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Physical education teachers' experiences and beliefs of production and reproduction teaching approaches

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HIGHLIGHTS

- PE teachers' experiences and beliefs influence teaching preferences.
- PE teachers held contradictory beliefs of the benefits for both teaching approaches.
- PE teachers use reproduction teaching but perceive learning as a constructivist process.
- PE teachers reported underprepared to implement the production teaching approach.

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ABSTRACT

The study aimed to identify participants' teaching preferences and the underlying reasons that support the implementation of the reproduction and production teaching approaches. Ten physical education (PE) teachers (6 males and 4 females) participated in the research. The phenomenological analysis indicated that the majority of the sampled PE teachers implemented the reproduction rather than the production approach. The findings revealed a pattern between the class goals the PE teachers' set as top priority and their teaching preferences. Furthermore, a variety of factors that influence their teaching preferences were identified including class management, time management, active time, discipline and students taking responsibility.

1. Introduction

Teaching in the physical education (PE) domain is by its nature a multidimensional and complex task (Graham, 2008), with PE teachers consciously endeavoring to accomplish a variety of goals. Previous research examining teaching quality in the PE context has highlighted how PE teachers set measurable and well-defined goals, and systematically attempt to design and deliver a lesson plan aimed at achieving these goals (Gallahue & Cleland-Donnelly, 2007).

Although curriculum goals can vary from country to country, the U.S. government established standards and the National Association of Sport and Physical Education (NASPE, 2004), proposed how PE teachers should foster students' motor skills acquisition, cognitive learning, physical activity levels and affective learning. In New Zealand, a new PE curriculum established in focused on students' and society's well-being through the learning of health and movement concepts (MoE, 2007). The curriculum emphasised the necessity of students' critical thinking development regarding the merit of their personal and social well-being and physical activity. In 2006 the Hellenic Ministry of Education and Religion Affairs (HMERA, 2006) adapted the existing PE syllabus to promote students' engagement in a healthy and active lifestyle by implementing self-regulation techniques through the development of life skills (Goudas, Hassandra, Papaharisis, & Gerodimos, 2006; Theodorakis, Tziamourtas, Natsis, & Kosmidou, 2006). The redesigned high school PE curriculum in Greece aimed to promote

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students' physical, motor, mental, social and moral development in order to embrace physical activity as a lifelong habit (HMERA, 1990). In addition, vocational education level PE programs in Greece focused specifically at the improvement of students' fitness and health through their motor development and the adoption of a physically active lifestyle (HMERA, 2003). These phases of reform implementation involved teachers undertaking professional development to support their delivery of the new programs.

Achieving the goals of the Greek PE curriculum reforms required that lessons constitute multidimensional environments and be supported through the implementation of a variety of teaching methods. Policy makers have acknowledged how educators' teaching quality influences students' learning and that PE teachers' professional development may enhance their teaching quality (Armour & Yelling, 2004).

The concept of PE teachers as life-long learners is in the U.S acknowledged how active participation in conferences and membership of professional organizations (NASPE, 2007) informed them of new trends in the PE domain. In the U.K. professional development programs have been designed and delivered to all PE teachers with the focus being on a broad range of aims such as improving the quality of teaching, coaching and learning in both PE and school sport (Armour & Duncombe, 2004). In Greece PE teachers attend mandatory 'workshops' following recruitment, with the content of these seminars focusing on effectiveness of PE teachers' intention to adopt alternative teaching approaches. PE teachers' intrinsic motivation to participate in seminars is a major factor in their intention to adopt these teaching approaches during top-down reforms underpinned by voluntary participation (Gorozidis & Papaioannou, 2014; Lam, Cheng, & Choy, 2010).

1.1. The pedagogical model: spectrum of teaching styles

Mosston and Ashworth's Spectrum of teaching styles can be considered as a "tool box" which could help PE teachers to cope with student diversity and to support the achievement of PE curriculum goals (Sanchez, Byra, & Wallhead, 2012). The Spectrum is comprised of at least eleven teaching styles, each one of them leading to different learning outcomes (Goldberger, Ashworth, & Byra, 2012).

Previous literature has proposed a range of different perspectives and orientations associated with the Spectrum. For example, the Spectrum of teaching styles has been perceived as a continuum in which decisions shift between teacher and students (Mosston & Ashworth, 2002). Mosston and Ashworth (2002) have identified two clusters of teaching styles (reproduction and production), the first cluster was characterized as reproduction because students typically reproduce the information or skills that the PE teacher delivers or demonstrates to them and is based on memory recall. Whereas, the production cluster included teaching styles, in which the PE teacher stimulates students to produce knowledge or skills and is based on discovery (Goldberger et al., 2012). Teaching styles in this cluster allow the students to experiment with different movements and strategies, to make comparisons with other movement responses of their own and their peers, and to analyse the possible motor responses (Nichols, 1994).

A significant number of studies have been conducted the last decades in which researchers have typically examined the relationship between the reproduction cluster of teaching styles and learning outcomes (Chatoupis, 2010). Jenkins and Byra (1996) have suggested that the inclusion teaching style promotes skills retention more effectively than the practice and the self-check teaching styles. The findings of another study (Patmanoglou, Digelidis, & Tsigilis, 2008) imply that the self-check style promotes students' tennis skills more effectively than the command teaching style. Alhayek (2004) found the implementation of the practice teaching style helped students to perform better in basketball skills compared to the reciprocal teaching style. Several studies have examined the influence of the production cluster of teaching styles on outcomes such as students' critical thinking, responsibility and motor development. More specifically, the implementation of the divergent discovery teaching style during a dance class was found to promote students' critical thinking and dance skills (Chen & Cone, 2003). Dyson (2002) reported that the cooperative learning styles facilitated students' motor skills development, whereas problem solving teaching styles were found to be effective in developing students' critical thinking (McBride, Gabbard, & Miller, 1990).

