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**Elementary School Physical Education Teachers'  
Representations on Instruction: A Cross-National  
Comparative Perspective Between Greece and Hungary**

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## **Operational Definitions on Terms**

**Representations:** According to Moscovici (1973), representation is a system of values, ideas and practices embracing a dual function. Firstly, it establishes an order, which enables individuals to orientate themselves and master their material social world. Secondly, it facilitates communication among the members of a community by providing them with a code of the various aspects of their world and their individual history (Sotirakopoulou & Breakwell, 1992).

On the one hand, it is conceived as a social process of communication and discourse, in the course of which meanings are generated and elaborated. On the other hand, it is seen as an individual attribute, as an individual structure of knowledge and affect, which is shared with other people in a group or community. Farr (1990) concluded that representation indicates a specific form of knowledge, common-sense knowledge. That is, it indicates a form of social thought.

**Teaching Styles:** The term used to delineate the descriptions of specific teaching and learning behaviours. Style does not refer to personal style. Instead the term teaching style refers to a structure that is independent of one's idiosyncrasies (Mosston & Ashworth, 2002). Teaching styles are sets of actions with intent, they are product-oriented, teleological and institutionalized in relation to roles (Salvara & Biró, 2002b).

According to Mosston and Ashworth (1994), a teaching style is a plan of action that defines the decision behaviours of the teacher and learner for the purpose of leading to objectives in subject matter and behaviour.

**Pedagogical Content Knowledge (PCK):** “PCK is essentially situated knowledge specific to the skills taught. It is developed through the integration of theory and practice in teacher education” (Amade-Escot, 2000, p. 86). However, the concept of PCK in current research in PE has gradually become a generic term to signify teachers' professional knowledge (Chevallard, 1991).

**Didactic Research:** Didactic research concerns itself with the functioning of the ‘didactic system’ defined as the irreducible three-way relationship linking teacher, pupils, and knowledge taught (Shulman, 1987).

## **Abbreviations**

**ALT-PE:** Academic Learning Time in Physical Education

**CAFIAS:** Cheffer's Adaptation of Flanders Interaction Analysis System (Salvara, 2001b, 2001c)

**FIAS:** Flander's Interaction Analysis System

**I ITLB:** Instrument for Identifying Teaching and Learning Behaviours (Salvara, 2001b, 2001c, 2002a, 2002b; Salvara & Biró, 2002b)

**IPEPTH:** Ministry of Education and Religious Affairs, Athens

**MCE:** Ministry of Culture and Education, Budapest

**NCC:** National Core Curriculum (Hungary)

**PCK:** Pedagogical Content Knowledge

**PE:** Physical Education

**PETE:** Physical Education Teacher Education

**PE-TRIQ I & II:** Physical Education Teachers' Representations on Instruction Questionnaire I & II (Salvara & Biró, 2002a, 2002c)

**SIF:** Semantic Instructional Framework

## **Chapter 1. Introduction**

Throughout history, physical activity, in diverse ways, has been a significant element in all cultures. Physical education (PE) is, by definition, part of education (Bironé, 1971; Howarth, 2000; Naul, 1994). The instructional form of physical activity, that is, PE, has long been considered as an important component of the educational process, enjoying a sustained presence largely grounded in the Aristotelian concept of ‘harmonious balance’ (Hardman, 1998) and variously linked with a range of instrumental outcomes.

The vast majority of published research in PE concerned teaching and learning focusing on the investigation of teachers and learners behaviours (Byra & Jenkins, 1998; Byra & Marks, 1993; Cai, 1998; Curtner-Smith et al., 2001; Ernst & Byra, 1998; Fejgin & Haneby, 1999; Goldberger, 1992; Gusthart & Springings, 1989; Lawson & Stroot, 1993; Salvara, 2001b, 2001c, 2002a, 2002b; Salvara & Biró, 2002b; Silverman, 1991). Research on teaching provides a sound basis for improving PE Teacher Education (PETE) (Biró et al., 1981; Bironé, 1971; Graham et al., 1993; Metzler et al., 2000; Salvara, LeBlanc, Bognár & Biró, 2002). This type of research concerns with “what teachers do and how this affects and is related to learning and social dynamics of the class” (Silverman, 1991, p. 352).

To date, however, the majority of research studies, stemming from instruction framework, have investigated mechanisms that seem to be even today unresolved in comparative education: ‘What happens during instruction?’ ‘How does that happens?’ ‘What it aims at?’ and ‘Why?’ (Bolhuis, 2002; Reynolds, 2000; Salvara & Biró, 2002b; Salvara, 2002a).

Furthermore, research has focused on those decision-making processes that PE teachers emulate during instruction (Byra & Sherman, 1993; Mosston & Ashworth, 2002; Graham et al., 1993). More specifically, the employment of teaching styles (Curtner-Smith et al., 2001; Ernst & Byra, 1998; Fejgin & Haneby, 1999; Goldberger, 1992; Salvara & Biró, 2002b; Salvara, 2002b) and the roles of functional aspects of teaching, that is, feedback processes (Hebert et al., 2000; Lee et al., 1993; Rose, 1998; Silverman et al., 1992), have been broadly investigated.

In addition, much research has been conducted on the imitation and observation of patterns/tasks (Bandura, 1986; d’Arripe-Longueville et al., 2002), the problem-solving

mechanisms (Silverman, 1985, 1990), the pupils' practice with different educational paradigms (Byra & Jenkins, 1998; Byra & Marks, 1993; Cai, 1998), such as, practice, reciprocal, individual, self-check, selection of difficulty level and conduct of individual program among other systems (Byra & Marks, 1993; see Curtner-Smith et al., 2001, for a review).

Certain studies have explored teachers (Byra & Marks, 1993; Lambdin & Steinhardt, 1991; Meek & Behets, 1999; Rikard & Veal, 1996) and learners' thinking (Lee, 1997; Schunk, 1992; Wittrock, 1986). Similarly, several authors have investigated academic learning time (ALT), in order to analyze instructional effectiveness (Griffey, 1983; Lee & Solmon, 1992; Russell & Ford, 1983) based on "experimental teaching units" (Piéron & Graham, 1984, pp. 9-13) or time-on-task practice trials (Silverman, 1991).

Other studies have examined instructional effectiveness, investigated either, by a correlation approach among time-dependent variables to pupil outcomes, such as, the influence of teaching styles on teacher feedback (Placek, 1984), or the influence of selected teaching styles on pupils' motivational orientations (Dunn, 2000; Ernst & Byra, 1998; Hassandra et al., 2002; Papaioannou, 1994; Salvaras & Salvara, 2002; Salvara, Farkas & Biró, 2003; Salvara, Jess, Abbott & Biró, 2003; Treasure & Roberts, 2001). However, to this, Piéron (1994) suggested that, a relationship between two variables does not necessarily means any causality link or direction to the causality. To this, Macdonald et al. (2002) proposed, "cautions about allegiances to and use of theories in line with concerns for the applicability of educational research to pressing social issues." And they added "carefully designed studies are called for producing knowledge for good sport pedagogy" (p. 133).

Research paradigms have confirmed the large gap between pedagogical theories and the daily reality of PE classes (Macdonald et al., 2002; Salvara, 2002a). This is advocated by the fact that most studies were purely descriptive using a single investigation instrument, such as observation instruments, questionnaires, interviews or achievement tests (Armstrong et al., 1990; Ward & Barrett, 2002). Nevertheless, the teaching situation is far more complex and multidimensional, thus, such research approaches cannot effectively deal with all aspects of the teaching reality (Falus, 2000; Piéron,

1994). According to Lawson (1990) “the need for multiple research perspectives in sport pedagogy research remains” (p. 10).

Of equal import, Lawson added, “if sport pedagogy studies are to yield more useful knowledge, then multiple paradigms and their respective research perspectives are needed” (p. 10). According to Piéron (1994, p. 80) and Metzler (1989, p. 98) “critical inquiries, multiple data collection processes and improved systematic approaches will add insight to the processes of instructional pedagogy.” Only in-depth analyses could reveal the impact of some high inference teaching qualities (Lee, 1997).

Representations’ structural theory (Abric, 1993; Bergman, 1998; Flament, 1994) suggests that PE teachers have developed, in the course of time, their own **representations** regarding instruction; their own collective, consensual personal teaching theory (Bromme, 1984) in the form of a system. This system has two components: “the **central core** and the **peripheral elements**” (Abric, 1993, p. 75). The **central core** contains the PE teachers’ perceptions on learning, teaching, communication, evaluation, and pupils’ mistakes governed by instruction’s organizational principles (Moscovici, 1988).

Consequently, teachers’ perceptions formulate models (Abric, 1996), which are expressed in the representation’s **periphery** as teaching schemes that in turn become differentiated based on objectives, teaching-learning categories and interaction. In this vein, teaching schemes, as perceptual expression forms, revert to some kind of serial form during instructional conduct (Yongue, 1998), and have been of a particular interest among researchers dealing with didactics methodology (Daniel & Bergman-Drewe, 1998; Flanders, 1970, Flanders & Havumaki, 1960; Mosston & Ashworth, 1994, 2002; Mosston, 1966; 1981, 1992; Salvara & Biró, 2002b; Salvara, 2001b, 2002b; see Silverman, 2000, for a review, Tsangaridou & O’ Sullivan, 2003).

Acknowledging the suggestions made by Bogdan and Biklen (1998), and by Piéron (1994), **triangulation** was adopted in the present research design. The method of triangulation, involves the collection of data from multiple resources for all the subjects participating in a research, such as observation, interviews, questionnaires and documents used to crosscheck the results. Triangulation has been coined as the most

proper methodology for studying teachers' representations on instruction (Sotirakopoulou & Breakwell, 1992).

The body of literature on representations is clearly influenced by up-to-date studies concerned with teachers' perceptions on instruction that gained recognition and much endeavour, especially, during the 1990s (Lee, 1997). It appears that this orientation of research was apparently generated by the latest approach on constructivistic frameworks (Amade-Escot, 2000; Chen, 2001; Reynolds, 2000), which support that learning is a process where knowledge is constructed (Rink, 2001; Salvara & Biró, 2002b; Salvara, 1996, 1997a, 2000b), in a social environment (Amade-Escot, 2000; Grahaigne & Godbout, 1995; McCullick, 2000).

A small but growing number of studies on PE have investigated the effects of teaching on pupil learning and the employment of teaching styles during instruction (Byra & Jenkins, 1998; Byra & Marks, 1993; Cai, 1998; Curtner-Smith et al., 2001; Ernst & Byra, 1998; Goldberger, 1992; Salvara & Biró, 2002b; Salvara, Jess, Abbott & Biró, 2003). However, there has not been any multi-methodological published research with respect to teachers' representations on instruction in Greece and Hungary, especially comparative in nature.

Therefore, based upon current approaches and recommendations, the present research investigated the instructional act, aiming at the revelation of:

- (i) The PE teachers' perceptual models for the representations' organization principles, and
- (ii) The teaching style schemes that emerged during instruction, including the implementation of its characteristic features that occurred during the teacher-pupil interaction.

Furthermore, the present field/didactic research, conducted in the cities of Athens and Budapest, aimed at revealing the two semantic instructional frameworks, as well as at identifying any similarities or differences between the teachers in the two cities. These instructional frameworks could be characterized as multilevel and multipurpose (Salvara, 2001a, 2002b), consistent with the theoretical processing found in recent publications (Mosston & Ashworth, 2002) and employed in PETE (Metzler & Tjeerdsma, 2000; Tsangaridou, 2002).

The **comparison** between Athens and Budapest in terms of the two semantic instructional frameworks was “balanced” (Haag, 1986), because the analyses conducted were based on data that were gathered and interpreted with identical approaches. From the comparative analyses and the relevant information that will be hopefully gained by this research, a number of implications and applications might be suggested for the improvement of the teaching-learning process in PE, both within schools and during teacher preparation (Faulkner & Reeves, 2000; Kirk & Gorely, 2000).

Due to the pervasiveness of teacher efficacy (Kelly et al., 2000), it seems appropriate to begin viewing a little more critically at teachers’ beliefs and practices in order to “attempt to understand the consequences for PE pedagogy” (Kirk, 1993, p. 246). Nevertheless, within this research’s hopes is that in both cities local and governmental curriculum developers would promote improvements in their works.

### **1.1. Identification of the Problem**

In the course of time, PE teachers have compiled their personal representations, that is, their own consensual, common-sense “personal teaching theory” (Bromme, 1984, p. 178), as a structured set of instructional schemes that appear to have many similarities to each other (Marland, 1994). In this perspective, the similarities are two-fold and refer to **structure** and **function** (that is, the **Pedagogical Content Knowledge** and the **didactic system**).

The **structure** of representations involves the formation of perceptual models for learning, teaching, communication and evaluation, while the **function** refers to the formation of teaching styles and instructional practices (Abric, 1993, 1996; Salvara, 2001b, 2002a). In short, structure and function have been recently referred to as Pedagogical Content Knowledge (PCK), which integrates the teachers’ beliefs about the subject matter in connection to the content, pupils’ understanding of that content, instructional styles or strategies employed and curriculum (Ennis, 1996). The PCK stresses the teachability of PCK as an element of improvement for PE teachers, whereas the didactic system tries to identify the conditions and possibilities to change the practices. According to Amade-Escot (2000) “an important difference between the two agendas is the focus of didactics research on the content itself and its major role in the teaching system, whereas PCK focuses on the teacher cognition variable” (p. 94).

The introduction of both National Curricula in 1995 (IPEPTH, 1995; NCC, 1995) was undoubtedly the innovative attempt needed by Greece and Hungary. Both government-appointed curricula working groups stressed out the need for overall pupil development in the 21<sup>st</sup> century (Salvara, 1998b; Salvara, Bognár & Biró, 2002).

Among the Greek curriculum purposes, the dominant position is held by the psychomotor purpose (Presidential Decree 377/1995). It is the one that principally represents the Greek curriculum elements (Mountakis, 1994). Zouhnia (2000) and Papaioannou et al. (1999) have highlighted the fact that the curriculum lacks the fostering of physical abilities development. Two case studies developed by Salvara (1998c) and Salvara, Bognár and Biró (2002) on the given policy texts, suggested that the curriculum lacks the field-based methods for selecting and describing teaching (Corbin, 2002).

Within the Greek curriculum, despite the fact that activities are explained in detail, the pupil evaluation methods and instructional tools, which teachers could employ, are not described. The curriculum is characterized by a great quantity of activities. But, ‘does this quantity guarantee quality in instruction?’ However, it can be considered as a traditional curriculum with its objectives set and its targets allocated within generalized principles.

The National Core Curriculum (NCC, 1995) of Hungary is a unified subscribing framework and not a program having a simple explanation of targets to be implemented (MCE, 1996, 84-7). Its main purpose is the development of physical condition. NCC is based on the modern pedagogical concept of ‘open’ curricula that presuppose the active participation of PE teachers during instructional planning. Hamar (1998) stressed out that within the NCC of Hungary, PE is appointed as the 10<sup>th</sup> cultural domain. As a result, this newly contextual viewpoint establishes PE within the cultural significance of the country, “undertaking the roles of creating a balance in between healthy body and soul, educating healthy lifestyles, forming recreational and rehabilitative abilities” (Hamar, 1998, p. 70).

Therefore, it was one of the present research objectives to investigate how these **innovative contextual curricular changes** have influenced teachers’ beliefs and instructional practices. The investigation of instruction is of paramount importance in

order to construct pupils' achievement frameworks (Todorovich & Curtner-Smith, 2002). Furthermore, for researching current practices, with meaningful outcomes, collecting data through questionnaires, interviews and direct observation were the suggested method (Ward & Barrett, 2002).

Consistently with Curtner-Smith et al. (2001) suggestions, the preferable methods used in the present study were two systematic observation instruments and one interview. In addition, questionnaires were also included, but since, the singular use of questionnaires could lead to misleading outcomes because "there are differences between what people say and what they do" (Lawson & Stroot, 1993, p. 445), field didactic systematic approaches comprised the investigative core on the basis of which conclusions could be validly drawn (Ward & Barrette, 2002).

The present study has focused on questions that were thought of comprising unresolved mechanisms for the examination of teachers' representations on instruction. Specifically, the questions addressed were:

- (i) Which are the perceptual models formulated by the teachers in the two cities? What are the educational theories of the PE teachers (Tsangaridou & O'Sullivan, 2003)?
- (ii) How are they organized?
- (iii) Will teachers' personal teaching theory be differentiated? Which are those teaching practices adopted by the teachers? What are the characteristics of instruction? What are the practices of the PE teachers?
- (iv) Will teachers' practices formulate a spectrum? In what extent this spectrum develops learners' abilities: reproducing and assimilating with the execution paradigm; discovering the 'how's' and 'why's' of tasks; creating and producing unknown tasks (Jewett, 1994; Mosston & Ashworth, 2002)?
- (v) In what extent can these represented instructional realities meet the requirements of the curricula and contribute to the learners' overall development (Kirk, 1993)?

