their behaviour to new situations (e.g. focusing on where the ball goes after hitting as in the example of Correia et al., 2019 where they constrained the height that the ball must be driven over the net and the spatial area of the court in which the ball should strike the ground). From this perspective, with focus on improving performance, players are biological system searching for a functional state of organisation that will be reached thanks to constraints that help players to focus on a feature of the environment which acts as information to shape or guide the constant re-organisation (i.e. they learn to search and react in a simultaneous decision-making process by facing the constraints; Renshaw et al., 2019). In this regard, players involved in a task need to be committed to learning to play the game for this type of task to work.

Conclusion

In conclusion, the aim of this paper was to decode under the framework of McLuhan's aphorism 'the medium is the message', the pedagogical messages that NLP and TGfU send to learners. We tried to move forward from the theoretical debate and to show the implications of the use of these approaches in the practice of games teaching and learning physical education. To do that, first we described the main features of NLP and TGfU. Then we selected two intervention studies of NLP and TGfU for comparison. As a result, we found two similar studies and we used these two papers to provide examples of what two different interventions with each respective approach look like when enacted in physical education. In the aftermath, when comparing the two interventions, similarities become obvious. In practical terms, there was only one main difference

between lesson designs, that in the TGfU intervention there was a reflexive and guided discovery ‘questioning’ task. Similar tasks could be found in other GBAs studies (e.g. debate of ideas: do you think it was better to run with the ball or to pass it? Why? What did you do after passing the ball? How can you support your teammate on-the-ball?) but not in NLP, where questions are used as a type of constraint (e.g. did you see the distance from the goal when you throw out? Were you able to see the square from that distance?). In this regard, NLP needs an external focus created by the constraints (including an opponent) and the players’ exploration to create variability in trials, while TGfU can sometimes try to short-cut the exploration process using guided discovery type questions to focus the learner on possible solutions, often to assist students who need success to stay motivated to learn the game.

NLP and GBAs are implemented with similar features and under similar principles, which makes them successful when compared to the traditional approach. This allows us to say that both, under different ways to understanding how learning and improvement happen, are equally valid to be used to improve game learning. Over many years we have already known the importance of modifying games according to the learner capacities and how that increases the learning and motivation more than traditional, technique-based approaches. In this sense, the debate between these perspectives has for sure increased and enriched our knowledge but, we would argue, it has not really brought anything new to the debate. We need to ask ourselves new questions, in other words, more useful questions to be able to help the community of practitioners. We should care more about the environment, we cannot forget the word ‘pedagogical’ from the pedagogical approaches’ discussion. When we are in learning contexts, we have a responsibility to face learning with a pedagogical sensibility. NLP and TGfU were developed in different contexts. NLP was developed by coaches, coach educators and researchers and needs motivated learners to solve problems set by context where learning happens more implicitly through trial-and-error correction leading to solution with variability. In TGfU the teacher role seems more focused on novice players needing more support to learn (Kirk, 2017). Considering the diversity of learners in school physical education lessons and the need for the learners to mix and play with others of different ability, this is a remarkable difference in context.

In this regard, the question that was intended to be answered in this paper was which message it was being sent through the use of each approach, what learning is being encouraged to develop in games in physical education? This question was answered by using the comparison between the main features, the practical implementation and the theoretical basis that informs each approach. The main difference noted was that GBAs include a ‘questioning task’. As GBA authors pointed out, learners need time to ask question themselves, and reflecting on their own and others’ ideas to develop critical thinking (Kirk, 2017). We consider this to be a particularly valuable feature of GBAs since, as Postman and Weingartner (1971) argue, is something all students can learn to do and thus must be something the medium of physical education fosters.

Note

1. In the present work we will refer to GBAs because it is stated by the AIESEP TGfU SIG (2021), however in other works it can also be found under the name of Game Centred

Approach (GCAs) which seems to be the most widespread in the literature according to Harvey and Jarrett (2014).

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