A number of studies explored the relationship of students' motivation with the Spectrum of teaching styles. The findings of a study (Goudas, Biddle, Fox, & Underwood, 1995) indicated that the inclusion teaching style promoted students' intrinsic motivation and task goal involvement more than the practice teaching style. Similarly, the findings of Morgan, Kingston, and Sproule's (2005) revealed that peer and inquiry teaching styles such as the reciprocal and the guiding discovery respectively promoted a more mastery oriented motivational climate than direct teaching styles (the command and the practice teaching styles). Byra (2006) reported that a PE lesson delivered through the reciprocal style for 15 weeks lead students to report positive motivational reactions such as challenge and enjoyment. Alternatively, the findings of a longitudinal intervention delivered through the reciprocal teaching style revealed that the students recruited to the intervention group reported higher levels of task orientation. In addition, they perceived that their PE teacher emphasised more on task involvement compared to students of the control group (Digelidis, Papaioannou, Laparidis, & Christodoulidis, 2003).

Goldberger et al. (2012) stressed that each teaching style can create an expected learning context that will contribute to the accomplishment of specific objectives or goals. Garn and Byra (2002) have suggested that the implementation of each one of the Spectrum teaching styles might lead to specific outcomes and help PE teachers to accomplish specific goals regarding NASPE standards. However, they argued that the reproduction cluster of teaching styles promotes more effectively the psychomotor performance whereas the production cluster of teaching styles place emphasis on the cognitive domain. Additionally, the production cluster of teaching styles may promote more effectively students' motivation (Hein et al., 2012).

1.2. Educational reforms and spectrum of teaching styles implementation

Researchers have previously proposed that the aforementioned NASPE goals can be accomplished through the incorporation of the Spectrum of teaching styles within curriculum implementation (Garn & Byra, 2002). Similarly, UK studies highlighted the achievement of a key goal of the National Curriculum for Physical Education (NCPE, 1992) that required students to plan, perform and evaluate their engagement in PE that necessitated the use of a broad range of teaching styles (Goldberger & Howarth, 1993; Mawer, 1993). Kulinna and Cothran (2003) stressed that students' diversity and the wide variety of PE lesson goals demand the implementation of an array of teaching styles. However, Curtner-Smith, Hasty, and Kerr (2001) proposed that the NCPE reform was not acting as a catalyst to change PE teachers' practices so as to accomplish the multidimensional goals. They argued that PE teachers' pedagogical choices are influenced by a variety of factors such as prior experience, curriculum knowledge, confidence in their own skill level, and student expectations. Curtner-Smith

(1999) has also suggested that PE teachers' background and schooling experiences play important role in the formation of their professional profile.

Lawson's (1986) occupational socialization theory aimed at classifying relevant socialization factors that initially influence the individual's decision to enter the field of PE and guide their perceptions and actions as teachers. According to Lawson's theory (1983a, 1983b) the socialization period the socialization period is divided into three stages: acculturation, professional, and organisational. The acculturation period is the most influential period on the development of PE teachers' pedagogical principles. During this period, a person constructs his/her knowledge and beliefs about teaching approaches, course content and instructional perspectives. Therefore, a possible mediating factor is that PE student teachers enter university teacher preparation programs having already formed an initial professional profile. Lawson (1983b) suggested that during the organisational period a variety of factors (e.g., facilities, equipment, class size, schedule, other physical education teachers, classroom teachers, administrators etc.) may influence their decision to implement their own pedagogical and teaching perspectives or adopt the teaching approach established by the school culture. Guskey (2002) has articulated how only professional development programs may influence PE teachers to alter their teaching preferences, attitudes and beliefs, aiming to ensure students learning. Finally, research has also demonstrated that teachers' expectation of success may influence their intention to implement innovative courses (Abrami, Poulsen, & Chambers, 2004).

Previous findings (Cothran et al., 2005; Jaakkola & Watt, 2011; Kulinna & Cothran, 2003; Syrmpas, Digelidis, & Watt, 2016) have highlighted that PE teachers typically resort to the reproduction rather than the production teaching approach but perceived production teaching styles to be equally beneficial or more beneficial for their students than styles from the reproduction cluster. The findings of a study (Jaakkola & Watt, 2011) also indicated that PE teachers' perceived ability to implement each teaching style was an important factor that may urge PE teachers to more frequently adopt teaching styles from the production cluster of teaching styles. Similarly (Syrmpas et al., 2016), reported that PE teachers' perceived ability could be an important factor but not the sole factor that may influence the implementation of the majority of the teaching styles.

Physical education teachers' teaching preferences could be influenced by their willingness to promote their students' experiences of fun, learning, or motivation in relation to that particular style. The findings of previous quantitative studies revealed that PE teachers' beliefs about the benefits of each one of the teaching styles may influence their teaching preferences (Jaakkola & Watt, 2011; Cothran et al., 2005). Nevertheless, a differentiation exists between PE teachers' self-reports about their use of teaching styles and the reality of practice. For example, SueSee and Edwards (2011) study of Australian PE teachers' self-reporting of their teaching practices identified that a variety of styles were implemented in the delivery of curriculum. However, subsequent field observations and video recording of the sample revealed that they resorted to a limited repertoire of reproduction teaching styles. The exception to this tendency was the implementation of the convergent discovery teaching style (SueSee & Edwards, 2011).

Cothran and Kulinna (2008) explored PE teachers' knowledge regarding Metzler's direct, peer and inquiry teaching models (2005) and the factors that influence their decisions to implement these approaches. The findings revealed that class control, time management and students' effective learning were the most important factors that influenced their decision to implement direct teaching styles. However, this study did not explicitly focus on the production and the reproduction teaching approach, relative to Mosston and Ashworths' model, the direct and peer teaching styles have previously been included in the reproduction cluster of teaching styles. Furthermore, the production teaching approach incorporates the inquiry or problem solving teaching styles and teaching styles that provide students with autonomy in the PE context (e.g., learner-designed individual program, learner initiated and self-teaching teaching styles). Specific findings also reinforced that PE teachers reported that learning is more effective in the case where the teacher is the source of knowledge. Additionally, they argued that the cultural context influences both PE teachers' teaching preferences and their attitude towards reforms. Finally, they proposed that future studies should explore the influence of teaching styles on areas such as students' motivation (Cothran & Kulinna, 2008).