- (vi) How similar or dissimilar are the teachers' instructional representations regarding structure and function in Athens and Budapest? Will teachers' beliefs relate to their actions?
- (vii) Will curricula differences influence teachers' selections of teaching styles?
- (viii) Will teachers' representations differ with respect to a vector of factors considered, including teachers' gender, teaching experience, pupils' socioeconomic status at which teachers' taught and teachers' postgraduate studies? Are there any similarities?

The distinction of teachers' perceptual models on instruction, the teachers' employment of teaching styles and the teacher-pupil, as well as the interschool interaction are of paramount importance for meaningful didactic descriptions of the two cities' PE (Kelly et al., 2000).

Consistently, the reasons for this investigation were based on **three sound arguments**:

- A.** Perhaps PE teachers' **representations** with regard to structure and function might not be in sequential agreement. Even so, representations might comprise, in a lesser or greater extent, a medley. Likewise, they might be non-systematic or even contradictory in their appearance. As a result, this medley could have disastrous effects on instruction (Wagner, 1993).
- B.** There exist several studies suggesting that **pupils** present heterogeneity (Hare & Graber, 2000; Salvara, 2001b, p. 127, 2002a; Willis & Hodson, 1999, p. 75), meaning that each pupil learns different things, in a different manner and for different purposes. In this vein, pupils could be characterized by different thinking patterns and achievement orientations for the subject to be learnt (Papaioannou, 1994; Silverman, 1991; Todorovich & Curtner-Smith, 2002). Again, consonant with the work on pupils' learning, Coker (1996) suggested that pupils have their own ways of learning. For the learning process to be as efficient as possible, teachers should recognize their pupils' learning modes and adjust instruction accordingly (Coker, 1996; Woods et al., 2000).

Four contrasting general learning types have been described in current literature. Dunn and his colleagues (1989) have distinguished pupils to visual learners, kinaesthetic learners, thinkers and listeners. Pupils are expected to understand and internalize major

concepts and principles and on the same time to acquire cognitive and motor skills that will enable them to distinguish evidence from fantasy and reality from illusion (Gagné, 1964; Tamir, 1991). For this to be achieved it has been strongly supported (Mosston & Ashworth, 2002) that teaching styles should alternate and be variable (Salvara, 2001b, 2002a, 2002b). Consistent with constructivist theory, pupils' prior knowledge is an important factor for teachers to consider before planning teaching new concepts. Not to forget that construction of knowledge is a process that has to be undertaken by the learner (Hare & Graber, 2000).

**C. Investigating instruction** has many inherent difficulties, given the complexity of teaching circumstances (Falus, 2000; Piéron, 1994). Teachers are accountable for what happens in the class. They are the primary decision makers (Salvara, 2002b) and they define the tasks for pupils (Piéron, 1994). PE teachers need to make decisions in ever-changing situations and to perceive pertinent elements of given instructional situations, as well as to decide upon appropriate teaching styles to be used, in order to meet the curricular objectives (Salvara, 2001b, 2001c).

There is little doubt that PE teachers have understood the role and significance of perceptual models in the employment of teaching styles (Byra & Jenkins, 1998; Byra & Marks, 1993; Cai, 1998; Curtner-Smith et al., 2001; Ernst & Byra, 1998; Goldberger, 1992; Salvara & Biró, 2002b; Salvara, 2001b, 2002b). To date, a plethora of studies that investigated teacher effectiveness through interviews or survey research have indicated that teachers' are especially concerned about the variability in their teaching repertoire (Alexander & Luckman, 2001; Evans & Penney, 1993; Salvara, LeBlanc, Bognár & Biró, 2002; Tjeerdsma, 1997).

As yet, however, teachers are concerned about the appropriateness of style they selected for the given task to be taught (Boulton-Lewis et al., 2001; Kember, 1998; Leinhardt, 1989). It seems imperative, as appointed from up-to-date studies in their future implications, to investigate teachers' instructional representations with regard to structure and function (Abric, 1993; Boulton-Lewis et al., 2001; Frank, 1998). Additionally, Corbin (2002) in his article on lifelong pupil promotion of physical activity has suggested that, studying the beliefs of PE elementary teachers has great impact on field-based instructional methods.

Lambdin and Steinhardt (1991) reported linear relationships between teachers' stated goals, their expertise, the taught curriculum, and pupil achievement, although these assumptions have not been empirically tested. Lawson (1990) has claimed that, "research needs to consider teachers as individuals who think and act within the context of their own history and current environment" (p. 15). In this perspective, the present research included the investigation of representations so as to identify asymmetries, apparent deterministic relations and time sequential occurrences. Moreover, this study provides with the possibility to evolve instructional contexts (Howarth, 2000). It is clear from relevant literature that this type of investigation could not be conducted with experimental instructional research. Instead field research in a naturalistic type setting is currently advocated (Babbie, 1998; Byra & Marks, 1993; Gibbons & Ebbeck, 1997).

Moreover, only field type didactic naturalistic setting can reveal the PE teachers' representations in terms of structure and function (Rumelhart & Norman, 1980) structured in accordance with the social entity and in tally with the sport pedagogy science contextual settings (Abric, 1996; Doise, 1978; Farr, 1993; Haag, 1994, 1995; Jewett, 1994; Jodelet, 1989; Mosston & Ashworth, 2002; Salvara & Biró, 2002b; Salvara, 2002b).

Didactics research studies the transformation from the academic knowledge to the knowledge taught, their effects on practice and their possible improvement in teaching. The didactics of PE investigates the specific phenomena of transmission and appropriation of knowledge know-how. It is organized around two main orientations: to design new content in PE and to better understand how the didactic system works (Amade-Escot, 2000). The first orientation is to develop new approaches. The aim is proposing new curricula. This orientation is not included within the scope of the present research and, therefore, will not be investigated. However, curricula are studied, not with an aim to produce new, but to produce pedagogical reasoning and action appointed from the results. The second research focus is to study the PE system with an aim to understand how it works (Dodds, 1994).

To this, researchers at the macro-level examine curricula and pay attention to the transformations that knowledge and social practices undergo when the subject matter delivered from the academic discipline to the school discipline. At a meso-level,

researchers study the teachers' conception of the content, to what they elect to teach. Finally, at the micro-level, researchers are concerned with the implementation in the classroom. Studies underscore the heterogeneity of didactic conceptions (Rovegno, 1991). The analysis of didactic interactions is the oldest sector of research on the didactics of PE. The observation and decoding of volunteer teachers and their pupils characterize the functioning of the didactic system of PE. Consistencies in the difficulties encountered in day-to-day instruction are revealed. Furthermore, the present research includes all levels of didactic research practices, in order to reliable study the two countries systems.

There have been many conceptual frameworks that have attempted to describe instructional processes (Flanders, 1970; Mancini, 1974; Mosston, 1966; see Ward & Barrett, 2002, for a review). Based on research of the past two decades and in different parts of the world, there is evidence that Hungarian and Greek instructional teaching and learning behaviours with respect to teaching styles' employment have not been thoroughly investigated, with the exception of some published research developed only recently (Salvara & Biró, 2002b; Salvara, 2001b, 2002b). The significance of such investigation stems from the evidence, that data-based linkages can be established between selected teaching styles and learners' development (Goldberger, 1983; Salvara, LeBlanc, Bognár & Biró, 2002).

Utilization of interaction analysis with systematic observation instruments in an attempt to ascertain the instructional communication components and patterns is not a relatively new method. Yet, however, its application along with other research tools, such as survey, has been suggested, in order to increase the validity of a research design (Haag, 1986). Heinilá (1977) stated that the purpose of observational research focuses on three main revelations:

- (i) To describe analytically the didactic phenomenon of teacher-pupil interaction,
- (ii) To describe those factors, which influence the teaching-learning process, and
- (iii) To study and to develop methods for modifying the factors affecting the teaching-learning process.

Through observing and interpreting overt human behaviours, it is possible to determine the teacher-pupil relationship and the involvement in prescribed programs and reach tentative conclusions about their effectiveness (Cheffers, 1977).

## **1.2. Purposes of the Research**

The main purpose of this research was to investigate PE teachers' representations on instruction in Athens and Budapest for both levels of structure and function, and subsequently to compare them. The lack of research on the important topic of the teachers' representations on teaching and learning, as well as the lack of studies concerned with teachers' employment of teaching styles explains the need for further analysis (Byra, 2000). In this vein, the purposes of this study were as follows:

### **A. At the level of structure:**

**A(i).** To investigate teachers' perceived importance and the frequency of employment as measured with the application of the Physical Education Teachers' Representations on Instruction Questionnaire- PE-TRIQ I (importance) & PE-TRIQ II (frequency of employment) for learning, instruction, communication, pupils' development, evaluation and manipulation of mistakes (Salvara & Biró, 2002a, 2002c).

**A(ii).** To construct the PE teachers' perceptual models on instruction in both cities.

**A(iii).** To compare the PE teachers' representations structure between the two cities.

### **B. At the level of function:**

**B(i).** To demonstrate the PE spectrum of teaching styles employed in Athens and Budapest as coded with the application of the Instrument for Identifying Teaching and Learning Behaviours -I ITLB (Salvara, 2000b, 2001a, 2002a, 2000b; Salvara & Biró, 2002b).

**B(ii).** To analyze the teacher-pupil interaction, that is, verbal and non-verbal, regarding the organizational structures, the didactic work, the communicational direction, the forms of instructional appearance as coded with the Cheffer's Adaptation of Flander's Interaction Analysis System-CAFIAS (Salvara, 2001b).

**B(iii).** To compare the function as revealed in Athens and Budapest.

### **C. At the level of didactic system:**

**C(i).** To determine the relations between the revealed PE teachers' perceptual models functioning in the centre of representations, as well as the teaching styles, structured in the periphery of representations.

**C(ii).** To compare the relations found in the structural and functional levels in Athens and Budapest.

## **Chapter 2. Review of Literature**

Research and theory provide abundant descriptions and findings that PE teachers' representations, with regard to the structure and function, operate in a three-fold way. Firstly, as a **hermeneutic system** of instructional reality, which allows PE teachers to explain their didactic selections (Doise, 1993; Flament, 1994). This hermeneutic system configures a common instructional framework, which determines the teaching styles that teachers' employ during instruction (Doise, 1973; Doise & Mugny, 1979). Secondly, as a **construction system** of instructional identity, which differentiates the PE teachers in Athens and Budapest with regard to their representations' organizational principles and the teaching styles they employ, while allows for comparisons between them (Mugny, 1985). Thirdly, as a **pre-codification system** of instructional behaviour, which produces predictions and speculations, while it determines the teaching styles to be adopted by each teacher group (Flament, 1994).

For the formulation of PE teachers' representations' dynamics, decisive role is played by:

- (i) The **instructional frameworks** tally to theory and research with regard to instruction in PE (Haag, 1986; Howarth, 2000; Piéron, 1994; Rink, 1998, 2001; Tsangaridou & O' Sullivan, 2003) and
- (ii) The **PE National Curricula** (IPEPTH, 1995; NCC, 1995) that each country has brought to forth as an expression of its educational philosophy, the learning and teaching theories as well as the teachers' beliefs and experiences (Faulkner & Reeves, 2000; Gee, 1994; Graham et al., 1993; Hastie & Siedentop, 1999; Kirk, 1993; Lambdin & Steinhardt, 1991; Matanin & Collier, 2003; Rikard & Veal, 1996; Rink, 2001; Silverman, 1994; Tjeerdsma, 1997; Woods et al., 2000).

## **2.1. Physical Education Teachers' Representations Dynamics**

PE teachers design, apply and evaluate their instruction based on the representations they have in their minds (Abric, 1996). According to Moscovici (1973), representation is a system of values, ideas and practices embracing a dual function. Firstly, representation establishes an order, which enables individuals to orientate themselves and master their material social world. Secondly, it facilitates communication among the members of a community by providing them with a code of the various aspects of their world and their individual history (Sotirakopoulou & Breakwell, 1992).

This “multifaceted concept” has been strongly supported by Wagner (1993, p.1). On the one hand, representation is conceived as a social process of communication and discourse, in the course of which meanings are generated and elaborated. On the other hand, it is seen as an individual attribute, as an individual structure of knowledge and affect, which is shared with other people in a group or a community. Representation’s versatility stems from a particular openness of the theory, which according to Moscovici (1988) and Farr (1993) encompasses the precondition for further development and elaboration. Farr (1990) concluded that representation indicates a specific form of knowledge; moreover, it indicates common-sense knowledge, a form of social thought.

In this perspective, Wagner (1993) stated that, “representations do not account for the behaviour of individuals *per se*, but only for the behaviour of individuals *qua* members of social groups” (p. 236). As such, Moscovici (1984) holds that representations “do not mediate stimuli but they are stimuli themselves and therefore independent variables in empirical investigations” (p. 60). The property of representations as independent variables makes them a prime candidate to explain collective behaviour on a group level in research of a given population (Echebarria & Gonzalez, 1993).

The term ‘representation’ is being used in cognitive psychology to indicate the way information about the world is mentally represented in our cognitive system through act, image and symbolic codifications (Bruner, 1966) in the form of schemes or schemata (Yongue, 1998), which are hierarchically organized and direct our actions.

Schemes, as representation forms, might be acknowledged:

- (i) As **active organizations**, found at the base of any action (Bartlett, 1932).

- (ii) As **structured programs** that, when challenged, provide the basis for decision-making, organizing actions and appreciating outcomes (Shapiro and Schmidt, 1982).

In this vein, schemes function as active structures of information processing. They also function as situation analyzers (Rumelhart & Norman, 1980), that is, they formulate frameworks of stereotyped actions, in the form of scenarios for every teaching situation (Yongue, 1998). Moreover, schemes produce constructs of personal theories, which guide our actions. Cognitive psychology views have been claimed by social psychology as one-sided (Doise, 1993). Consistently, social psychology indicated that this explanation hardly consider the social conditions, which primarily halt the procedure, whereby representations are acquired (Doise & Mugny, 1979; Moscovici, 1994).

Theory and research on representations (Flament, 1994) utilise both components, that is, they involve both the cognitive and the social components. In this view, representations are defined as socio-cognitive structures, common among the members of a group (Abric, 1993; Bergman, 1999), as in the cases of the PE teachers in Athens and Budapest, who become unified in two different groups on the basis of nationality, culture, education system and PE curriculum. PE teachers' representations incorporate a basis of knowledge about the teaching-learning processes, which is elaborated and spread among the members of the group and contributes to the construction of a common teaching reality (Jodelet, 1989). However, representations are necessary in routine teaching acts. It is through them that teachers and learners read and decode a given teaching practice and adjust their behaviour accordingly (Wagner, 1995).

Given that representation embraces anything related to PE teachers' collective thought on teaching and learning, and that it is the outcome of cognitive processed, experienced and commonly accepted knowledge (Moscovici, 1994), then it can be regarded as a tool used by the two groups of PE teachers, in Athens and Budapest, included in the present research to understand their employed teaching practices (Abric, 1996).

A further explanation on representation is that it contains meanings and icons for all instructional factors (Abric, 1993). It appears more likely, that PE teachers, in order to make their thoughts and ideas applicable in the field, tend to create an image of the actions for their instruction (Abric, 1996). These images are followed by constructed

perceptions ready to be applied in practice (Moscovici, 1994; Mosston & Ashworth, 2002), which ‘obey,’ more or less, to one-landmark cluster theory of teaching styles (Mosston & Ashworth, 2002). These constructed perceptions are known as representations (Moscovici, 1994; Shulman, 1999).

A basis for the configuration of representations is the critical faculty that representation directly depends on the status applied by the educational system. In order to form representations, it is essential to integrate a multitude of codification regarding action, visual perceptions and verbal application (Bruner, 1966). In their study, Sotirakopoulou and Breakwell (1992) mentioned, “the fact that social representations acquire meaning, structure and image through verbal expression and communication creates one more complexity that has to be taken into account in the selection of the methodology” (p. 30). However, representations are, in fact, thinking systems that do not simply represent opinions, pictures and postures. By contrast, they are theories for the organization of reality (Moscovici, 1994).

It is suggested (Moscovici, 1994) that the representation system has coherence and balance. It summarizes and categorizes complex teaching situations. Additionally, it incorporates contradictions and it changes and evolves. When a group of teachers expresses its opinion in relation to a teaching style, the system reconstructs the representation involved, in such a way, that it could be coherent with the configured conceptions (Moscovici, 1988). There is no *a-priori* objective teaching reality. Instead, the teaching reality can be represented, assimilated by the group of teachers and reconstructed in its passage through time. PE teachers’ representations on teaching and learning are a product of cognitive processed activity that an educational group reconstructs given the specific teaching reality of its nation (Abric, 1996).