Widodo, Duit, and Muller (2002) have previously confirmed that teachers hold transmissive rather than constructivist perceptions about the learning process. In a constructivist learning environment, the teacher urges students to think critically through collaboration with peers to discover the knowledge. Alternatively, in a transmissive learning environment where teacher's authority is the leading force, it is common that student would passively reproduce knowledge taught by the teacher (Chan & Elliott, 2004). In this regard, Anderson and Helms (2001) suggested that it is crucial for teacher education programs to change future educators' perspective for teaching and aim at adopting a constructivist rather than a transmissive approach. Similarly, Kirk and Macdonald (1998) stressed that the constructivist approach could be the driving force to motivate the structure of an alternative pedagogical framework in the PE context.

1.3. Spectrum of teaching styles in the Greek PE context

In order to assist teachers and students to achieve the multidimensional goals of an enriched PE curriculum, the Greek Ministry of Education decided to incorporate the spectrum of teaching styles as a part of both the revised school based program for teachers (Papaioannou et al., 2007) and within the updating of student textbooks (e.g. Digelidis, Theodorakis, Zetou, & Dimas, 2006). During a top-down reform teachers' textbooks was released and PE teachers' resources materials package included examples of ready-made spectrum-based lesson plans. Based on these lessons plans PE teachers could design and deliver a lesson by choosing the teaching style that they perceived as the most effective on accomplishing the lesson goal. It is important to note that in 2000 when the Spectrum of teaching styles became integral part of the Greek PE academic curriculum, many PE teachers were not familiar with the pedagogical model. Since then undergraduate studies have included theoretical and practical course content related with spectrum framework theory. Taking into consideration that most PE teachers were qualified before this period, it could be assumed that their knowledge regarding spectrum has been acquired through the use of the PE guidelines books and participation in optional seminars or workshops. Previous research conducted in the Greek context mainly examined the outcomes of Spectrum teaching styles on student skill learning (Chatoupis, 2013; Kolovelonis & Goudas, 2012; Kolovelonis, Goudas, & Gerodimos, 2011) students' motivation and cognitive learning (Chatzipanteli, Digelidis, & Papaioannou, 2015). Additionally, the findings of one Greek study indicated that PE teachers' self-efficacy may influence their intention to implement student-centered teaching styles (Gorozidis & Papaioannou, 2011).

1.4. The purpose of the present study

Previous quantitative research has identified that an inconsistency appears to exist between PE teachers preferred teaching styles and their actual use of teaching styles (SueSee & Edwards, 2011). Further to this point, the teaching styles that teachers actually use also differs from those teaching styles they perceive as being beneficial to students in the typical teaching situation (Syrmpas et al., 2016). As such, the purpose of this study was to contrast existing quantitative findings by adopting a qualitative approach to examine PE teachers' (a) beliefs about the influences that urge them to implement the production or the reproduction teaching approaches; (b) beliefs concerning the broader goals of PE curriculum and which teaching approach best support the attainment of the goals; (c) perceived ability to implement teaching approaches; and (d) sources of knowledge for the reproduction and the production teaching approaches.

2. Methodology

2.1. Participants and procedure

The study involved 10 PE teachers (6 males and 4 females) from both primary ($n = 5$) and secondary ($n = 5$) schools who ranged in age from 45 to 57 years old. Age ranges for children in Greek primary settings are 7–12 years, and in the secondary setting, 13–18 years. The participants were randomly recruited from a list of school districts in Central Greece. Teaching experience levels varied between 10 and 25 years with two individuals holding postgraduate degrees. All participants had prior coaching experience in one or more sports. The study was conducted with the approval of the University Institutional Review Board. Participation in the study was voluntary with informed consent being obtained from all participants.

The participants taught their students for two sessions of 45-min lessons each week. Only one primary PE teacher taught in an experimental school and had to teach students four times a week for 45 min each time. These types of schools engage in the piloting of a new curriculum that places emphasis on teacher autonomy regarding the decision making to develop lesson goals based specifically on students' characteristics and needs. The curriculum prioritizes not only motor/sport skills, but also the development of students' life skills and social-emotional characteristics. Ten interview sessions of approximately 25–40 min in duration were conducted at settings convenient to the participants (e.g. teacher's office or gym). The interviews were recorded and transcribed for further analysis. As a result, 100 pages and 1880 lines of Times New Roman 12, double-spacing raw data was produced in total.

2.2. Interview design

An interview protocol was developed to support investigation of the PE teachers' experiences and beliefs concerning the production and the reproduction teaching approach. More specifically, following Patton's (2002) instructions, open-ended questions were used to explore their pedagogical approaches in relation to their experience, knowledge and perceived outcomes for students. The semi-structured interview protocol included a short thread of descriptive questions (e.g., teaching history, sporting background, teaching philosophy) and the participants were asked to portray the structure of an ordinary daily lesson. The short but detailed exemplar scenarios retrieved from a book (Digelidis et al., 2006), were used as prompts for each teaching approach. More specifically, interviewer presented to interviewees two photocopies of lesson plans delivered through practice teaching style (reproduction approach) and guided discovery (production approach). The scenarios included a brief but comprehensive description of lessons' goal of a specific case for example: a basketball drill in which PE teachers' role and students' tasks were described. Finally, a design with a lesson's episode was included. Based on both scenarios PE teachers were asked to describe how the learning takes place. The participants were prompted to describe how and on which occasion each teaching approach is more applicable and give rational explanations of their beliefs. The participants were also asked to describe the advantages and disadvantages of each of teaching approaches and were asked to report their source of knowledge for these teaching approaches and supporting curriculum.

The intent of the interview process was to elicit narratives of practice and sought to trace the implementation of the production and the reproduction teaching approaches in relation to students' learning outcomes. As such, the interviews were grounded in phenomenological narratives in which participants' perspectives of situated pedagogical practice were elicited. The reconstructed vignettes of the teaching and learning interface, as told by the PE teachers, demonstrated a disciplinary understanding of their implementation of the production and the reproduction teaching approaches and the PE curriculum goals.