In this vein, the aforementioned teaching reality has got its own structure. The organizational principles of teaching practice are constituents of this structure. The organizational principles work in a generative and stabilizing manner (Abric, 1993; Flament, 1994). They determine the teaching styles that teachers employ during instruction. A considerable number of studies (De Rosa, 1994; Jodelet, 1989) have validated the fact that the composition of teaching identity indicates the presence of varied representations, determined by the specific organizational principles that are

directly oriented by the given instructional situations, the PE teacher's personality, their colleagues, and the curriculum of each country (Molinary & Emiliani, 1996).

In short, representations have two components: "the central core and the peripheral elements" (Abric, 1993, p. 75). Their organization, as well as their functioning, is governed by a double system: the **central system** and the **peripheral system**. Both systems function as an **entity**, each part having a specific but also a complementary role towards the other. The **central system** or core (Heider, 1958) has a consensual function. It is through the central system that the homogeneity of a social group is achieved and defined (Abric, 1993). It is stable, coherent (Flament, 1994), and it resists changing as it is historically marked and it is relatively independent of the explicit nature of representation. The core forms the element that determines the teaching styles schemes during instruction. However, any apparent change in the central system principles involved causes overall alterations in representations, which occur as a subsequent modification in the peripheral system, that is, the teaching styles employed during instruction (Salvara, 2002a, 2002b).

Round the core, representations' **peripheral system** is found to be salient (Abric, 1993). Abric (1993) indicated that the peripheral system "constitutes the indispensable complement of the central system which it depends on" (p. 76). It is much more flexible than the central elements. It permits a given individual modulation of representation. This flexibility allows for individual variations linked to the personality characteristics of teachers. In this vein, peripheral elements are adaptive and relatively heterogeneous (Doise & Mugny, 1979).

PE teachers, under any given teaching situation, cause the projection of specific teaching styles, as an expression about their perceptions of learning, teaching, communication, performance, evaluation and the handling of pupils' mistakes. The identification of the central nucleus allows for comparison between representations at the level of organizational principles regarding teaching practice (Abric, 1993, 1996). In specifically, the constitution of teaching styles plays a prominent part in realizing the sense and explanation of representation as well as in explicitly stating and justifying representation's sense (Bergman, 1999). From this perspective, it seems that teaching

styles mediate between the central nucleus and the teaching situations. Teaching styles assemble three functions:

- (i) They **concretize** the representations;
- (ii) They **regulate** adjustments depending on the teaching circumstances, and
- (iii) They **constitute a defence shield** in the form of ‘buffers’ during the transformations of representation (Flament, 1994).

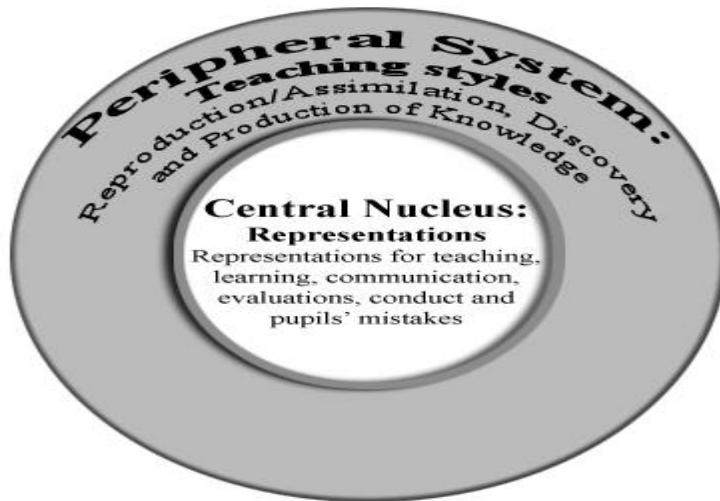
Consequently, the organizational principles and the teaching styles schemes function in unison. The schemes of teaching styles are formed and operate round the organizational principles, which safeguard uniformity in teaching action. Teaching styles are sets of actions with intent. They are product-oriented and institutionalized in relation to roles. Thus, representations are experienced peripherally in the form of teaching styles (Abric, 1993).

In support to this, certain authors have advocated (Bergman, 1999; Wagner, 1993), that the organizational principles play a part in the stability, coherence, duration and conservation of representations, while the teaching styles depend on the teaching circumstances and the individual characteristics of the PE teachers. As a consequence, teaching styles may be adjusted, differentiated and altered (Bergman, 1999). It appears that the organizational principles and the schemes of teaching styles mutually exist and function as the representations’ multiple systems (Bergman, 1998).

It has been strongly supported that representation accompanies teaching style, while, at the same time, it precedes and informs it, gives form to it, justifies and rationalizes it (Abric, 1996). To this, it is has been argued that organizational principles **only organize** teaching styles. On the contrary, organizational principles **construct** teaching styles, when these are well constituted and possess the scheme of a product-oriented action base (Flament, 1994).

In short, the literature on representations has proposed two controversial positions: (i) Organizational principles are determined by the teaching styles. They are mere reflections of production procedures (Beauvois et al., 1991; Ibanes, 1989). (ii) Teaching styles are determined by the organizational principles (Abric, 1993; Jodelet, 1989; Moscovisi, 1988).

Figure 1 displays the schematic depiction of representations' integrated system (Salvara, 1996, 1997a).



**Figure 1.** Representations in a Diagrammatic Depiction

The evidence so far, supports the existence of a deterministic relationship between the teaching styles and the organizational principles, in instances where the latter consist of representational acts, that is, a set of habitual teaching styles, in a routine form, a product of the collective perception, applied with the group consensus, within a framework of relative autonomy, which allows for varied and contradictory options. It is supported that, when the role played by the organizational principles increases in importance, the more complicated and dilemmatic the situations faced by PE teachers become (Abric, 1996), as in the case with every teaching situation. To this, Piéron (1994) stated that, “teaching is a very complex activity” (p. 73). The organization of representations is presented in Table 1.

**Table 1.** Representation's Structural Elements

Central nucleus	Peripheral system
<b>Organizational principles of teaching practice</b> <ul style="list-style-type: none"> <li>- Organizational principles form a common basis, which is connected with the collective perception and reflects the homogeneity of teaching practice.</li> <li>- Organizational principles are stable and coherent, while their role is regulatory.</li> <li>- Organizational principles are of generative character and determine the organization of representations.</li> </ul>	<b>Teaching styles</b> <ul style="list-style-type: none"> <li>- Teaching styles are susceptible to trans-individual differences and reflect the heterogeneity of teaching practice.</li> <li>- Teaching styles are pliable and flexible, while their role is functional.</li> <li>- Teaching styles consist of representational acts adjusted to teaching situations.</li> </ul>

In the investigation of teachers representations on instruction two methodological approaches were implemented: (i) the structural (Flament, 1994; Jodelet, 1989), in order to reveal the “collective map” of instruction (what is happening) (László, 1997, p. 156; after Doise et al., 1993) and (ii) the socio-dynamic (Doise, 1978), in order to explain the instructional function (how it happens; on what purpose; which are its characteristics; what it aims at) (Dick, 1980).

The embedment of both methodological approaches will enable (i) to ascertain the construction of the spectrum of teaching styles that PE teachers employ in Athens and Budapest; (ii) to relate the point at which the spectrum is in use with the organizational principles that govern instruction, and (iii) to export the systematic observation indices for spectrum’s quality. The combination of the two approaches has been claimed as mandatory in the investigation of specific populations (Molinari & Emiliani, 1996), such as the PE teachers in Athens and Budapest.

### **2.1.1. Physical Education Conceptual Semantic Instructional Frameworks**

There are many conceptual frameworks that have attempted to describe and organize the processes involved in teaching (Dick & Carey, 1978; Gagné, 1977; Mosston, 1966, 1992; Wessel & Kelly, 1986; see DeMarco & McCullick, 1999, for a review). In addition to these conceptual semantic frameworks, there also exists, considerable literature related to the instructional effectiveness of teachers (Housner, 1990; Reynolds, 2000; Rikard & Veal, 1996). According to Boyce (1992) “the frameworks and effective teaching behaviour cannot be viewed separately, as both contribute to the teaching and learning environment” (p. 389).

Research on PE semantic frameworks has primarily evolved the teachers’ perceptual models and teaching styles in the form of an instructional spectrum (Boyce, 1992; Curtner-Smith et al., 2001; Goldberger, 1992). In addition, the literature coming out of psychomotor learning clearly alludes to the idea that learning occurs with the combination of perceptual, cognitive and emotional personality components (Schmidt, 1975). In this context, the semantic PE frameworks are hereby presented:

### ***Physical Education Semantic Framework by Strzyzewski (1982)***

Strzyzewski (1982) framework was grounded on pupils' intrinsic activation and consists of three perceptual models. Furthermore, these three perceptual models establish different teaching styles and instructional practices.

- (i)     **Closed tasks accurately defined**, with teachers' external guidance. Pupils have no participation in the decision-making processes.
- (ii)    **Tasks partial defined** that combine teachers' guidance with learners' autonomy.
- (iii)   **Open tasks** that conquer pupils' autonomy and creative thought.

The closed task model denotes reproductive teaching styles, whereas pupils perform under teacher's commands or when the teacher demonstrates the task and explains, while pupils reproduce the task individually. The partial defined task model involves teaching styles focusing on games, imitative activities and cooperative learning. Finally, the open task model is characterized by teaching styles, which ensure creativity, critical thinking, thinking skills and solving tasks.

### ***Physical Education Semantic Framework by Mosston and Ashworth (2002)***

This conceptual framework has been widely employed and has undergone a series of refinements since its conception in the mid 1950s (Goldberger et al., 1982; Mosston & Ashworth, 2002). Mosston's spectrum of teaching styles is a framework of teaching approaches derived from the chain of decision-making occurring in the teaching-learning interaction. Mosston and Ashworth (2002) theorized that specific teaching styles emerge based on whether the teacher or the pupils make these decisions (Curtner-Smith et al., 2001). Spectrum theory suggests that there are two instructional directions alternating in the teacher-pupil interaction. At one end of the spectrum pupils make all the decisions and at the other end all the decisions are made by the teacher (Curtner-Smith et al., 2001; Mosston & Ashworth, 2002; Salvàra, 2002b).

Mosston and Ashworth (2002), suggested that, by "identifying the vast possibilities of decision-making and understanding the possible combinations of decision patterns can provide us with insights into the structure of the possible relationships between teacher and learners and the consequences of these relationships" (p. 11). It seems that, the level

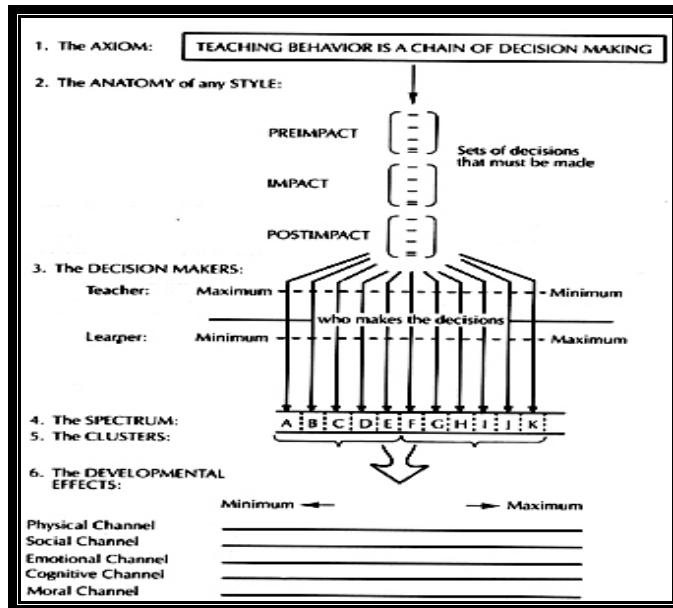
of participation in the decision-making process constructs groups of teaching styles that have different target assessments and different teacher and pupil behaviours. In this vein, Mosston and Ashworth have identified two clusters/models of landmark styles.

The styles in the one cluster/model are known as reproductive, because within them pupils reproduce information demonstrated by the PE teacher (Salvara, 2001b). In the reproductive model there is only one correct way of execution. Plenty of academic - learning-time is devoted to practice tasks. During learning, short-term memory is embedded, while feedback is focused on the reproduction of the one way of execution of a given task. Reproductive class climate is favouring task repetition and mistakes limitation (Brady, 1998). In contrast, the styles in the second cluster/model are known as productive, because pupils produce knowledge that is not known; “knowledge that is new to the learner, new to the teacher and at times new to society” (Mosston & Ashworth, 1994, p. 5). This cluster aims at having pupils explore and explain tasks. It also aims at having pupils create multiple solutions on a problem-task. Plenty of academic learning time is attributed to critical thinking and to the exploration of thinking skills (Brady, 1998).

Consistently, during productive learning, long-term memory is stimulated, involving cognitive processes such as contrasting, comparing, categorizing, hypothesizing, drawing conclusions, following a divergent or convergent thought. The process of feedback is focused on the production of multiple ways of execution of given tasks. Productive class climate favours individual differences, while knowledge attainment moves beyond the already known (Byra, 2000; Salvara, Bognár & Biró, 2003).

Mosston and Ashworth (2002) have distinguished different teaching styles (see Curtner-Smith et al., 2001, for a review). Each teaching style is unique because it has its own decision-making process, where teacher and pupils operate under different sets of conditions. Briefly, Mosston organized decisions regarding the teaching-learning process into three sets: (i) pre-impact, before instruction occurs, related to the planning of decisions; (ii) impact, during the instruction, related to the execution of decisions, and (iii) post-impact, after instruction, related to the assessment of decisions. Thus far, ten discrete teaching styles have emerged as a result of this decision chain (Boyce, 1992; Mosston & Ashworth, 2002). It is noteworthy that, “decisions always influence

what happens to people, each style affects the developing learner in unique ways" (Mosston & Ashworth, 1994, p. 6). Figure 2 displays the structure of the spectrum of teaching styles. The definitions of the ten teaching styles are displayed in Table 2.



**Figure 2.** The Spectrum of Teaching Styles (Mosston & Ashworth, 1994, p. 4)

**Table 2.** Teaching Styles Managerial Definitions

<b>COMMAND:</b> The teacher makes all the decisions; demonstrates or explains a task for the pupils to emulate, then directs pupils' practice by giving commands. Pupils 'shadow' the action of the teacher.
<b>PRACTICE:</b> The teacher demonstrates or describes a task. Subsequently, pupils practice the task at their own pace. The teacher provides pupils with feedback, as they practice.
<b>RECIPROCAL:</b> The teacher demonstrates or describes a task. The pupils practice in pairs. One pupil (the doer) practices while the other pupil (the observer) provides feedback for his partner based on chart criteria given by the PE teacher.
<b>SELF-CHECK:</b> The teacher presents a task. Pupils practice at own pace and are responsible for analyzing their own performances. Teachers' role is to help pupils hone their self-evaluation skills.
<b>INCLUSION:</b> The teacher models a task with several levels of difficulty. Pupils choose the level of difficulty at which they feel more comfortable. Pupils are encouraged to decide when to proceed to a new level of difficulty.
<b>GUIDED DISCOVERY:</b> The teacher asks a series of questions or sets a series of physical problems that when answered or solved lead the pupils to discover a desired skill or concept.
<b>CONVERGENT DISCOVERY:</b> The teacher asks a question or sets a physical problem to which there is one possible answer/solution.
<b>DIVERGENT PRODUCTION:</b> The teacher asks a question or sets a physical problem to which there are many possible answers/solutions.
<b>LEARNERS' DESIGN:</b> Pupils perform a series of tasks organized into a personal program under PE teacher's guidance.
<b>LEARNER-INITIATED:</b> Pupils initiate a design, experience it, perform it and evaluate it together with the teacher based on agreed-upon criteria.

*Note: Parts were adopted from Mosston & Ashworth (2002) and Curtner-Smith et al (2001)*

The semantic frameworks of Strzyzewski (1982) and Mosston and Ashworth (2002) have attempted to overcome the dichotomy between the perceptual models and the teaching styles, as both involved multi-exemplar expression forms. Kuhn (1970) was the first to employ the term 'example.' Kuhn specialized its content, so that the term defines recognized scientific endeavours. In this perspective, Kuhn tautologized the

development of science with the example prevalence. However, Kuhn's standpoint has been, thereafter, criticized and claimed as out-of-date. Currently, it has been advocated that scientific problems should focus on the formulation of a multi-exemplar dimension, both theoretical and methodological, so that scientific problems could be multifariously accessed (Lawson, 1999; Siedentop, 2002).

The semantic framework of Mosston and Ashworth (2002) has been unanimously accepted as an instrument for scientific endeavour employed during instruction (Byra & Marks, 1993; Cai, 1998; Curtner-Smith et al., 2001; Ernst & Byra, 1998; Goldberger, 1992). Congruently, the confirmation of the framework's theoretical assumptions continues to be critical (Byra & Jenkins, 1998), given that the perceptual model of production has been claimed as virgin territory for both the instructional reality and research (Byra, 2002; Goldberger, 1992).