Narratives of practice were used to prompt informants' perspectival dispositions. The interviews also provided descriptions to clarify an understanding of the influence of PE teachers' preferences and lesson goals on their decision to implement specific teaching approach. A consideration of perspectives of pedagogical practice was threaded throughout the interviews that sought to locate the reasons that compel PE teachers to implement both teaching approaches. Conducted as professional conversations the interviews drew upon the wider discursive characteristics of being a physical educator in a Greek context. As in any reconstruction of experiences, a focus and attention given to the role of researcher, reflexivity was paramount in analysing the narratives of understanding within the informants' stories of practice.

In order to facilitate participants' confidentiality, a coding process was used. More specifically, names were replaced with the letter A or B, depending on whether the participant taught in elementary or secondary education following by a number. For example, the first interviewee coding was of an elementary PE teacher and coded as A01.

2.3. Data trustworthiness

The trustworthiness of the 'data' was established through the implementation of strategies described by Shenton (2004) these being: (a) well-established research methods; (b) random sampling; (c) background, qualifications and experience of interviewers; (d) negative case analysis; (e) peer reviewing; (f) and tactics that help ensure honesty in interviewees. In order to ensure external reliability, the following practices were followed: (a) interviews took place in school classrooms or sport centers, so that respondents could feel comfortable with the physical environment, (b) data were collected during formal discussion after arranging an appointment with each participant (LeCompte & Goetz, 1982). Finally, the framework to establish internal reliability incorporated the random selection of two respondents from the participant group who were invited to confirm that their views as phrased in the interview were accurately transcribed.

2.4. Data analysis

Specific qualitative analysis procedures proposed by LeCompte, Preissle, and Tesch (1993) were adopted that included a multi-level

thematic analysis incorporating constant comparison and analytic induction to identify common themes representative of all participants. NVivo 8 software was used in the data analysis process. More specifically, open and axial coding were used to categorize students' responses (Corbin & Strauss, 2015). An experienced PE teacher with a PhD in Teaching in PE domain was recruited as peer reviewer and during the open coding process two researchers independently created codes based on students' responses. For example, when in the question: "Do you perceive that PE teacher's authority play an important role in students' leaning" the student's answer was: "PE teacher should be the main source of knowledge, because young students can learn only when PE teacher demonstrate the skill or propose a solution to a problem that arises during the lesson." it was coded as "transmissive learning". Then, both coding list with quotations were printed and examined for codes reflecting common understanding of the concepts. During the axial coding process codes from each question were examined to find patterns reflecting concepts. Themes were identified by comparing concepts across students' answers (Corbin & Strauss, 2015). A peer debriefing was conducted throughout the research process to provide a critique concerning study's methodological issues, the data collection and the analysis process. The following themes emerged: (a) Learning as a transmissive or a constructivist process; (b) PE teachers' preferences, lesson goals and effective teaching approach; (c) Contradictory beliefs about the factors influencing implementation teaching approaches; (d) PE teachers' perceived ability to implement each teaching approach; and (e) Sources of knowledge and the data set was independently coded based on the theme list. Both coders examined the data, and through discussion reached consensual agreement about the most appropriate codes that captured the essences of the data (Braun & Clarke, 2006). Data analysis, included examination of negatives cases that could reject assumptions or provide an alternative explanation for a given phenomenon. Consequently, a negative case analysis was conducted in order to confirm the themes emerging from data analysis. The percentage agreement between coders was 90%.

3. Results

The intent of the present analysis was to identify the contributing factors that influence PE teachers to implement teaching styles from the reproduction and the production clusters. PE teachers' statements revealed a variety of reasons that guide their decision to employ specific approaches. The five areas that served as the focus areas of the PE teachers' experiences were aligned with the themes identified in the data analysis. The area of beliefs about the influences that urge participants to implement the production or the reproduction teaching approaches was represented by the themes of: 'Learning as a transmissive or a constructivist process' and 'Contradictory beliefs about the factors influencing implementation teaching approaches'; the area of beliefs concerning the broader goals of PE curriculum and which teaching approach best support the attainment of the goals was considered to be associated with the theme of PE teachers' preferences, lesson goals and effective teaching approach; the area of perceived ability to implement teaching approaches was exactly matched by a corresponding theme; and the area of sources of knowledge for the reproduction and the production teaching approaches represented by the theme of sources of knowledge. The results in relation to the themes form the basis for each of the following sections.

3.1. Learning as a transmissive or a constructivist process

The participants were prompted to report if they perceived that learning is a transmissive process or constructivist based on their consideration of both scenarios. The majority of PE teachers (A01, A02, A04, B01, B02, B03 and B05) appeared to hold the belief that learning is a constructivist rather than a transmissive process. For example, B03 stated (quotes presented as translated into English):

> Students should self-act. PE teacher should plan the lesson in such a way that his/her students could explore the correct answer to a given problem or situation. Then they will never forget the answer, otherwise if you give the answer they will forget it.

However, three of the participants (A03, A05 and B04) believed that learning is a transmissive process where teachers' authority (teachers' ability to make most of decisions related with learning process and classroom guidance) acts as a catalyst on students learning.

Participant A05 reported:

> It is not possible students to learn without my guidance. Especially in elementary school the majority of students do not have the cognitive and the motor background, but mainly the cognitive to confront with difficulties and give rational explanation to a given problem. Thus, PE teacher should be the source of knowledge.

3.2. Teachers' style preferences, lesson goals they prioritize and effective teaching approach to accomplish these goals

Interviewers prompted participants to describe how they deliver a typical lesson to elicit the PE teachers' perception of their preferred teaching approach. The interview responses indicated that the teachers typically use the reproduction teaching methods but also reported that they consider the production teaching methods as equally or more effective for achieving explicit teaching goals. Specifically, seven teachers (A1, A3, A4, A5, B1, B4, and B5) reported their preference to be the main source of knowledge and expect their students to simply reproduce the new information. Participant A01, stated 'During lessons I convey the knowledge to my students and I always try to organise a structured lesson because in my opinion this way I can effectively facilitate the learning process'. Participant (A04) responded that he frequently implemented the reproduction teaching approach, however, he occasionally delivered lessons to fourth, fifth and sixth grade classes using the production teaching approach. He emphasised that:

> PE teacher should combine both teaching methods … for example, recently I appointed to fourth graders as a task to learn about winter Olympic Games. While I ask, sixth graders to self-evaluate their behaviour based on their textbook … Students' autonomy assists students' learning, but when students are unfamiliar with a teaching skill or concept then they have to follow my instructions.

In contrast, participants A02, B02, and B03 reported that they typically use the production more than the reproduction teaching approach with participant A02 reporting how:

> Firstly, I make use of the reproduction teaching approach in first and second grades and then progressively move to the production teaching approach … in any case I try to help my students to get involved in the lesson by self-evaluating and make decisions about the learning process. I try by asking questions to prompt my students to discover the answer to a given problem.

> When I demonstrate a skill I use to ask them to express their opinion e.g. did I perform well or not the skill and why?

Participant B02 stated: 'learning should be based on students' effort and in no case on PE teachers' authority. Students' should discover knowledge … also this way students are likely to enrich my own knowledge'.

Regardless of their teaching style preference, the majority of PE teachers reported that they frequently implement problem solving teaching methods as a production teaching approach. For example, participant B03 reported that: 'I usually put questions to my students in my attempt to lead them to the scientific acceptable response or I ask them to discover the correct or fault movement'.

Moreover, participants were asked to report the lesson goals they prioritize. Interviewees' reports revealed that teachers varied in the goals they set as their top priority. Three teachers (A04, B02 and B04) set the improvement of their students' physical activity levels as a priority, especially B02 who reported: 'I planned my lesson based on students need for increased physical activity. That is my main goal because in my point of view two hours per week are inadequate, so I try to increase their physical activity'. Teachers A01, A03, A05 and B05, set motor skills' development as their highest priority. For example, as A03 stated:

> My main goal is to lead my students to learn a few skills. I am aware that is not possible for all them to play, for example, volleyball efficiently, but it is likely to learn the skills in order to actively participate in a game in the future.

Furthermore, B01 and B03 also indicated that supporting students' engagement in lifelong physical and recreational sport activities is an important priority. Teacher B03 reported: 'PE teachers should lead students in the adoption of exercise habits in order to engage in lifelong physical activity'. In contrast, A02 stated:

> I do not believe that I have to set a priority for my lesson goals. I try to organise my lesson plan in such way that I will achieve all of them or, at least, most of them. In my point of view, it is not useful for students to only perform a specific skill well, but it is important to exhibit responsible behaviour and develop critical thinking.

Included in the interview was a question that related to the participants' perception of the most effective approach in achieving the lesson goals they prioritize. The PE teachers' reports revealed that eight of PE teachers' teaching style preferences are congruent with the teaching approach that they perceive to be more beneficial for achieving their lesson goals. However, for some teachers were not following that tendency. More specifically, B02 perceived the development of students' fitness as the most important and effectively facilitated by the implementation of the reproduction approach. Nevertheless, she reported that she more frequently uses the production teaching approach.

Alternatively, B01 prioritized lifelong physical activity as their most important goal and perceived the production teaching approach as the most effective for accomplishing this goal. She reported frequently relying on the reproduction teaching approach noting how:

> "The production teaching approach is the best teaching method. Nevertheless, usually students reluctantly participate in the lesson. Then, I have to implement the reproduction teaching approach that I am familiar with and is an effective teaching approach. Although I perceive that when students work independently and trying to learn, only then they will be active persons."

The findings revealed a pattern between the PE teachers' perceived teaching approach for accomplishing the lesson goals they prioritize and the teaching approach they implemented. However, that two of the PE teachers did not follow this tendency implies that a variety of factors influence PE teachers' decisions to implement a teaching approach.

3.3. Factors influencing implementation of teaching approaches

During the interview, attempts were made to elicit the PE teachers' perceptions about the more profound reasons that urge them to implement each of the teaching approaches. Question were raised about the advantages of the teaching approaches they implemented and based on the interview data it can be inferred that the teachers rely more frequently on the reproduction teaching approach. This preference could be influenced by their perception that a reproduction approach would be pedagogically more effective for class control, the development of positive behaviours and social responsibility of students. According to their responses, discipline and social responsibility were perceived as prerequisite elements of an effective learning process. As teacher, B05 reported: 'In cases that the PE teacher is the source of knowledge, then the design of lesson and the class control are more effective. Class control is an important factor because their absences constrain the lesson's accomplishment'.

The teachers also perceived time management and activity time as a catalyst in effective teaching. The vast majority of the participants reported that both could be achieved efficiently with the reproduction teaching approach. As A04 stated: 'Due to the limited time of the actual lesson, I think that the reproduction teaching approach is more effective for time saving, understanding of game demands and, mainly for understanding the essence of the game'. In addition, B04 stated: 'I was informed that students' actual activity during PE usually lasts approximately 8 min, but the specific approach (production approach) diminishes students' active time even more'.

Additionally, few of the PE teachers perceived that the production teaching approach lead to lack of class control, ineffective time management, and contributes to the limiting of student learning outcomes. For example, B04 stated:

> I try sometimes to provide my students with opportunities for making decisions. Unfortunately, it does not work. They made noise and they could not make a common accepted decision. As a result, students' active time was decreased.

In concurrence with this view, A03 stated that:

> I tried to teach by using reciprocal and self-check teaching styles a couple of times but students make noise, they hustle and bustle forth and there. They could not understand the exercise and in general, the lesson was not effective.

Alternatively, three of PE teachers believed that the production teaching approach could facilitate their teaching goals and class control, student safety and discipline as well. More specifically, A02 stated:

> The PE teacher through the reproduction teaching approach has total class control but this lasts for a certain period, on the contrary through the production teaching approach PE teachers

could promote students' personal responsibility and then class control could be permanent.