The vast majority of researchers in the field of PE instruction have emphasized the significance of the continued investigation on the PE teachers' beliefs (Catderhead, 1996; Lee, 1997; Shulman, 1986; Tsangaridou, 2002). Consequently, PE teachers' perceptual models and their employed practices could be reconstructed with substantial reasoning (Tsangaridou & O'Sullivan, 2003).

#### **2.1.1.1. Physical Education Teachers' Perceptual Models: Enacted Pedagogical Content Knowledge (PCK)**

Tsangaridou (2002) in her paper described the perceptual frameworks that teachers acquire within their own classroom practice, the knowledge that informs them to employ the instructional styles, tactics and routines that they do, as their PCK. Specifically, PCK has sometimes referred to as 'craft knowledge' (Catderhead, 1996; Shulman, 1986), 'wisdom of practice' (Shulman, 1986), or 'practical knowledge' (Elbaz, 1991).

In a recent review article of Amade-Escot (2000), it was suggested that PCK is embedded in the practice of teaching and it is composed of ultimately linked and integrated knowledge, beliefs and experience. Consistently, Grossman (1989b) defined PCK as "...the overarching conceptions of what it means to teach a particular subject, knowledge of curricular materials, knowledge of pupils' understanding and potential

misunderstanding of a subject area, and knowledge of instructional strategies and representations for teaching particular topics” (p. 25).

Parallel to Grossman, Shulman (1987) defined PCK as “that special amalgam of content and pedagogy that is uniquely the province of teachers, their own special form of professional understanding” (p. 8). In this view, according to Tsangaridou (2002) teachers’ knowledge includes “the most useful forms of representations of those ideas, the most powerful analogies, illustrations, examples, explanations and demonstrations-in a word, the ways of representing and formulating the subject that makes it comprehensible to others” (p. 22) (after Shulman, 1986).

Consistently, up-to-date research on PE teachers’ perceptual models regarding learning, instruction, communication, learners’ development, evaluation and manipulation of mistakes is based on learning theories, such as the theoretical models (see Salvara, 1996, 1997a; Salvara, Bognár, Biró & Salvaras, 2002; Vosniadou & Brewer, 1987, for a review) of Skinner (1963) on behaviourism, of Bandura (1986) on assimilation and observation of a pattern, of Bruner (1966) and Gagné (1964) on cognitivism and Piaget (1967) on constructivism.

Moreover, PE teachers’ perceptual models express a well-structured formulated theory that guides teachers to select among specific teaching styles during instruction (Amade-Escot, 2000; Grossman, 1989a; Tsangaridou, 2002; Tsangaridou & O’ Sullivan, 2003).

### **2.1.1.2. Teaching Styles Employment in Physical Education**

Teaching styles, as expressions of different perceptual models, differ in their targets and in their instructional operations, that is, in the teaching and learning behavioural categories, which control, in different ways, the teacher-pupil interaction (De Marco & McCullick, 1999; Goldberger & Howarth, 1993).

In this perspective, teaching styles have two dimensions: the **functional** and the **communicative**, which interweave during instruction (Habermas, 1986). Consistently, researchers that studied the functional dimension of interaction (Boyce, 1992; Byra & Jenkins, 1998; Byra & Marks, 1993; Cai, 1998; Ernst & Byra, 1998; Martinek et al., 1977) identified and coded the **analysis units**, which denote instructional actions such as demonstration of a task or explanation on a task.

Consequently, the analysis units were grouped in **teaching and learning behavioural categories** (-usually up-to twenty-) formulating a systematic interaction analysis instrument that could be employed to code teacher and pupils non-verbal interaction (Anderson et al., 1996; Curtner-Smith et al., 2001; Graham, 1989; Salvara, 2001b, 2002b; Salvara & Biró, 2002b; Silverman et al., 1992).

Employing instruments for coding PE settings, allow for the identification of the teaching and learning behaviours displayed during instruction and the sequential appearance of these. Moreover, the employment of coding instruments permits researchers to formulate functional categories, that is, teaching styles (Glaser & Strauss, 1967; Salvara & Biró, 2002b).

On the basis of instructional targets, e.g. the development of pupils' imitative abilities, the development of learners' critical thinking or the development of cooperative learning, teaching styles construct a spectrum, which is shorted in groups (Amade-Escot, 2000; Salvara & Biró, 2002b). This pliability assures variability in teaching practices, while it contributes to quality instruction (Goldberger, 1992; Mosston & Ashworth, 2002; Salvara, 2001b).

In contrast with 'functional' researchers, 'communicative' researchers (Flanders, 1970; Gusthart & Springings, 1989; Kneer, 1986; Koppich & Kerchner, 1999; Manross & Templeton, 1997; Mead, 1934; Rikard & Veal, 1996; Rink et al., 1994; Rink, 1993, 1994, 1996, 2001; Siedentop et al., 1994; Tjeerdsma, 1997; Werner & Rink, 1989) investigate the communication forms between teacher and pupils. Three **communicative forms** can be identified in literature:

- (i) The **forceful**. Its main interest is the transmission of the message (Fiske, 1989). It introduces conventions (-for the task to be learnt and the way it is going to be learnt-), while it follows an introductory thinking in a unidirectional direction.
- (ii) The **logical necessity**, as a result of communication. Its main interest is the investigation of the message (-the how's and why's of tasks-), while it follows a bi-directional communication (Dyson, 2002).
- (iii) The **cooperative** communication. Its main interest is the production of new messages, while it transforms to previous knowledge. It relies on a metacognitive level (Anderson, 1984) with a looped communicational direction.

Since 1970s, the pliability of published research in PE have targeted at the communicative aspect of instruction for studying the teacher-pupil interaction. Initially, the system of investigating verbal interaction developed by Flanders (1970) was much in use. However, Flander's Interaction Analysis System (FIAS), due to certain limitations, was scrutinized and criticized, early after the year of its development. The main objection was the limitation of FIAS at investigating only the verbal behaviours, without taking into account the non-verbal interaction.

With the Cheffer's Adaptation of Flander's Interaction Analysis System (CAFIAS), developed by Cheffers (1977), both verbal and non-verbal interactions are coded. In a recent study (Salvara, 2001b) it was found that the categories, during which the PE teacher informs, introduces, explains and guides pupils accounted for the greater percent of the recorded intervals. In contrast, teacher's acceptance of pupils' ideas and emotions, as well as pupils' development of initiatives hardly ever were discerned among the recorded intervals (Salvara, 2001b). Pupils' contribution was kept to 40% compared to that of teachers that reached 60% of the recorded intervals. Pupils' contribution was mainly non-verbal. Anderson (1975) reported similar results.

CAFIAS enriched and modified by Salvara (2001b), has been employed in the present research, amongst other instruments, to identify the verbal and non-verbal behaviours of the different teaching style schemes encountered. The investigation of instruction's functional dimension with regard to interaction, could primarily inform researchers on the characteristic features occurring during instruction, that is, teaching schemes fundamentals (Salvara, 2001b). Interaction analysis has lost much of its appeal. However, it is still used to control the teaching process in multidimensional studies in different geographical areas (Anderson & Barrette, 1978, 1980; Dunham & Makszin, 1990; Gusthart et al., 1997; Lee & Solmon, 1992; Piéron, 1994; Schempp & Choi, 1994; Silverman et al., 1992).

### **2.1.2. Curriculum Theory-Beyond the Objectives Approach?**

Various curriculum models exist in the area of PE (Hellison, 1985; Jewett & Mullan, 1977; Jewett, 1994; Lambert, 1999; Siedentop et al., 1986), all having slightly different primary goals. Based on the curriculum goals, teachers select program objectives and determine the process and the product of curriculum to be taught (Kovar et al., 2001).

Kovar and her colleagues (2001) suggested, "...many, if not most, physical educators view curriculum as an end in itself rather than a means to an end" (p. 114).

Kirk in his study (1993) analyzed curriculum objectives and offered alternative approaches to curriculum work. Siedentop et al. (1994) suggested that "...the delivery of curriculum to pupils through instructional classes represents the major professional task for teachers and it occupies the majority of their time" (p. 375). Curricula comprise the basic tools for instructional planning, conduct and evaluation. The structural elements of a modern curriculum are its purposes and goals, its content, its instructional methodology, and its evaluative tools (Buschner, 1994; Vrettos & Kapsalis, 1999).

Orientations (Jewett & Bain, 1985, pp. 21-39 for a review) in PE curricula include: (i) the disciplinary mastery perspective, which is the most traditional approach (priority is given to the subject-matter); (ii) the self-actualization perspective (the direction is towards the individual learner, individual autonomy and self-direction); (iii) the social reconstruction perspective (the priority is placed on society); (iv) the learning process perspective (the priority is placed on the process on learners as well as what is learned); and finally (v) the ecological integration perspective (based on the assumption of unique individual). This perspective advocates balanced priorities between individual and societal concerns (see Jewett, 1994, for a review).

Curricular purposes could be one or many and could comprise generalized principles or could be oriented towards future demands. Purposes could be further analyzed to specific goals or to goal-phases that define the general or the detailed demands (Locke & Lathan, 1990). Selection of content is based on criteria, such as 'life-long exercise' or on the establishment of 'motor abilities' enhancement (Blair & Meredith, 1994; Pate & Hohn, 1994; Wall & Murray, 1990). Curriculum content could be distributed on 'homocentric cycles' (exact motor subjects from class to class); on 'spiral' layout (re-application of motor subjects in a more analyzed form) or even on 'inter-curricular' layout (PE in connection to other disciplines) (Haag, 2000; Placek, 1996).

Additionally, 'sphericity' principles (the variety of motor abilities); 'bravery gaps' principles (attention focused on selected subjects); and 'exemplar' principles (attention focused to representative motor subjects-keys) could be applied for the selection of curriculum content (Buschner, 1994). Instructional methodology could be limited to

generalized or specified notifications that have as a result fluctuations regarding learner participation in the decision making processes concerned with instructional introduction, conduct and evaluation (Mosston & Ashworth, 2002; Zouhnia, 2000).

Evaluation could be oriented towards mastery or ego (Salvara, 2001a; Salvara, Jess, Abbott, & Biró, 2003). In cases that the orientation is towards mastery, evaluation could occur parallel to the instructional conduct, examining pupil knowledge level on a given subject (preliminary evaluation); or helping pupils to recognize their mistakes (educational evaluation), so that pupils can regulate future knowledge (constructive evaluation), and or evaluate themselves (proven evaluation), comparing their current performance to the previous. In contrast with mastery orientation, ego orientation is centred to the evaluation of outcome, comparing one's performance to that of others (Lee, 1997; Nicholls, 1989; Treasure & Roberts, 2001). The functions of evaluation are linearly correlated to pupil motivational orientations (Salvara, 1999a, 2001a).

The analysis of Greek and Hungarian curricula was based on records, texts such as the Greek Presidential Decree 337/95 or Guide to the Hungarian NCC (1996) and books that report on their structure and applications. Among the records, personal thoughts and notes of unofficial discussions with teachers, and curricular developers relevant to the study were also included (Lincoln & Guba, 1985). The elements of the content analysis were conducted on the basis of taxonomy categories and detailed discussion. Specifically, the Greek core curriculum appears in this section as it was published in the *International Journal of Physical Education* (Salvara, Bognár & Biró, 2002).

This section's curricula case studies were not intended to be a comprehensive examination of the Greek and Hungarian curricula in action, neither to be generalized to other situations. In short, this section merely provides a critical viewpoint of the recent Greek and Hungarian curricula (IPEPTH, 1995; NCC, 1995) and their use by all elementary schools in Greece and Hungary for the last years.

According to Weber's theory, every PE teacher is "an active being but on the same time a suppressed being" (1976, pp. 53-8). This statement presupposes that teachers' actions are determined by their perceptual models for learning, instruction, evaluation and communication, while in parallel, they are suppressed by the institutional, historical and social factors, as these are expressed in the National PE programs, without the teachers

to really understand the programs' power and manifestations in the structure and function of their representations.

Linear relationships are often assumed between teachers' stated goals, their expertise and the taught curriculum (Lambdin & Steinhardt, 1991). PE teachers' representations in Greece and Hungary regarding teaching and learning are highly affected by each country's curriculum (Salvara, 2002b). Curriculum formulates the objectives, suggesting tasks, organizes procedures, while it sets requirements and standards of achievement.

#### **2.1.2.1. Greek Physical Education Curriculum-Historical Views**

The PE system in Greece was late in acquiring its physiognomy. PE systems applied in the country were actually imported from foreign countries. Surprisingly, PE entered schools as late as 1860 and at that period, firemen taught the lessons. Soon, soldiers took the firemen place as teachers. It was then that the Hellenic Ministry of Education defined as 'pupils' playful activities' the imitation of army barracks environment. The Olympic Games that took place at 1896 contributed to a change for PE, but not for long.

Until 1900, in force was the German system. According to Dimitriou (2000) "...the introduction to German gymnastics (military exercises) to the schools and the universities represents a contemporary example of the close relationship between PE and nationalism." He also mentioned, that "...during this period, teachers were officers in the Greek army" (p. 67).

Subsequently, the Swedish system was imported, which was based on a series of exercise sets, strictly aimed at health and upright posture. At a later stage, in 1950, a new version of the Swedish system was applied, given the term 'pedagogic gymnastics,' the exercises of which, from static, became dynamic and rhythmic. Pupils performed in a uniform and coordinated manner all together in front of the PE teacher.

Predominant was the 'command' teaching style rooted in teacher-centred approach (Mosston & Ashworth, 1994, 2002). The efforts made during the 60's and the 70's focused on the facilitation of emphasis on game gymnastics, and athletic exercises did not yield successive outcomes. As a result, the Swedish system was being taught for several years (Golegou et al., 1997; IPEPTH, 1995), actually altogether for almost a century.

In the year 1988, the first step was made to upgrade the role of PE and to improve instruction by appointing gym instructors in primary schools and in the year 1995 (IPEPTH), a new curriculum was produced (Presidential Decree 377/1995). This new approach took into consideration, according to its authors (Golegou et al., 1997), the current trends for psychomotor learning, the international assumptions for curriculum education, the ancestral athletics and dance tradition, the Greek school reality and the prevailing weather conditions. The authors assumed that the teaching objectives applied in the curriculum would form a modern and representative Greek curriculum (Presidential Decree 377/1995).

The team of scientists was assigned by the Ministry of Education and Religious Affairs to develop this new curriculum. It is recognized as a National standardized curriculum and all Greek elementary schools apply it, since the year of its publication (IPEPTH, 1995).

#### **2.1.2.1.1. Purposes of the Greek Curriculum**

The main purpose of the Greek curriculum in elementary schools is to help, through the varied psychomotor activities, primarily the pupils' physical development and to contribute to their emotional and cognitive refinement, as well as to enhance their harmonious socialization process. The purposes of the Greek curriculum are set below per category: (Golegou et al., Hellenic Ministry of Education and Religious Affairs, 1997; Salvara, 1998b, pp. 10-3)

- (i) Psychomotor purposes: sense of body in space and time; coordination and synchronization of upper and lower body with the aid of vision; sense and enhancement of static and dynamic balance, as well as lateral movement development, sense and refinement of rhythm and motor skills and learning of basic activities techniques.
- (ii) Biological purposes: development of basic physical skills; endurance, power, speed, flexibility and agility; prevention, improvement and correction of morphological and functional bodily deviations.
- (iii) Social purposes: development of social and cognitive virtues, such as cooperation, group spirit, self-discipline, will power, sense of responsibility, patience, persistence and courage; development of self-respect through physical

- abilities enhancement, motor skills learning and participation in sports activities, and confidence acquisition through awareness of personal abilities, and performance limitations in comparison to others and self; fostering of free democratic expression.
- (iv) Moral purposes: development of moral values, such as honesty, justice, meritocracy, respect towards opponents, and acquirement of modesty and consistent approach to victory and defeat.
  - (v) Aesthetic purposes: acquaintance with Greek motor tradition; fostering of rhythmical motor expression through Greek traditional dances, and appreciation of aesthetic features through a variety of movements.
  - (vi) Cognitive purposes: comprehension of basic notions and knowledge acquisition related to PE; comprehension of basic rules and regulations that govern the various games and athletic contests; knowledge acquisition related to dance, music and songs at local and national levels; basic knowledge acquisition in hygiene and first aid, and development of imagination and creativity through the planning of individual exercise programs.
  - (vii) Life-style purposes: consciousness of the need for life-long physical exercise and the benefits stemming from such an approach, as well as the adoption of athletic hobbies throughout life span.

Among the curricular purposes described above, psychomotor purpose dominates. It is the one that principally represents Greek curricular elements (Mountakis, 1994). In psychomotor learning, according to the curriculum authors (Golegou et al., 1997), pupil behavioural changes towards exercise are evident along with the improvement of psychomotor learning as a result of acquired psychomotor skills.

A variety of psychomotor skills have a favourable impact on the very physical development and on the same time on the development of certain brain centres (Karapetsas, 1999; Magill, 1993; Salvara, 1997b, 1998c; Schmidt, 1982). It appears that, when reference is being made to physical development at the elementary school, it is meant the development of psychomotor skills and, through them, the development of physical abilities (IPEPTH, 1995).