Whereas, B02 reported: 'By providing students opportunities for autonomy and actively participating in the learning process then they exhibit responsibility'. Finally, B04 stated:

> I used to create an environment in which students participate in the decision-making. This way I try to make them responsible for their behaviour and consequently I ensure their safety. I take the control only when a risk of accident occurs.

The PE teachers who reported that they implement the reproduction teaching approach perceived that the reproduction approach may facilitate class control, student behaviour management, and social responsibility. Alternatively, PE teachers that reported they frequently implement the production teaching approach perceived that this approach could promote students' autonomy that in its turn reinforces students' social responsibility and facilitates class management. Finally, they reported that student safety was ensured by the implementation of the production approach. The main factors that may urge PE teachers to implement the reproduction and the production teaching approach are presented in Figs. 1 and 2 respectively.

3.4. Teachers' perceived ability to implement each teaching approach

As previous research identified that the PE teachers' perceived ability to implement each teaching styles was an important consideration that may influence teaching preference, the following question was posed to the participants: 'Do you perceived that you are capable to deliver both teaching approaches?' The teachers' statements highlighted the underpinning factors supporting their self-assessments of effectiveness in the implementation of both types of teaching approaches. As A05 reported: 'I can deliver a PE lesson by implementing both teaching approaches. I had the privilege to learn about Mosston's teaching styles through a seminar. Of course, PE teachers' textbooks include ready-made lessons plans'. Similarly, B02 PE teacher reported that 'I am capable to implement both teaching approaches, but I perceive that the production teaching approach is the most appropriate for achieving my goals'.

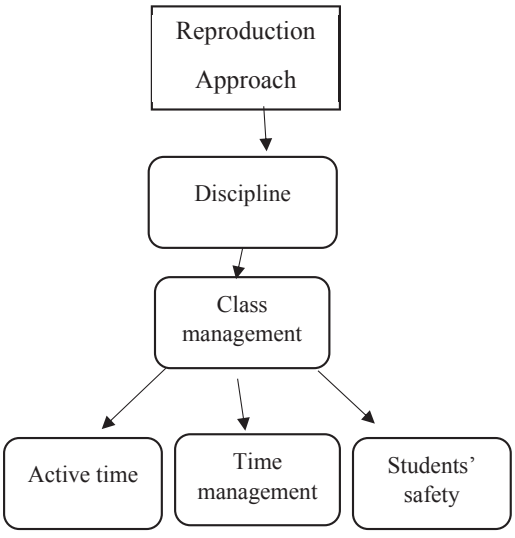

Fig. 1. Concept map of PE teachers' beliefs of the benefits of the reproduction teaching approach.

Although the teachers stated that they are able to implement both teaching approaches two of them clearly reinforced that they believed both the production teaching approach and teaching styles from the reproduction cluster (e.g., self-check) are not effective in engaging students. A04 reported: 'I tried two or three times to deliver my lesson through self-check and I created criteria sheets. Unfortunately, students were distracted and the active time decreased'. In addition, B04 pointed out that: 'the production teaching approach is not effective because students' active time is most of the time negligible'. The PE teachers all reported they feel competent to implement both teaching approaches. However, several teachers indicated they tend to rely on the reproduction teaching approach because of concerns with lesson complexity, lack of class control, and reduced active time, not only for the production teaching styles but also for certain teaching styles from the reproduction cluster (i.e., self-check, reciprocal).

3.5. Sources of spectrum knowledge

The participants were asked to report to which extent they are aware of both teaching approaches and how they sourced their teaching styles information. Many of the teachers' comments highlighted they were knowledgeable of the reproduction approach through their undergraduate studies. In contrast, they were primarily informed of the production teaching approach through either textbooks or seminars. The participants indicated that they were not taught the production teaching approach during undergraduate studies. Nevertheless, five of them learnt about the production teaching approach during mandatory seminars that took place just before their recruitment in education. A04 reported how:

> Seminars may urge you to explore alternative teaching approaches. This is very important especially for our generation since we have not taught Spectrum of teaching styles during undergraduate studies. During a seminar, I have my first contact with Mosston's Spectrum of teaching styles. … I would prefer seminars last longer because the stimulus was not enough … … … be more experiential and include not only theory but a demonstration of a PE lesson delivered with each one of teaching methods.

However, some of the participants reported that the influence of these seminars was weak or ineffective, and thus the reproduction teaching approach is their typical teaching style. B01 reported:

> Our prior beliefs formed primarily during schooling play an important role in shaping of our personality … I was lucky to be under the instruction of very talented coaches … Consequently, whatever you will teach me in a seminar it will affect me, but in case that I get tired, or have to deal with difficulties, then I will follow my prior teaching approach (reproduction) because I am familiar with it and I am aware that it works.

While, A05 stated that: 'Seminars should last more time because from my point of view the stimuli is not enough and additionally I would prefer it to be more experiential … I' am not convinced that the implementation of this kind of teaching styles (production) is effective for delivering a successful lesson'. Noteworthy was the fact that two participants (A02, B04) reported that their experience with the production teaching approach through textbooks urged them to revise their prior beliefs. Participant A02 noted how:

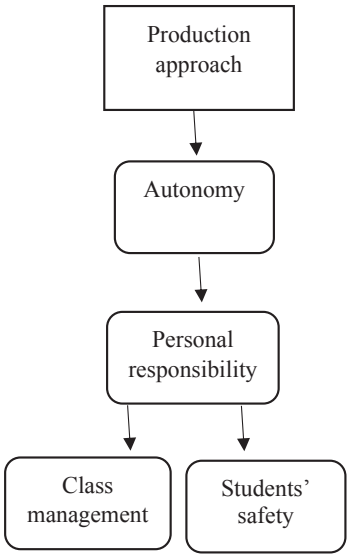

Fig. 2. Concept map of PE teachers' beliefs of the benefits of production teaching approach.

> Later I discovered that the curriculum includes a lesson plan delivered this way (production) and that was my first inspiration. After that, aiming to teach more effectively, I read the textbooks … Initially the implementation of the production teaching approach was difficult, because both the students and I were used to a different teaching approach. However, I followed my decision, because I think that this way I lead my students in effective learning.

B02 claimed that: 'From my point of view, nothing happens if you don't make an effort and the PE teacher should constantly be informed about the new teaching tendencies in order to be able to meet students' needs'. The PE teachers referenced how during undergraduate studies they attended course about the reproduction teaching approach. Alternatively, seminars/workshops and textbooks were the main source of knowledge about the production teaching approach. It is noted whilst the influence of their prior experiences was strong, the influence of seminars was weak. Only, three of the participants PE teachers were not aligned with the teaching preferences of the overall sample because they reported implement the production teaching approach rather than the reproduction teaching approach. These teachers constituted a negative case framework to serve as a focus for comparison of both theory and practice. The use of a negative case analysis was connected to the overarching theoretical underpinning of the study and illustrated the presence of motivation as an influencing factor for the use of a production teaching approach. Methodologically, the inclusion of these participants' views enabled a contrast in teaching approach to be further considered and subsequently applied to the process of generating an extended understanding of pedagogy situated in practice. These 'negative cases' could be linked by the comments of the teachers that characterize these individuals as life-long learners. More specifically, two of the teachers (A02, B03) hold a master degree in PE pedagogy while, the third (B04) stressed that 'From my point of view, nothing happens if you don't make an effort and the PE teacher should constantly be informed about the new teaching directions in order to be able to meet students' needs'. Hence, it may be proposed that their motivation to become more effective teachers, urges them to alter their perspectives and include the production teaching approach to their teaching repertoire.

4. Discussion

The present study was an initial attempt to explore the underlying reasons that influence PE teachers' pedagogic choice of the reproduction and the production teaching approaches. A further purpose of this study was to examine the goals of the PE lessons that are prioritized, and the teaching approach that the participants believe promotes the achievement of each goal. The findings of the present study highlighted a variety of factors that determine PE teachers' preferred teaching style. Interestingly, most of the PE teachers perceived that learning should be a constructivist rather than a transmissive process, but reported they typically implemented the reproduction teaching approach more regularly than the production teaching approach. Only three of the participants stated that they used the production teaching approach. Although this finding may be interpreted as a contradiction in the implementation of perceived best practice, a possible explanation could be that participants confirmed that many Greek PE teachers frequently resorted to problem solving teaching methods, and more specifically to the Socratic method. Findings of previous studies also supported this perspective (Syrmpas & Digelidis, 2014; Syrmpas et al., 2016). Taking into consideration that problem solving teaching styles promote critical thinking (Chen & Cone, 2003), it could be argued that they perceive the learning as a constructivist process even if many frequently employ the reproduction teaching approach.

Furthermore, the findings reinforced the perception (Byra, 2000; Garn & Byra, 2002) that the reproduction teaching approach promotes students' motor skill and physical development. A possible explanation for most of PE teachers' tendency to prioritize students' skillfulness and physical development may have arisen due to familiarity with these characteristics as an outcome of their own school experience (Capel, 2007). Since all of them reported that, they have coaching experience then it could also be assumed that the PE teachers' sporting background may influence teaching style preference. Thus, the majority of PE teachers involved in the present study could be categorised within the classification of physical educators (Lawson, 1983b) for whom coaching is their first priority. However, the fact that a significant number of respondents were not following this tendency implies that PE teachers' goal prioritization is not the sole factor that influences their decisions on implementing a specific teaching approach. This interpretation is aligned with Cothran and Kulinna's (2008) suggestion that a variety of factors influence PE teachers teaching choices.

Cothran and Kulinna's (2008) findings that class control and time management influence most of PE teachers' decision to frequently resort to the reproduction teaching approach are reinforced within outcomes of the current research. Physical educators in the present study perceived class management as a key component for a successful lesson. The vast majority of participants reported that the reproduction teaching approach assisted them to facilitate control, and therefore time management, student behaviour, and safety. This finding is consistent with earlier scholars' suggestions that class control (Gallahue & Cleland-Donnelly, 2007) and time management (Rink, 1996) could be perceived as a prerequisite for effective PE. The current findings also reinforce the generally accepted assumption that class control is normally linked with the direct teaching styles as evidenced by the PE teachers of the present study reporting a strong reliance on the reproduction teaching approach (Cothran & Ennis, 1997; Cothran & Kulinna, 2008; Curtner-Smith, 2001). Alternatively, three of the PE teachers also perceived class management as an

important factor of an effective lesson. They reported that the reproduction teaching approach may facilitate overall class management but only in the context of these lessons. In contrast, they stressed that the production teaching approach facilitates students' autonomy, responsibility and active participation in the learning process which may more effectively foster greater class control as a long term behavioural development.

Specific beliefs of the PE teachers in the current study are congruent with the findings of a previous study. Ennis et al. (1999) suggested that a learning environment, created by curriculum such as "Sport for Peace", promotes students' autonomy and active participation in the decision making framework of the class environment. Additionally, it is likely to enhance students' acceptance and awareness of social responsibility and promotion of safety. Furthermore, the production approach may better support the integration of disruptive students within the learning process thus supporting student behaviour management goals.

Although many PE teachers reported that they attended mandatory seminars regarding the spectrum of teaching styles prior to their recruitment in public schools, they also indicated that their teaching styles preferences were not sufficiently influenced to promote future implementation of the production teaching approach. Curtner-Smith (1999) have suggested that the limited use of the production approach may be due to the finding that PE teachers are influenced by their prior beliefs. The influence of pre-existing perspectives of the pedagogy of PE, combined with an inadequate influence from participating in teaching style seminars, inhibits the broader implementation of the production teaching approach. An additional restraining factor in the regular adoption of the production teaching approach could be that these specific seminars were compulsory for PE teachers, thus representative of an extrinsic motivator. Gorozidis and Papaioannou (2014) suggested that intrinsic motivation plays a determining role on teachers' decision to adopt innovative teaching methods. This finding further reinforces that the influence of the obligatory seminar approach to professional learning could be temporary and superficial and may have a very limited influence on the development of best practice curriculum goals.