The development of social and moral characteristics, such as cooperation, group spirit, and sense of responsibility is to be achieved, according to Golegou et al. (1997), through the teaching methods applied rather than through the curriculum contents. In their study, Theodorakis and Goudas (1997), suggested that, the "...social factors were particularly related to participation in physical activities" (p. 67). It has been supported that the enhancement of aesthetic education could be developed through Greek traditional dances rather than through sport activities (Golegou et al., 1997).

Participation of the cognitive purpose is restricted, according to the authors of curriculum (IPEPTH, 1995; Golegou et al., 1997), on movement learning and performance regulations of various sports and games. However, this is not the case. Behind any motor activity there exist cognitive elements such as stimulus recognition, decision-making and movement organization. It appears that knowledge and understanding of exercise mechanisms strengthen pupils' attitudes and motives (Fox & Corbin, 1987; Theodorakis & Goudas, 1997). The recognition of perceptive, cognitive and motor combination factors has led to the terms: psychomotor learning and psychomotor skills (Schmidt, 1975).

Life style purpose is regarded as the crowning of all aforementioned purposes. Theodorakis and Goudas (1997) stated that, "the provision of knowledge about physical conditioning topics and the emphasis on the benefits of exercise for health can affect the cognitive component" (p. 67). According to the authors of curriculum (Golegou et al., 1997), "...physical condition and health are indirectly enhanced by pupil participation in motor activities and directly enhanced by the performance of upright-posture exercises" (p. 123).

#### **2.1.2.1.2. Analysis of the Greek Physical Education Curriculum**

Greek curriculum is based on the internationally known model, called 'activity-based education.' Its core subject matter consists of the instruction of psychomotor abilities. Emphasis is given to the achievement of psychomotor abilities (Blair & Meredith, 1994; Papaioannou et al., 1999; Zouhnia, 2000), on the grounds that this leads to 'life-long exercise.' Teaching psychomotor sessions had a great impact on primary school PE over the last 25 years, according to Thomas et al. (1988).

This viewpoint is actually questioned by many researchers (Pangrazi & Corbin, 2000; Pate & Hohn, 1994). Emphasis is now given to physical abilities (development of cardio-respiratory endurance, strength, muscular endurance and flexibility) in conjunction with health education, which is bound to the notion that this safely leads to 'life-long exercise in good health' (Pangrazi & Corbin, 2000; Pate & Hohn, 1994; Salvara, 1999c).

The Greek curriculum as far as its 'know-how' compilation is a traditional curriculum with spiral layout. Its orientation is towards the disciplinary mastery perspective (Jewett, 1994), which gives priority to the subject matter. It merely considers the Greek cultural identity and the Greek traditional dances (Tirovola, 1998), while it overlooks Olympic educational matters (Giosos & Mastora, 1999; Salvara, 1999b).

Curriculum purposes consist of generalized principles, without their analysis into specific teaching objectives. It appears that the goal achievement theory, which is based on pupil perceived motivational orientations towards learning/task or performance/ego, has not been considered in this curriculum (Papaioannou et al., 1999; Salvara, Jess, Abbott, & Biró, 2003). The nucleus of the curriculum is its contents, which are set out in the form of a list divided into activities.

It seems that the PE's tendency to be connected to other educational disciplines (Proveleggios, 2001), in order to comprise a horizontal aim among them is quite restricted in the Greek curriculum (CIDREE, 1999), which is evidently characterized by great quantity of activities. Having in thought that 'sphericity's' principle prevails in this curriculum; one might conclude that this will result in long-term negative consequences in learning (Augerinos, 2000; Corbin, 2002).

A study made by Emmanuel et al. (1992) suggested, that the lack of the Greek curriculum having field-based methods for describing and evaluating instruction, could have great negative consequences in instruction. The methodological guidelines used in this curriculum are not connected to its aims and contents, but they are rather general and theoretical (Xamilakis & Aggelidaki, 2000), while in research has been clearly proposed that the methods themselves comprise instructional aims (Vrettos & Kapsalis, 1999). Moreover, the curriculum gives no suggestions for pupil evaluation control methods and 'tools'. It disregards the trend, internationally established, of planning a

curriculum on a “cyclic pattern” (Buschner, 1994, p. 23; Salvara, Bognár & Biró, 2002, p. 34; Vrettos & Kapsalis, 1999), as presented in Figure 3.



**Figure 3.** Cyclic Pattern of Curricula

The Greek curriculum is evidently subject matter centred, to the ‘what’ of teaching with a lack of reference to the ‘how’ of teaching. However, the lack of formulated teaching objectives makes evaluation of learners and teaching difficult. The consequences of such deficiencies might deeply influence instructional construction (Salvara, 1996, 1998c, 2000b).

#### **2.1.2.1.3. Methodological Considerations on the Greek Curriculum**

The methods for the achievement of curricular purposes at elementary school level are the various motor and athletic activities, such as ball and motor games, kinds of sports which are recognized and popularized in Greece and, especially in the higher elementary school grades, free psychomotor activities (Salvara, 1998b) with or without music and, finally Greek traditional dances. Material aids that have been suggested for employment during instruction are mattresses, balls, mobile and fixed baskets, elastic balls, elastic skipping-ropes, hoops, pins, tiny balloons and cassettes with a variety of tunes. The curriculum is configured under the framework of general methodological principles:

- (i) PE teachers may select a specific purpose on which emphasis will be given either within the framework of a teaching unit or within a day’s lesson, but the greatest importance should be given to psychomotor purpose.
- (ii) 5<sup>th</sup> and 6<sup>th</sup> grades’ curricula are divided in periods of three months, so that each theme may begin and end within a three-month period, thus, fragmentation of

theme's assimilation by the pupils may be prevented. Dances, ballgames and classical sports are divided into time periods exceeding three months.

- (iii) Each grade includes the instruction of exercises that are directly related to the subject matter, so that learning could be neuromuscular served. It is recommended to avoid dividing the one-hour session into parts, such as warming up, main part and recovery period, which in contrast, should be integrated.
- (iv) Teaching can be organized in a variety of forms, such as whole class, individual work, reciprocal and teamwork. It is recommended that learner groups be heterogeneously composed, because there are no essential differences between boys and girls at elementary school level and, additionally, to promote possibilities for 'kinetically weaker' learners to be induced, taking part in all learning procedures. Class climate is task/mastery-involved rather than ego-oriented.
- (v) Teaching Greek traditional dances should not be restricted to the teaching of technical elements, but instead, considering the architecture of each dance, learners should be encouraged to create dancing movements and learn about the initial traditional environment of dances.
- (vi) For pupils that are kinetically delayed in their development and due to their great heterogeneity, PE teachers should develop individualized schedules applying motor principles referring to task analysis, step-by-step learning procedures and learning under the guidelines of a hierarchical approach model (IPEPTH, 1995; Salvara, 1998a).

At the end of school year and within the framework of cultural events, a sports day with joyful activities could be organized. At elementary school level, the initiation of all pupils into activities should be pursued and should not be limited to the special performance of few gifted pupils.

#### **2.1.2.1.4. Subject Matter of the Greek Curriculum**

The Greek curriculum consists of topics, allocated per cycles and per three-month periods. Each trimester period is devoted to the teaching of one single general unit, sub-

divided into specific teaching units. For each teaching unit there are activities defined in succession. Table 3 includes the curriculum topics divided in three cycles along with the instructional proportions.

**Table 3.** Greek Curriculum Allocation per Cycles

Teaching Topics	Cycles/Teaching Time Ratio		
	Grades 1 and 2	Grades 3 and 4	Grades 5 and 6
Sense in space-time	22%		
Audio-visual synchronization/coordination	13%		
Balance: dynamic – static	11%		
Lateral movement	13%		
Upright posture education	5%	16%	
Breathing education	3%		
Music-motor training	19%	9%	
Greek traditional dances	11%	10%	19%
Imagination – Creativity	3%		
Motor skills - physical abilities		30%	
Conditioning		11%	
Initiation into ball games & track & field		24%	
Ball games			51%
Track & field			19%
Gymnastics with the use of apparatus			16%

Table 3 describes the Greek curriculum allocation per cycles (IPEPTH, 1995). According to the findings of Table 3, the following remarks aroused:

- (i) Pupils try a wide range of movements and an early specialization is avoided through the teaching of sport techniques, aiming at the development of the brain centres responsible for motor control.
- (ii) Pupils acquire a wide range of fundamental notions, necessary for motor learning. Apparently, the emphasis is given on the development of economical movements, but as the curriculum advances through its stages, the reverse can be observed.
- (iii) Pupils preferably perform motor activities stemming from the sporting and cultural Greek tradition, e.g. basketball, or dancing.
- (iv) Pupils acquire motor skills through the various games, which cover the 50 percentage of the curriculum.
- (v) Pupils move successively from the basic motor skills to specialized skills. The organization of motor skills follows the principle: ‘From simple to complex,’ which ensures good application of learners’ previous knowledge.

*Note.* The Greek Core Curriculum can be found in the **Appendix, Table A.**

### **2.1.2.2. Hungarian Physical Education Curriculum-Historical Views**

The PE system in Hungary acquired its physiognomy within the first decade of the 20<sup>th</sup> century. PE systems applied in the country were actually based on the developed ‘Hungarian physical exercise system,’ which was a mixture of Swedish and German systems. However, the PE system of Hungary included English outdoor games and other sports as well (Földesi, 1996).

As stated by Szikora (2000), in 1912 experts thought that “the Swedish system...would stand nearer to the Hungarian temperament” (p. 38). The conditions that prevailed in the country, promoted for many years an exceptional role for PE and sports on cultural policy for National reasons. After the First World War, when Hungary’s territory decreased by 2/3, PE was converted in secret military preparation (Bukta, 1998). In parallel, Szikora (2000), in her study reported that, “all the parties agreed with the hidden military preparatory training in the form of PE” (p. 38). It was then according to Bukta (1998), that “the leaders of Hungary realized the importance of sport and created the first sport law in 1921” (p. 1).

However, it should be noted that at the 12<sup>th</sup> December of 1925 the opening ceremony of the Hungarian Royal College of PE took place. PE was step-by-step developed manifesting to the outstanding role of cultural politics during the 1930s (Szikora, 2000). Sport and PE were abundant parts of culture (Takács, 1988).

A common feature of the period between the two World Wars was that the selection and organization of curricula, highly affected by the political power, which was based on humanistic and national Christian values. After the Second World War, and in the early years of Soviet occupation, until 1956, the strong propaganda promoted the Soviet sport model. However, after the 1956 revolution, Hungary used to implement a kind of eclectic PE, aimed at promoting the image of its political regime. After the 1948 only the Communist ideology was allowed into classrooms, as the Soviet example dominated along educational policy makers.

During 1960s and 1970s, PE appeared developed and upgraded along with the movement of other countries like England, Germany and France. To this, the Hungarian College of PE played a significant role, since the college professional graduates were already appointed in schools along the country (Veto, 1965). The crisis felt later during

1980s throughout the world, was especially serious in Hungary, as an Eastern Block country (Földesi, 1993), based on the worldwide idea of ‘back to the basics.’

The beginning of 1990s school education became multifarious (MCE, 1996, p. 19). The so-called bipolar model linking central and local curricular regulation gradually emerged. The Education Act in 1993 prescribed the tasks to re-model the curriculum. In the past few years the Hungarian school education system has undergone dramatic changes. Not long ago, Hungary issued the National Core Curriculum (NCC) as legislated by the LXXIX law of 1993-reformed in 1995 and 1996- concerning national education. PE and sports are appointed as the 10<sup>th</sup> cultural domain (MCE, 1996, pp. 28-30) area.

NCC as the national curriculum reform, according to its authors (MCE, 1996), became a necessity due to the transformation of the wider social, political and economic environment (NCC, 1995). To this, Farkas (1998) added “the Hungarian school system had reached a point where the natural changing process had to be enforced...by...modernization” (p. 5).

In this perspective, NCC is therefore a key document in regulating the internal processes of the new Hungarian school education. It is merely a national document operating as a mean for regulating the modernization processes “within the system of school education” (MCE, 1996, p. 11). NCC concentrates on humanistic European values and strengthens the place of Hungary within Europe.

#### **2.1.2.2.1. Purposes of the Hungarian Curriculum**

The primary purpose and function of school PE is to enrich and develop pupils’ movement through playful activities compatible with their “psychosomatic maturity and interest” (MCE, 1996, p. 84).

Dominant objective of the NCC is the development of pupils’ coordination abilities, which lasts until the age of 12 years approximately and its level determines the extent to which pupils perform effective movements and sports activities. Coordination ability level affects the degree of pupils’ satisfaction for physical exercise and develops their security during movement activities. Among the objectives ascertain to coordination ability and its developmental level, are for the pupils to acquaint in problem-solving tasks effectively (NCC, 1995).

A distinctive objective among NCC cross-curricular objectives is for the PE to contribute through its specific methods in developing pupils' personality with positive attitudes towards a healthy life-style. NCC cross-curricular objective among all the cultural domains is physical and mental health. According to NCC guide (MCE, 1996), every educational activity should reinforce "the healthy physical, mental and social pupils' personality characteristics" (p. 29).

Parallel to this, Farkas (1998) in her paper mentioned that "...in processing the content of every cultural domain, schools shall teach pupils how to preserve their health and prevent injuries and illness" (p. 8). In this aspect, pupils should recognize the health benefits and preventive values of PE and regular physical activity so that it actually becomes an organic part of their lives. Out-of-school sport activities are highly fostered and sub-coordinated in conjunction with public education. As stated in the National Core Curriculum Guide, "participation should itself give pleasure" (MCE, 1996, p. 84).

NCC authors distinguish among the 10<sup>th</sup> curricular domain objectives (MCE, 1996, pp. 84-5):

- (i) Develop pupils' awareness of their motor abilities and maintenance of these.
- (ii) For pupils to enjoy games and competitions involving movement.
- (iii) For pupils to respect at others' performance and be confident.
- (iv) For pupils to participate actively in motor coordinated activities.
- (v) For disadvantaged pupils to feel that their personality is respected and that they are supported to overcome their given shortcomings. In addition, to feel that their efforts and development are highly appreciated.
- (vi) For pupils to develop character potential of fair competition.
- (vii) At last but not least, to encourage pupils to make efforts and participate in extra-curricular sport activities.

The National Core Curriculum guide justifies five general developmental objectives (1996, p. 85). The objectives are listed below in brief.

- (i) Healthy physical development: involves the provision of regular physical activity and the prevention of abnormal posture; it also involves the enhancement of conscious exercising.
- (ii) Erudition of movement: involves the knowledge of basic techniques of athletics, swimming and sport games.
- (iii) Motor abilities: involves the development of stamina, coordination and spatial orientation skills
- (iv) Need for physical activity: denotes the maintenance of the need for physical activity for a healthy life-style.
- (v) Low-impact and special PE: determines the need for the PE teachers to employ the proper correcting activities in the light of specific problems diagnosed. The purpose is for the pupils to be able to perform special exercises compensating their disability independently, consciously, precisely and regularly.

#### **2.1.2.2.2. Structural Analysis and Subject Matter of the Hungarian Physical Education Curriculum**

NCC (1995) is not a traditional curriculum, that is, subject matter centred; instead, it comprises the integrated framework or foundation upon which local curricula could be thoroughly built (Farkas, 1998). In this view, NCC separates from the form of traditional central curriculum regulation, which used to determine in detail the ideological and educational goals, tasks, materials of instruction, the number of lessons and the pedagogical activities (MCE, 1996, p. 25, for a review).

The fact that NCC formulates its structural contents in the form of cultural domains allow for local curriculum frame workers to choose, since NCC does not determine the objectives for each grade, but involves stages of objectives to be accomplished by the end of certain grades. NCC comprises unified objectives to be enforced in every school in Hungary. By this, it aims at promoting “the indispensable unity of contents, as well as to allow pupils to change to a different school type” (MCE, 1996, p. 26). In this manner, NCC is leaving free scope for diverse individual activities of schools, teachers and pupils (NCC, 1995).

NCC sets three kinds of objectives, the comprehensive, the general and the detailed ones. In this vein, the comprehensive and general objectives of cultural domains should be accomplished at the end of 6 and 10 grades. On the other hand, “the detailed objectives should be fulfilled on the accomplishing of the grades 4, 6, 8 and 10” (MCE, 1996, p. 30; Farkas, 1998, p. 7).

Moreover, NCC sets the minimum levels of competence. Knowledge and skills are only listed separated to make NCC easier to handle. In this perspective, it determines the required knowledge, performance and results of pupils’ in each cultural domain and their areas. However, it leaves open 30 to 50% of the teaching sessions, the curriculum layout and planning pattern. NCC is rather the basis where upon supplementary emerging syllabuses can be compiled (NCC, 1995).

NCC comprehensive requirements for the grades 1 to 6 refer to the healthy physical development, to the development of motor culture and motor abilities, and to the need and preservation of physical activity and therapeutic exercising throughout life span. The detailed requirements specify the general ones at the end of 4<sup>th</sup> and 6<sup>th</sup> grades in conjunction with the specification of the curricular local core syllabuses. Parallel, it sets the basic abilities that pupils have to become acquainted with and the minimum competence to achieve.

*Note.* The classification of the comprehensive and detailed NCC requirements can be found in the **Appendix, Table B.**

#### **2.1.2.2.3. Methodological Considerations on the Hungarian Curriculum Reform**

NCC is based on current international trends that promote curricula to be ‘open,’ where the duties of the local planner and the pupils are interwoven to the latter needs. This type of framework makes the teaching-learning processes easier and effective in terms of instructional reached objectives and pupils’ overall personality development (Salvara, 2002a; Salvara & Biró, 2002b).

The provision of school autonomy, promoted in approximately 40 percent by the NCC, promotes, for the local educational units and PE teachers, to endeavour in problem-solving and changing school structure upon given pupil needs. Nevertheless, the preparation of local syllabuses makes national requirements more specific, supplements and enriches, given the local conditions and the existing means for physical activity. In

the same manner, local syllabuses enhance tradition, pupils' interests, teacher's direction, and class constitution and develop the prior pupils' knowledge levels.

NCC comprehensive objectives are expressed with reference to all pupils, in contrast to the detailed ones that refer to each pupil respectively. The objectives are proportionately and symmetrically allocated along the NCC (1995). They involve both motor and cognitive procedures, which, by all means, could yield emotional fulfilment.

By having a thorough view on the Table B found in the Appendix, one can observe that the curricular activities are interwoven. The primitive movements such as walking, running, jumping, throwing, crawling, balancing, swimming and climbing contribute to the normal development of all pupils. The basic techniques in sport games, athletics and gymnastics constitute structured combinations of movements closely associated with the generic movements. The physical abilities, as strength, endurance, agility, rhythm, coordination, spatial orientation and speed are again closely related to the basic and primitive movements along NCC.

Local curriculum developers, according to NCC should take into consideration, for selecting and laying out syllabuses; when determining the minimum competence and when preparing therapeutic exercise programs, the sensitive developmental periods, the coordination abilities and the organic growth of pupils. Special emphasis is given to the safety aspects of motor activities. Safety constitutes one of the most prominent learning goals in the NCC, as a necessary precondition to any physical exercise. The instructional approach, concerned with the attainment of safety, includes a variety of teaching and learning activities. NCC ensures a wealthy deposit of psychomotor skills for the learners, parallel to the development of physical abilities involving healthy lifestyles. NCC, as far as its know-how compilation is concerned, is a modern framework. Its core is formed by objectives, both general and detailed, for which there had been an 80 percent consensus among 1713 PE reviewers.

The requirements are 'open,' while the minimum competence is 'closed' and mandatory. Requirements are functioning as procedures with a two-fold manifestation. Firstly, they identify the curriculum and secondly, they identify the manners and means for task elaboration and accomplishment.

### **2.1.2.3. Comparison of the Greek and Hungarian Physical Education Curricula**

Comparing both countries curricula, it turns out that the processes of PE teaching systems development are characterized by many differences. However, the greatest of differences are presented in their conduction philosophy and compilation.

The Greek Core Curriculum is traditional and ‘closed.’ Its vast emphasis is given on psychomotor learning and the development through sports functioning as its main target. The Greek curriculum centralizes on the teaching material and formulates generalized objectives without to follow into their specialization at specific goals regarding the employment of means, instructional evaluation and teaching methodology, which are all considered as the basic structural elements of a PE standardized curriculum (Vrettos & Kapsalis, 1999).

It is imperative that those elements coexist and support each other. Otherwise, the weight falls onto the content, sustaining the process in the background (Boekaerts, 1997). Today, it is well known that instruction involving self-directed learning promotes life-long learning (Bolhuis, 2002; Siedentop, 2002a).

In contrast, the Hungarian Core Curriculum is modern and ‘open.’ Its main emphasis is given to physical abilities that are developed through the use of sports functioning as means. NCC has the form of a unified base framework that is comprised by common, general and specified elements used in the preparation of local syllabuses, where the needs of pupils comprise the main interest.

The NCC framework promotes the development of local syllabuses by the PE teachers, which at last are the active and responsible members for pupils’ development. In this perspective, PE teachers are active participants in the formulation of the targets, the subject matter and the learning process. Furthermore, teachers’ experiences transform to critical thinking and create the prerequisites for a change in their perceptual models and teaching styles they employ (Corbin, 2002).

Recent comparative studies made by Asteri (1996) and Hardman et al. (1988) for Greece and by Andersen (1996) for Hungary, suggested that in the case of Greece, despite the compulsory status of PE as an assessed graded subject, it is “not effective” (p. 6). According to Hardman’s study on the international PE context (1998), teachers in

Greece have been reported as being “unable to understand curricula because they were written in such obscure language” (p. 359).

Pimplis and Routzi (2003) maintained that, “although the German-command system stopped to be taught, a walk nearby schools in Greece will show us different things” (p. 13). Is it a matter of teachers’ limitations in their fantasy?. Additionally, Hardman et al. (1988) added that, many schools have minimal, if any, sport facilities. In the case of Hungary, Andersen (1996) claimed that, “75% of schools do not have [yet] proper facilities” (p. 41).

## **2.2. Comparative Educational Research-Comparing Physical Education Teachers’ Representations**

The main aim of the present research is by the use of comparison to reveal similarities or differences (Haag, 1986) between the Greek and Hungarian PE teachers’ representations for instruction regarding structure and function.

To begin, it is proper to define **comparative education**. As far, yet, there is no universal agreement among educators about what it should mean. **Education** is defined as “the planning, conduct and results of formal and non-formal schooling” (Postlethwaite, 1987, p. 9). **Comparative** means the examination of two or more educational entities, while looking for similarities and differences between or among them (Haag, 1986).

Comparative studies serve three functions (King, 1979, p.31):

- (i) To inform and sensitize people eager to study the workings of education in a variety of alternative contexts.
- (ii) To aid analysis of educational phenomena, trends and problems.
- (iii) To guide educational decision and development with increasing recognition of socioeconomic and political repercussions.

Broadfoot (1977) pointed out three advantages gained by such studies for the educational decision makers. Firstly, “comparative studies can provide internationally consistent data on the effects of different educational practices.” Secondly, “in providing detailed [cross-cultural] studies, which reveal how the integral dynamics of education systems influence the idiosyncratic effects of educational practices.” In any

particular context, comparative studies can provide planners with ways for analyzing the likely outcomes of any innovation in their own society. Thirdly, “and most fundamentally, comparative studies can stimulate questioning of the basic assumptions under which any education system operates” (p 136). Taken together, Broadfoot’s assumptions, they are overwhelming (Cogan, 1986).

Comparative studies within European countries have long been used in research (Curtner-Smith et al., 2001; Haag, 1986; Salvara, 2001b, 2002a; Salvara & Biró, 2002b; Tsangaridou & O’ Sullivan, 2003). In this vein, comparative education is a well-developed part of educational science (Hans, 1951; Kandel, 1933). In this perspective, the present research was based on Bereday’s notion (1964) in conjunction with juxtaposition and comparison.

Juxtaposition, involves the “systematic collection of data from two or more countries” (Haag, 1986). Furthermore, in this investigation, comparison was “balanced”, since similar data were gathered and used for the analyses (Haag, 1986, p. 43). Haag (1986) proposed that Bereday’s model of comparison can “also be applied in sport pedagogy” (p. 43) Consistently, Haag in the same study supported that the clear evidence and distinction of foreign PE contributes to a better understanding of national realities.

However, comparative research has not deeply researched the fields of instruction, learning and teacher-pupil interaction within classrooms. Having in thought that comparative studies should centralize directly in activities bounded with practice, there is increased necessity for comparative researches to structure the micro cosmos of PE teachers’ perceptual models (Dyson, 2002; Siedentop, 2002a).

Comparative theorists have suggested that samples should present approximately equal number of subjects and characteristics, while, the instruments used to gather or measure subjects should be the same in cross-sectional approaches, so that comparisons could be valid (Bereday, 1964). The comparison between the PE teachers in Athens and Budapest, it is hoped, that will discover meanings and will unfold practices that would have been difficult to discover without a comparative perspective. In this aspect, the findings could provide help to develop the needs of each country’s teaching-learning processes.

## **Chapter 3. Research Hypotheses**

This study aimed at the revelation of PE teachers' representations on instruction with regard to structure and function. Representations' **structure** is composed by the PE teachers' perception for learning, instruction, communication, pupils' development, evaluation and mistakes. These perceptions comprise the organizational principles of instruction and are considered as the frameworks of teachers' beliefs. The agreement of their implication towards importance (PE-TRIQ I) and frequency of employment (PE-TRIQ II) formulates the teachers' perceptual models (Flament, 1994).

Representations' **function** is composed by teaching styles and instructional practices, as an expression of PE teachers' perceptual models. Teaching styles possess the teaching and the learning behavioural categories. The agreement in the interval appearance of the categories and their continuation would appoint the spectrum of teaching styles (ITLB and CAFIAS).

Greek and Hungarian PE teachers' perceptual models and the teaching styles they employed during instruction structure the **PE semantic instructional frameworks** (SIF) that become different or indifferent due to the factors of PE teachers' ethnicity, gender, years of teaching experience, teachers' postgraduate studies, school grade and pupils' socioeconomic status at which teachers' taught.

### **3.1. First Hypothesis**

It is expected to find a **convergence** between the PE teachers' represented importance (1<sup>st</sup> Questionnaire-PE-TRIQ-I) and frequency of employment (2<sup>nd</sup> Questionnaire-PE-TRIQ-II) of the instructions' organizational principles examined with the PE-TRIQ (Physical Education Teachers' Representations on Instruction Questionnaire). This convergence is hypothesized to reveal **perceptual models**.

Four models (dependent factors) are expected to be revealed on the basis of basic human abilities: **1<sup>st</sup> Reproduction; 2<sup>nd</sup> Assimilation; 3<sup>rd</sup> Discovery and 4<sup>th</sup> Production**. Additionally, it was assumed that the teachers from Athens and Budapest will differ for the independent factors of **gender, years of teaching experience, postgraduate studies and pupils' socioeconomic status and grade at which teachers taught** with respect to the revealed factor structure.

Theory and research have claimed that teachers of a given scientific field, in the given situation, possess similarities in the way they form their perceptions on instruction (Siedentop, 2002a). In order to distinguish PE teachers' perceptual models, it is required that their estimations are related with their perceptual structures.

Given that PE teachers' perceptual models are found in the central core of representations (Abric, 1993), that is, are stable and change with difficulty (Abric, 1993), and given that they determine the quality of instruction (Clark & Peterson, 1986), then the expected model taxonomy on the basis of the general human abilities would have descriptive character. It involves elements acquainted in the common employment of PE teachers' perceptual models. This kind of taxonomy could be characterized as generic, general, diachronic and intercultural and claimed as the most appropriate for comparative studies (Kandel, 1933).

### **3.1.1. Second Hypothesis**

PE teachers' **represented importance** (1<sup>st</sup> Questionnaire-PE-TRIQ-I) for the organizational principles regarding instruction, that is, perceptions for teaching, learning, communication etc., is expected to be closely related to their **represented frequency of employment** during instruction (2<sup>nd</sup> Questionnaire-PE-TRIQ-II). It was assumed that PE teachers would similarly represent both importance and frequency of employment. This finding is expected to be displayed within each city teacher's sample (Ennis & Chen, 1995).

It has been widely supported that instruction's organizational principles denote **base thought structures** that could be thoroughly investigated by the PE teachers' represented importance and frequency of employment research time lag (Flament, 1994). For the organizational principles to be revealed, it is suggested that the thought structures should be short, so that their dimensions could be evident. In the present research the thought structures included in the PE-TRIQ I & II are 6 and their dimensions range from 3 to 7.

### **3.2. Third Hypothesis**

The frequency and sequence of the teaching and learning behavioural categories (dependent variables) examined with the **I ITLB** (Instrument for Identifying Teaching and Learning Behaviours) developed by Salvara (2001b) are expected to establish a

spectrum of teaching styles. It was assumed that the teachers from Athens and Budapest might differ for the independent factors of teachers' **ethnicity, gender, years of teaching experience, postgraduate studies, pupils' socioeconomic status and grade at which teachers taught**, given their employed field practices.

Taba (1962) initially established the term 'teaching styles' (or strategies). Today, the term is widely used in theory and research (Byra, 2000, 2002; Curtner-Smith et al., 2001). From the different syntheses of teaching and learning categories, different teaching styles emerge, as an expression of the representation's flexible peripheral elements (Abric, 1996) and as the instruction's functional dimension (Piaget, 1972).

According to recent studies, the syntheses of teaching and learning behavioural categories present similarities among European school classrooms (McBride et al., 1986). However, differences have been noted in the teachers' represented frequency of employment with versus without further education (Salvara, 2002b; Salvara & Biró, 2002b; Salvara, LeBlanc, Bognár & Biró, 2002). Additionally, it has been suggested by Housner et al. (1993) that well-educated and experienced teachers have a richer, better instantiated cognitive representations of subject matter, teaching styles and the nature of children.

In parallel to this, Chen and Rovegno (2000) believed that postgraduate education as a factor highly contributes to the representations' transformation with respect to structure (perceptual models) and function (teaching styles). In this strand, Van der Mars et al. (1995) suggested that, "novice and expert PE teachers think differently" (p. 340). But do they behave differently? It was assumed that novice and expert teachers would do behave differently in their teaching styles selections.

Predictions about the kind of results this research would yield were difficult to make. On the one hand, there were several reasons for expecting similar findings between Greek and Hungarian teachers, that is, teachers would employ predominantly reproductive teaching styles, given the logical speculations accounted from comparative published studies (Curtner-Smith et al., 2001; Goldberger, 1992; Salvara, 2002b).

Logical speculation also includes the results of a recent study (Salvara, 2002b), concerned with the two countries PE curricula, the analysis of which revealed a disciplinary mastery approach for Greece (Jewett, 1994) where the priority is given to

the subject matter (IPEPTH, 1995). While, in the case of Hungary a more ecological perspective was found (Jewett, 1994) that societal and individual needs seemed to intervene (Hamar, 1998; MCE, 1996; NCC, 1995).

On the other hand, based on previous research (Salvara, 1996, 1997a; Salvara, Bognár, Biró & Salvaras, 2002) that revealed a tendency for the Hungarian teachers towards a constructivist approach to instruction, it was then assumed that Hungarian teachers might favour to employ more productive teaching styles along with reproductive ones. In this vein, there were several reasons for expecting the factor of ethnicity (nationality) to differentiate, given the differences in the philosophy and technical compilation of the two National Core Curricula.

### **3.3. Fourth Hypothesis**

Teaching styles present different verbal and non-verbal interactions (**CAFIAS**-Cheffers' Adaptation of Flander's Interaction Analysis System-enriched by Salvara, 2001b, 2001c). It is expected that differences will be revealed:

- (i) In the **teaching-learning interaction of teaching styles** as employed by the PE teachers in both countries, and
- (ii) In the **teaching-learning interaction by the PE teachers** (dependent variables) in both countries concerning the independent factors of ethnicity, gender, years of teaching experience, postgraduate studies, gender, and pupils' socioeconomic status at which teachers' taught.

Several researchers have suggested that interaction, verbal and non-verbal, composes the most important part of instruction (Cheffers, 1977; Cheffers et al., 1976; Flanders, 1970; Koppich & Kerchner, 1999; Piéron, 1994; Rink, 2001; Salvara, 2001b). Interaction analysis informs about the communicative characteristics of the employed spectrum of teaching styles (Byra, 2002). It is developing from the reflective behavioural level to the level of intentional behaviour (Graham, 1989; Mead, 1934).

### **3.4. Fifth Hypothesis**

It is hypothesized that the **revealed perceptual models regarding the organizational principles of instruction will be related to the spectrum of teaching styles**. It is expected for those PE teachers that their beliefs centralise around:

- (i) The reproduction model, to employ predominantly teaching styles that belong to the first group (A), which includes command-like styles.
- (ii) The assimilation model, to employ predominantly teaching styles that belong to the second group (B), which involves individual, reciprocal, self-check and inclusion styles.
- (iii) The discovery model, to employ predominantly teaching styles that belong to the third group (C), which denotes the convergent discovery of tasks.
- (iv) The production model, to employ predominantly teaching styles that belong to the fourth group (D) that involves divergent production and learners' initiated programs.

PE teachers' perceptual models and the teaching styles they employed formulate a semantic instructional framework (SIF) bounded to their instructional preferences, which will reveal their representations with respect to structure and function (Clark & Peterson, 1986). In short, SIF will reveal the teachers' personal instructional teaching theory (1984). The comparison between the SIFs in Athens and Budapest is expected to reveal asymmetries and contradictions (Marland, 1994; Mosston & Ashworth, 2002; Salvara & Biró, 2002b) in the data-linked results.