Based on the teachers' interviews it can be surmised that their decision to frequently adopt the production teaching approach was influenced more by their motivation to successfully and efficiently deliver a lesson, and less by the knowledge presented in seminars. The participants reported that they seek alternative sources of knowledge drawn from textbooks and the internet in their attempt to become more effective teachers. This is consistent with Vosniadou (2007) and Pintrich, Marx, and Boyle (1993) who all stressed that motivation can act as a catalyst within the learning process.

The PE teachers in the present study perceived themselves as capable to implement both teaching approaches but reinforced that inadequacies in professional development opportunities limits their confidence to explore a broader range of styles. The PE teachers' perceived ability to implement each teaching style is an important predictor of their intention to implement each teaching style (Syrmpas et al., 2016). The findings of one study (Jaakkola & Watt, 2011) revealed that PE teachers' confidence to teach may urge them to implement teaching styles that require greater student involvement in the learning process. The overall perception of the teachers that they could equally implement both the reproduction and the production approaches was not supported by their specific responses. An explanation as to why they were reluctant to resort to the production teaching approach is their possible undervaluing of the physical and motor skill development opportunities connected to the outcomes of that approach. Furthermore, participants proposed the perception that this pedagogical framework constrains class control, demonstrates ineffective time management, and contributes to the limiting of student learning outcomes.

Arguably, it can be inferred that PE teachers demonstrate a cautiousness that students will adjust to new learning contexts. This restraint in modifying practice serves as an explanation for the rejection of not only of the production teaching approach but even teaching styles included in the reproduction cluster that encourage a relative level of autonomy for students such as self-check teaching style. Several respondents (e.g., B04, A03) appeared to disregard that the students and the teachers are not typically familiar with this teaching approach. According to Dyson (2002), the implementation of teaching styles that promote cooperative learning is not a simple, smooth and undisturbed process. This type of change in approach requires that PE teachers make a persistent effort to adjust class control practices and improve lesson organisation. The PE teachers regardless their teaching preference appear to disregard Goldberger et al.'s (2012) suggestion that PE teachers should implement a variety of teaching styles aimed at accomplishing the diverse goals of PE lessons. More specifically, they should consider that many curriculum objectives (e.g. socio-moral, cognitive and affective) could be effectively promoted through the production teaching styles (Garn & Byra, 2002). Alternatively, students' skills and physical development could be better accomplished through the reproduction teaching styles (Garn & Byra, 2002; Goldberger, 1995; Mosston & Ashworth, 2002). Thus, it is counterintuitive to infer that each one of the teaching approaches could effectively accomplish all lesson goals.

5. Implications and limitations

The outcomes of the present study are aligned with previous findings (Cothran & Kulinna, 2008) and reinforce that a variety of factors may influence PE teachers teaching preferences. The current findings indicate that PE teachers' prior personal school experiences influence their teaching preferences, and that the in-service professional development (e.g., workshops, seminars) had rather a weak impact on their practices. Additionally, the findings revealed that most of the PE teachers prioritized their students' motor skills and physical activity enhancement. Finally, their perceptions that time spent in activity and class management are important factors for an effective lesson and that the reproduction teaching approach can more effectively accomplish the goals they prioritize constitute principal factors that motivated them to implement the reproduction cluster of teaching styles. Only, three of the PE teachers perceived that the implementation of the production teaching approach may facilitate PE lesson goals, foster class control, assist in time management, and encourage student social responsibility.

Based on the findings of the present study policy makers and curriculum developers should consider the implementation of a formalised pre-service and in-service professional development structure. The research of Postareff, Lindblom-Ylänne and Nevgi (2007, 2008) and Bitan-Friedlander, Dreyfus, and Milgrom (2004) has highlighted that the limited early exposure of undergraduate students and the late stage exposure of in-service teachers, to innovative knowledge and new pedagogical approaches contributes to a weaker implementation of best practice programs. Policy makers should continue to support PE teachers to create learning environments that promote their own competence, connectedness and autonomy (Baard, Deci, & Ryan, 2004). This type of working environment could reinforce PE teachers' intention to implement innovative teaching methods (Lam et al., 2010).

The findings demonstrated that PE teachers perceived learning as a constructivist process however they report typically relying on the reproduction teaching approach. Nevertheless, the comments

that detailed they implement problem solving teaching styles from the production cluster implies that in many cases they merit the value of the production teaching approach. Thus, during seminars PE teachers should be informed that they should implement both teaching approaches aimed at accomplishing all the goals of the Greek PE curriculum. More specifically, the reproduction cluster of teaching styles can effectively promote psychomotor performance, whereas, the production cluster of teaching styles emphasises the cognitive domain.

The multidimensional goals of contemporary curricula demand the implementation of both teaching approaches (Digelidis et al., 2006; Kulinna & Cothran, 2003) however, most of the PE teachers tend to rely on the reproduction teaching approach. All participants claimed that they feel competent to implement both teaching approaches but underprepared to implement the production teaching approach. Professional development programs should therefore provide PE teachers with opportunities to attend programs that support teachers to successfully deliver the production teaching methods. As Guskey (2002), stressed PE teachers' perceptions and teaching preferences could be changed only in the case that they experience the delivery of a successful, efficient, innovative lesson. This long-term and gradual professional development process demands the combination of training and implementation of innovative or new approaches with tangible evidence of students learning. Educational systems should also be cognisant of Dyson's (2002) suggestion that the implementation of an alternative teaching approach is not a smooth and undisturbed process and demands efforts from both teachers and students.

This study was an initial attempt to incorporate qualitative data to highlight the teaching choices of Greek physical educators and the supporting reasons that influence them to implement the production and the reproduction teaching approaches. Improved understanding of the key influencing factors and subsequent encouragement of PE teachers to adopt a variety of teaching styles may also have societal benefits connected to improvements in student engagement in PE (e.g., health and well, increased physical activity). Due to the small number of participants, the results of the present study are limited in representativeness of all Greek physical education teachers. Nevertheless, the findings can provide valuable insights for policy makers in the design and successful implementation of educational workshops that facilitate the on-going development of Greek physical education. A motivated PE teaching workforce familiar with the production teaching styles are far more likely to integrate these approaches within their practices.

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