## **Chapter 4. Method of the Research**

### **4.1. Participants**

Eighty-four PE teachers randomly selected, employed in the cities of Athens (19 females and 23 males) and Budapest (20 females and 22 males) consented to participate in this research. They all taught mixed gender elementary school classes. The schools were located almost from all municipalities across Athens and Budapest. Teachers' experience ranged from 3 to 35 years. Throughout the duration of this study (1999-2001) teachers taught in 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades of elementary schools. Teachers teaching at these grades were selected, as this age pupils are regarded to be in a "functional level" that allow for more advantageous learning of complex motor abilities, skills and critical thinking (Nicholls, 1992; Piaget, 1969). Twelve of the teachers in Athens and 13 in Budapest have done postgraduate studies in the field of sport sciences.

Table 4 displays the two countries sample on the criteria of teachers' gender, teaching experience in years, postgraduate studies and school grade as well as pupils' socioeconomic status that teachers taught. As can be observed, the socioeconomic statuses of the school classes that teachers' taught were in their majority from the middle-low or middle-high socioeconomic classes in both countries (a total of 55 PE teachers). The categorization was based on the European standards of CIDREE (1999). CIDREE categories can be viewed in **Table C** found in the **Appendix**. The socioeconomic categorization was compiled by informal interviews conducted with school principals (Hare & Graber, 2000).

**Table 4.** Sample Description (N & %)

	Gender		Years of teaching experience			
	M 23 (54.8)	F 19 (45.2)	0-5 5 (11.9)	6-15 11 (26.2)	16-25 17 (40.5)	26-35 9 (21.4)
<b>Athens</b>						
Budapest	22 (52.4)	20 (47.6)	4 (9.5)	11 (26.2)	18 (42.9)	9 (21.4)
<b>Total</b>	<b>45</b>	<b>39</b>	<b>9</b>	<b>22</b>	<b>35</b>	<b>18</b>

*Table 4 continued*

	Postgraduate studies		School grade			Pupils' socioeconomic status			
	With 12 (28.6)	Without 29 (69.0)	4th (9.5)	5th (45.2)	6th (45.2)	U 6 (14.3)	Um 15 (35.7)	Lm 13 (31.0)	L 8 (19.0)
<b>Athens</b>									
Budapest	13 (31.0)	29 (69.0)	4 (9.5)	20 (47.6)	18 (42.9)	7 (16.7)	14 (33.3)	13 (31.0)	8 (19.0)
<b>Total</b>	<b>25</b>	<b>58</b>	<b>8</b>	<b>39</b>	<b>37</b>	<b>13</b>	<b>29</b>	<b>26</b>	<b>16</b>

Sample selection was manifested with catalogues given in the case of Budapest from the department of Theory of PE and Pedagogy of the Semmelweis University, while in the case of Athens they were supplied by the Pedagogical Institute. Most of the PE teachers that participated were affiliated with the given organizations. School principals helped the researcher to stratify the sample with on-the-spot interviews arranged before the beginning of this research (criterion-base sampling) (Goetz & LeCompte, 1984). In short, the sample is presenting equal number of subjects in each group, thus, enabling the researcher to conduct balanced comparison (Haag, 1986).

It should be noted that in the present research the main sample methodology employed was time analysis (Field, 2000; Thomas & Nelson, 1996) conducted with standardised systems for interval recording, such as CAFIAS (Salvara, 2001b) and I ITLB (Salvara, 2002a, 2002b, Salvara & Biró, 2002b), accounting for a total of 70.560 time-codings in

both countries. This research was based on anonymity of the subjects who participated and a letter explaining the procedures and purposes of this research was distributed to each teacher respectively. For the investigation that conducted in Budapest, the letter was signed by the dean of the Faculty of PE and Sport Sciences of the Semmelweis University, while for the research conducted in Athens, the Hellenic Pedagogical Institute granted permission.

#### **4.2. Research Instruments**

Two questionnaires, two observational instruments and a structured informal interview were used in this research. All 84 teachers were examined with each of the instrument procedures. Teachers' investigation was conducted in the cities of Athens and Budapest almost simultaneously, having a lag of 2-3 months.

##### **4.2.1. Physical Education Teachers' Representations on Instruction Questionnaires-PE-TRIQ I & II**

In the light of investigating PE teachers' representations in a multidimensional process, questionnaire survey research was the initial approach to the present research design. Following Babbie's (1998) suggestions that "survey is the best method available to the social scientist interested in collecting original data for describing a population," while he adds that "surveys are excellent vehicles for measuring attitudes and orientations" (p. 256), the author selected questionnaire survey to reveal the structure of representations.

Drawing from the work of Abric (1993, 1996) and Flament (1994) on representations as well as on Mosston and Ashworth (2002) on teaching styles, PE-TRIQ was developed to measure PE teachers' perceptual representation frameworks in terms of instructional structure. Researchers have suggested, that the teachers' perceptual models could be objectively investigated through survey research, thus, sustaining broad scope into the structure of representations (Abric, 1994; Doise, 1993).

The PE-TRIQ I & II (Salvara & Biró, 2002a, 2002c) consist of 28 identical items, which are attributed to six main areas of concern accounting for teachers' representations on learning, teaching, learner's development, communication, evaluation and handling of learners' mistakes. In the case of PE-TRIQ I, teachers were asked 'how important do they regard each item,' while in the case of PE-TRIQ II they were asked 'how frequent do they employ each of the items.' Table 5 presents the six

fields of teachers' perceptual representation frameworks that comprised the basis for constructing the PE-TRIQ. PE-TRIQ I & II can be found in the **Appendix, Table D**.

**Table 5.** Six Fields of the PE Teachers' Perceptual Representation Frameworks

Representations for:		Interpersonal Expression Forms	Items
1.	<b>Learning</b>	As demonstration with explanations; as observation and imitation of a model; as questions asked aimed at explanation; as solution through discovery; as multiple-solution creation; as directed or free individual program planning.	7
2.	<b>Instruction</b>	As work with all learners together, in a uniform manner; as reciprocal work; as work with self-check; as a work with selection of difficulty level; as work through discovery; as individual planning.	5
3.	<b>Learners' development (physical, social, emotional, moral, cognitive)</b>	When the PE teacher makes all the decisions for the preparation, the conduct and the evaluation; when the PE teacher delegates part of the decisions in respect of the conduct; when the PE teacher delegates part of the decisions regarding appraisal; when the PE teacher delegates part of the decisions regarding preparation; and when the PE teacher delegates all decision-making to the learners.	5
4.	<b>Communication</b>	When the PE teacher suggests, without explaining; agrees with the learners; guides the learners.	3
5.	<b>Evaluation</b>	When the PE teacher estimates the achievement of the objectives with either a mark or a remark (proven evaluation); when adjusts subsequent teaching actions (constructive evaluation); when checks the prerequisite knowledge (introductory evaluation); assists with the recognition and correction of mistakes (educational evaluation).	5
6.	<b>Handling of learners' mistakes</b>	When the PE teacher takes the learners' errors as products of carelessness, confusion and corrects them through practise; when regards mistakes as display of cognitive gaps and corrects them through procedure explanation; when regards mistakes as inadequate and wrong transformation of previous knowledge and brings them back for reformation.	3
		<b>TOTAL= 28</b>	

Through the aforementioned 6 fields, PE-TRIQ was hierarchically organized. In this vein, PE-TRIQ consists of 6 frameworks; each is having 3 to 7 dimensions (items) involving the PE teachers' interpersonal expression forms, accounting for the 28 PE-TRIQ I and II items (Salvara & Biró, 2002a, 2002c).

Furthermore, PE teachers' assumed convergence with regards to their represented importance (PE-TRIQ I) and frequency of employment (PE-TRIQ II)-2<sup>nd</sup> hypothesis-on the 28 PE-TRIQ items, is expected to reveal the PE teachers' perceptual models on instruction-1<sup>st</sup> hypothesis-. It has been suggested that the method of similarities reveals the structure of PE teachers' representations (Verges, 1987) and allows for comparisons between them (Moliner, 1995).

#### **4.2.2. Interval Coding Observational Instruments-Time Sampling and the Structured Interview**

Systematic observation instruments are regarded as the most spread method in empirical-analytic classroom researches (Graham et al., 1993; Silverman, 1991). Research on teaching-learning processes has identified a variety of pedagogical skills

that are related to instructional effectiveness. One such skill is observing and interpreting life in classrooms (Sabers et al., 1991).

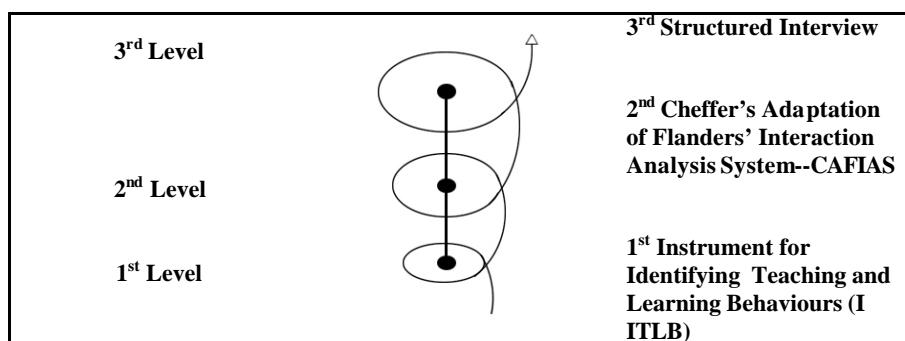
In parallel, Schempp and Choi (1994), Van der Mars (1989) and Cheffers et al. (1974) among others, pioneered in the theoretical basis for observational systems in PE. A system of observation has "...as its fundamental purpose the quantification of some aspect of teacher and learner behaviour during a lesson" (Schempp & Choi, 1994, p. 43). In its barest form it is comprised of two elements: a category system and a coding protocol (Van der Mars, 1989). The category system represents the variables of study, while the coding protocol of a system represents the procedures that regulate the use and function of the system. Productive lines of inquiry began with the videotape data bank project (Anderson & Barrette, 1978, 1980), and as new systems developed, combined research lines grew. Nevertheless, observational field analyses systems concurrently assess a greater number of behavioural variables in a real-time contextualized coding process.

In fact, systematic observation instruments are based on the unanimously accepted notion that during instruction a recurrent communication between teacher and learners exists that creates networks, forming a system of interactions (Salvara, 2001b, 2002a). The concept of teaching as a unifying system of interaction (Piéron, 1994) leads towards the definition of decision-making processes that differentiate the objective, the teaching-learning behaviours, the conditions for subject matter realization and the pupils' evaluation criteria. This, however, depends on the teaching objectives (psychomotor, cognitive, emotional and participative), on pupils' age, their previous knowledge and learning styles (Coker, 1996; Dunn et al., 1989).

In the present research two systematic observation instruments were employed. This means that each PE teacher was recorded for the same lesson with both the instruments. In this vein, one instrument was used for the constitution of the spectrum of teaching styles employed by the teachers in the two countries, that is, the Instrument for Identifying Teaching and Learning Behaviours (I ITLB), developed by the author (Salvara, 2001a, 2001b; Salvara & Biró, 2002b) followed by a structured interview (3<sup>rd</sup> hypothesis). And one for the analysis of teacher and learners interaction, that is, the

Cheffer's Adaptation of Flander's Interaction Analysis System (CAFIAS), developed by Cheffers (1977) (4<sup>th</sup> hypothesis). Both systems are presented in detail vide infra.

The systematic observational systems and the structured interview were organized in three levels (Salvara, 2001b, 2002a), that of **grouping** (what actually happens during instruction and how it is carried out); that of **substance** (which are its characteristic features and what it aims at) and that of **weighing interests** (which is its contribution to pupils' development), based on systemic theory (Piaget, 1969). The organization of these levels is **spiral** on the basis of **analytic induction** (Glaser & Strauss, 1967) and **triangulation**, meaning that one phenomenon is examined on a multi-methodological perspective (Goetz & LeCompte, 1984). Figure 4 displays the analysis of instruction in levels as described vide supra.



**Figure 4.** Instructional Analysis in Levels

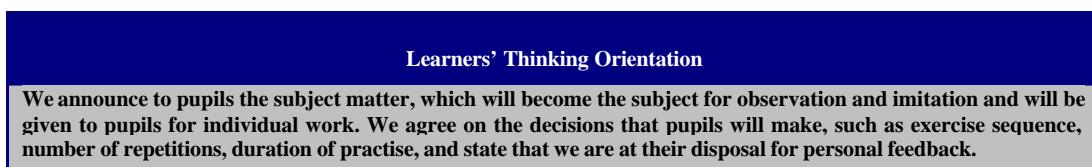
#### **4.2.2.1. Instrument for Identifying Teaching and Learning Behaviours -I ITLB**

Lessons were coded with the I ITLB (Salvara, 2001b, 2002a, 2002b; Salvara & Biró, 2002b), which is based thoroughly on Mosston's framework (Mosston, 1981; Mosston & Ashworth, 1990, 1994, 2002), and on the systemic theory (Piaget, 1969; Yongue, 1998). I ITLB is an interval recording instrument developed to record the amount of time in which teachers and learners apply each of the teaching and learning behaviours (Salvara, 2001b, 2002a, 2002b; Salvara & Biró, 2002b).

I ITLB includes seventeen categories of teaching (what the PE teacher does and says) and learning behaviours (what the pupil does and says), that recur constantly during instruction. Table 6 displays the I ITLB categories.

**Table 6.** Instrument for Identifying Teaching and Learning Behaviours

Introduction to instruction (A) occurs either with ‘the orientation of pupils’ thought’ (A1) or with the development of ‘questioning situation’ (A2). Continuation to instruction (B) can occur with each of the categories given (B3-B7). Reconstruction to instruction (C) can be performed either with one of the categories from C8-C16 and output to instruction (D) occurs with the ‘pupils’ evaluation’ (D17) for correspondence to the given role. Figure 5 represents an example of A1 (pupils’ thinking orientation) I ITLB category.



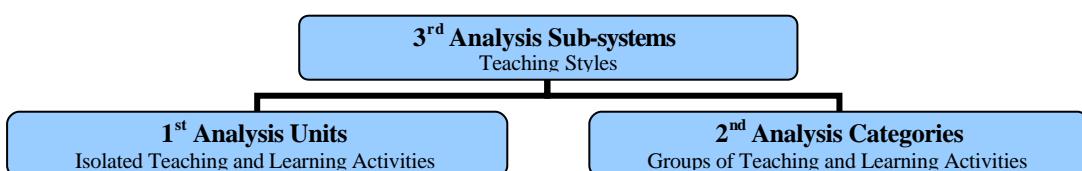
**Figure 5.** Learners' Thinking Orientation (A1 I ITLB category)

The teaching and learning behavioural categories “have a conspicuous position in the various teaching mechanisms and seek to convert teaching into apprenticeship” (Salvara, 2001b, p. 131). Consistently, the **categories** in question are totalities (Piaget, 1967, 1969) and are not presented statically. Instead, they assemble a great number of degrees of freedom, based on the notion that the categories function as agencies of a

unified action, which creates movement. This movement generate action series, so that each subsequent category, within its limits, is determined by the one preceding.

Moreover, the relationships between the categories form **sub-systems** of teaching act. Each sub-system is at the same time a different **teaching style**. In this view, teaching styles, as sub-systems, are not static but flexible and function in a speculative manner (Blauberg et al., 1976); that is they display autonomy. On the one hand, they are complementary to one another, and on the other hand, they are opposed to each other.

Each I ITLB category consists of more than one singular teaching and learning behaviour. Each of the teaching and learning behaviours constitute at the same time an **analysis unit**. Moreover, the analysis unit is active and therefore, capable of functioning even independently and as a result, it can be isolated. Teaching styles, “as teaching action subsystems, show some degree of centralizing tendency among themselves around the ‘mother-concepts’ of reproduction, assimilation, discovery and production” (Mosston & Ashworth 1994, 2002; Salvara 2001b, pp. 131-33; Salvara & Biró, 2002b). Figure 6 presents the formulation of the analysis units and analysis categories into sub-systems, that is, teaching styles.



**Figure 6.** Structural Analysis of Instruction’s Levels

Reviewing Table 6, which presents an example of a teacher coding, reciprocal teaching style, was revealed. Table 7 displays the reciprocal teaching style, as coded with the I ITLB. All coded instructions and their subsequent time analysis inform on ‘what happens’ during instruction, ‘how often does it happen’ and ‘how this happens.’

**Table 7.** Reciprocal Teaching Style

A1. <b>Orientation of the learners’ thoughts</b> Explanation of the roles of the PE teacher and learners	B3. <b>Observation and imitation of the task</b> Presentation of the exercise and configuration of the execution criteria	C10. <b>Reciprocal work</b> Distribution of the observer and doer roles; task execution with role alternation and feedback	D17. <b>Evaluation</b> Evaluation in respect of response to the roles and assimilation to the task
<b>Frequency:</b> 5' <b>Condition</b>	<b>9'</b> <b>Condition</b>	<b>20'</b> <b>Activity</b>	<b>6'</b> <b>Criteria</b>

For the construction of I ITLB, a preliminary study took place during the year 1998 aiming at revealing PE teachers' employed spectrum of teaching styles. Twelve PE teachers (6 in Athens and 6 in Budapest) were videotaped and coded. From this initial investigation, a set of teaching and learning behavioural categories were isolated and included in the I ITLB format, as published in the International Journal of Applied Sport Sciences (Salvara & Biró, 2002b). Until the I ITLB was initially published (Salvara, 2001b), pedagogy experts in the field, in both Athens and Budapest, attributed their ideas and expertise.

The intervention of PE curricula (IPEPTH, 1995; NCC, 1995) and their teaching objectives as *a priori* conditions, mediate in such way that the decision making of A, B, C and D I ITLB observational scales present an asymmetrical relation between the teacher and the pupils. Depending on who is making the decisions in the different stages of the teaching act, different teaching styles emerge evolving different landmark clusters (reproduction, discovery, assimilation or production) along with the educational models encountered (behaviourism, cognitivism and constructivism) (Bandura, 1986; Bruner, 1977; Gagné, 1964; see Vosniadou & Brewer, 1987, for a review).

Thus, with the I ITLB, the aim was for the teachers to construct the teaching styles that they employed given the form of the instrument. In this perspective, teaching expands from a close to an open act, while producing different kinds of interaction, contributing to pupils' development with a different manner. Mancini (1974) classified teaching behaviour into teacher-centred and pupil-centred, while Mosston and Ashworth (2002) classified it as a decision-making basis into reproduction and production of knowledge.

However, it should be noted that the present research, in an innovative attempt beyond existing literature, examined a spectrum of teaching styles extending from a relatively superficial approach, which is based solely on the regulatory role of the PE teacher (reproduction) to an in-depth approach, where pupils' self-regulation is a prominent feature (production). In this continuum, teaching styles that introduce regulations with regards to pupils' role distribution and their active participation in decision making were also examined (assimilation and discovery) (Salvara, 2001b).

#### **4.2.2.1.1. Structured Interview (Following the I ITLB)**

The structured interview was composed of four open pre-determined questions. Following Bogdan's and Biklen's (1998) suggestions that "qualitative data can be used to supplement, validate, explain, illuminate, or interpret reliably quantitative data gathered from the same subjects or site" (p. 37), qualitative inquiry was supplemented after the I ITLB recordings.

At the end of each session, every PE teacher was asked 'What he/she aimed at?' 'Which of the teaching activities that he/she employed aimed at activating the learners?' 'Which of them comprised the conditions for realizing the targets?' and 'Which of them comprised the control criterion for obtaining the pre-determined objectives?.'

#### **4.2.2.2.Cheffer's Adaptation of Flanders' Interaction Analysis System- CAFIAS**

The early 1970s the greatest part of the published research studies investigated teacher-pupil interaction. In the present research, the CAFIAS was applied to pursue multidimensional analyses of the teaching process (Cheffers, 1977; Cheffers et al., 1974) in Athens and Budapest. The CAFIAS is an adaptation of FIAS (1970) (Flanders' Interaction Analysis System) widely used in classroom studies. FIAS disadvantage was that it coded only the verbal behaviour between teacher and pupils, while CAFIAS' adaptation enables both verbal and non-verbal teacher-pupil behaviours to be coded.

In short, the CAFIAS was developed by Cheffers (1977) to allow systematic observation of PE classroom situations (Thomas & Nelson, 1996). Furthermore, the CAFIAS provides a device for coding teacher and learner behaviours through a double system so that any behaviour can be characterized as verbal, nonverbal or both. It also permits the coding of the class as a whole; when the entire class is functioning as one unit; when the class is divided into small groups, or when pupils are working individually or independently with no teacher influence (Hardy, 1998).

Additionally, the CAFIAS is based on the sum of experiences that create a relative permanent-apparent or not-apparent change in learning that define the quality of instruction. With the CAFIAS instrument 6 teacher and 4 learners' categories are coded. Due to the fact that learning in PE is by far psychomotor learning, the CAFIAS categories are further divided into 6 teacher and 4 learners' categories (Cheffers et al., 1976).

Plainly, teachers' categories include: (i) acceptance of pupils' emotions; (ii) encouragement; (iii) acceptance of pupils' thoughts; (iv) questions; (v) instruction; (vi) negative social reinforcement. Pupils' categories include (i) response; (ii) initiative behaviours and (iii) silence or confusion.

Nevertheless, the need for depicted revisions that the CAFIAS required has been consistently claimed by Mancini (1974) and to that effect, CAFIAS was further analyzed by the author of this research (Salvara, 2001b). In this vein, the 'questions' category was further analyzed into question types, such as informative, exploratory, converging and diverging.

Furthermore, several categories were analyzed, such as the 'learners' responses' to mechanical and conscious; 'teacher order' into the types of with speech, with speech and task execution and with questions and task execution; 'negative social reinforcement' was developed into strong control with disapproval, reproach, mild control with suggestions (e.g. to be more careful). In this manner, 'instruction' category was developed into the whole class together, individually and reciprocally; while, the 'learners initiative behaviours' was further broaden into discovery for a unique solution on a task and production of new solutions on a task.

The CAFIAS revisions created by the author have been derived from theoretical frameworks (Cheffers, 1977; Hardy, 1998; Mosston & Ashworth, 1994) and have been published in *Mentor Journal* (Salvara, 2001b). Cheffers et al. (1974) applied similar revisions on CAFIAS. To this, it is noteworthy that video entries have been suggested to be more reliable due to the possibility of repeatedly observing situations (Cheffers, 1977; Knapp, 1971). The CAFIAS is displayed in Table 8.

Each of the CAFIAS coded sessions present 'what actually happens' during instruction. The allocation of interaction behavioural categories is expressed in percentages (Cheffers et al., 1976), which help identifying the CAFIAS categories protocol.

**Table 8.** Cheffer's Adaptation of Flanders' Interaction Analysis System (enriched by Salvara, 2001b)

Categories of Verbal and non Verbal Behaviours		Every 3" marks with I	Categories of Verbal and non Verbal Behaviours	Every 3" marks with I
2	<b>The PE teacher makes use of positive social reinforcements:</b> ✓ Approves, rewards, praises, expresses thankfulness, encourages		7	<b>PE teacher makes use of negative social reinforcements</b> ✓ Disapproves strongly, reproaches, talks to himself ("cruel" control) ✓ Suggests attention, makes bona fide remarks about corrections of errors ("smooth" control) ✓ Scowls, frowns, and sets lips, raises voice, and smiles sarcastically.
12	✓ Smiles, moves head, applauds, friendly taps shoulders		17	
3	<b>The PE teacher accepts the learners' ideas and feelings:</b> ✓ Agrees, repeats, clarifies, expands, uses the difficulty		8	<b>Learners answer mechanically:</b> ✓ All jointly reproduce exercises without thinking about them or answer provident questions ✓ One by one in a row performs assisted by the instructor ✓ Move without expression their heads, laugh spasmodically, act mechanically
13	✓ Smiles without any nod, inclines head forward, takes part in the game, helps with the exercises		18	<b>Learners answer having thought about it:</b> ✓ Apply execution model ✓ Individual work ✓ Reciprocal work ✓ Group work ✓ Work with self-control ✓ Work with selected difficulty level -Reply in order of hierarchically placed questions until discovery of solution and confirm with movement - Hold jaw, have a thoughtful look, strike finger
4	<b>The PE teacher asks questions:</b> ✓ Informative ✓ Exploratory ✓ Converging ✓ Diverging		8'	<b>Learners develop initiative :</b> ✓ Ask unforeseeable questions and introduce movements giving multiple solutions ✓ Perform a program, with free or guided planning ✓ Sigh, pug & blow, ask unsolicited questions, at their own will and without provocative behaviour
14	✓ Frowns, lifts eyebrows up, opens mouth, holds jaw, stands still, looks right in the eyes		18'	
5	<b>The PE teacher recommends roles, describes, informs, shows, expresses himself:</b> ✓ By speech ✓ By speech & display ✓ <b>By rhetoric questions &amp; display</b>		9	<b>Learners are in a state of confusion, are naughty and noisy</b>
15	✓ With display, sketches, drawing lines, gestures		19	<b>Learners are seated doing nothing. They are silent</b>
6	<b>The PE teacher guides his learners:</b> ✓ With instructions and commands ✓ With performance plan and criteria		10	
16	✓ Nods with head, shows with finger, whistles		20	

### 4.3.Data Collection and Setting

Each research instrument employed to examine every of the 84 teachers consented to participate in the two cities.

#### 4.3.1. Physical Education Teachers' Representations on Instruction Questionnaire (PE-TRIQ I & II)

A pilot study was initially conducted including PE teachers ( $N=12$ ). Responses were first examined to determine whether the statements seemed clear and appropriate and

then the necessary corrections were made (Borg & Gall, 1989). An independent panel of pedagogy experts ( $N=9$ ) in the field reviewed each item's face validity in terms of whether it reflected a reproduction, production, assimilation or discovery model in the PE context.

The panel also provided guidelines and remarks for corrections regarding the clarity of language and meaning. Content validity was established by making all methodological decisions related to data collection and analyses in light of the framework that was theorized for studying representations and teaching styles (Moscovici, 1982; Mosston & Ashworth, 2002; Silverman, 1991). Goldberger's (1992) assumptions and analyses on PE teaching frameworks were also taken into consideration. Although no exploratory pilot testing was conducted on PE-TRIQ prior to its use in the present research, Salvara, Bognár, Biró and Salvaras (2002) used this measure in a similar fashion in the PE Greek and Hungarian context and reported acceptable internal reliabilities for the measure.

The questionnaires were self-administered with a lag of 1 month to each teacher, but not always completed on the spot by the teachers. The reason for this lag was that both PE-TRIQ I & II included identical items but different main questions (item importance vs. frequency of employment).

Prior to data collection, researchers explained that the PE-TRIQ was a survey, not a test, and there were neither right nor wrong answers. They also encouraged the participants to work at their own pace. In those cases, which the teachers did not complete the questionnaires on the spot, the author and two fourth year PE students were available throughout the process for uprising questions by the respondents. As a consequence, the possibility of missing or misunderstood data was eliminated. The return rate of the PE-TRIQ I & II was 93%.

The issue of the PE-TRIQ I statements estimated importance and PE-TRIQ II estimated frequency of employment were a matter of mere degree, expressed on a five-point Likert-type scale anchored by *not at all*=1 to *very much*=5.

#### **4.3.2. I ITLB and CAFIAS Systematic Observation Setting**

One lesson of each teacher choice in which they taught any activity to pupils was videotaped and coded during a half-year period in both cities. The mean length of these lessons was 40.14 minutes and the mean class size was 21.73 pupils. A total of 3.360

minutes were observed in Athens and Budapest in the case of the I ITLB, while a total of 67.200 tri-seconds in the case of CAFIAS.

Activities chosen by the teachers were athletics (high-jump, long-jump, low hurdles, races, medicine and soft ball tasks, shot-put, running, etc), gymnastics (vault, uneven bars, balance beam, floor exercises, etc), basketball, volleyball, football, handball, floor hockey, general conditioning (endurance, gym-strength) and elementary school-games (often tag and ball games). Since, for the CAFIAS investigation, the same lessons were coded as for the I ITLB, the videotapes were analyzed following each I ITLB unit.

#### **4.3.2.1. I ITLB Coding, Observer Training and Internal Consistency**

During observations, the seventeen categories of teaching and learning behaviours were recorded and videotaped simultaneously. The coders recorded except for the frequency of appearance of each category, their sequence as well. A beeper provided auditory and visual stimuli at the end of each and every minute. Observer training included the simultaneous coding of approximately 6 lessons, which were a combination of videotaped sessions and live observations.

Data collection did not begin until an interobserver agreement (IOA) of .86 was achieved between the author and the second coder. The two coders simultaneously observed fourteen (16.7%) of the classes for IOA. IOA percentage was established by dividing the number of agreements by the number of agreements plus disagreements and multiplying by hundred (Van der Mars, 1989). A high level of IOA was maintained throughout data collection. The average IOA for this study was 93.2%.

#### **4.3.1.2. Structured Interview (Following the I ITLB)**

The author following each I ITLB coding and videotape recording conducted the interviews. In Budapest, a native translator, being a fourth year (TF) university pupil was writing the answers for each PE teacher. The interviewer took a 2-hour training program. Effective interviewing skills were presented, discussed and practised during the training sessions. Each interview took place at the respective schools for a one-to-one 10 min session.

All interviews were transcribed and analyzed. Triangulation with the descriptive data was accomplished during the preparation of the analyses to ensure the credibility of the interview data.

#### **4.3.1.3.CAFIAS Coding, Observer Training and Internal Consistency**

Observers completed a training program similar to that developed for earlier CAFIAS programs (Cheffers et al., 1977). The training program included category definitions and the coding instrument (Siedentop et al., 1994). Observers studied, then met to discuss categories and, in particular, situations in which discriminations among categories might be problematic. Videotapes, existed from the initial I ITLB recordings were made available for practice, and the two coders always practised in pairs, coding portions of a tape, and then stopping the tape to compare and discuss their coding.

Using the videotape record, the author and the second observer, being also a (TF) university pupil, otherwise unconnected with previous I ITLB recording, coded every three seconds, the teacher-learners interaction data. To assess coding bias and reliability, the two coders recorded seven participants, randomly selected. The mean interobserver agreement measure was 91.6%.

#### **4.3.1.4. Limitations of the Research Instruments**

Several published papers have speculated on the limitations of the instruments employed in the present research. In this vein, for the questionnaire survey, McBride (1993, p. 195) interestingly asserts that, “no single paper-pencil instrument can be totally effective in quantifying all concerns.”

Although informed consent was obtained prior to recording, PE teachers, school principals and pupils were well informed and despite the advantages of field observation, that is, “studying the independent variable in a natural context” (Cozby, 1997, p. 71), the PE teachers and pupils might have felt uncomfortable and careful to their explicit behaviours (Cozby, 1997; Thomas & Nelson, 1996).

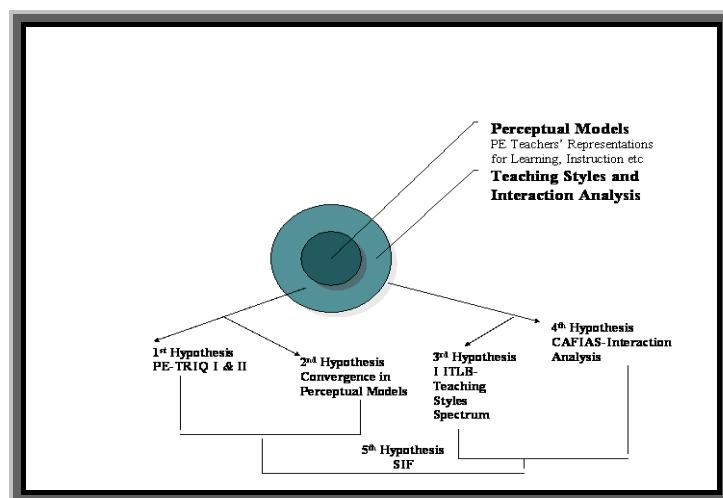
However, in the present design, interval systematic observation was obtained, that is, only specific behaviours were of interest (Anderson, 1975). Since, it is difficult to observe and code behaviours on the same time, videotape equipment was employed in the present research, as it ensures a permanent record of the behaviour observed. To

this, the issue is “reactivity-the possibility that the presence of the camera will affect people’s behaviour” (Cozby, 1997, p. 83). It should be noted that, “the presence of a camera may alter behaviour, to the extent that the subjects do not behave normally” (Thomas & Nelson, 1996, p. 338).

Another limitation is the interviewer bias. It refers to “all of the biases that can arise from the fact that the interviewer is a unique human being interacting with another human” (Cozby, 1997, p. 98). It should be noted that a response set (Cozby, 1997) is a tendency of the responders to provide answers directly related to the questions, that is, social desirable answers. Acknowledging limitation issues, triangulation was adopted in the present design to minimize possible bias.

#### **4.3.1.5. Algorithm of the Data Collection and Analyses**

Data collection and analyses were conducted on the basis of triangulation (Goetz & LeCompte, 1984). Figure 7 displays the algorithm.



**Figure7.** Data Collection Algorithm

#### **4.4. Data Analyses on Research Hypotheses**

Data analyses were performed solely with the statistical package for social sciences (SPSS) 10.01 version (Norusis, 1999). In all cases probability was regarded as significant at a value of .05 or less, for control of Type I error rate (Field, 2000). Effect sizes, Eta squared (?<sup>2</sup>), was a variance-accounted-for effect size measure in MANOVA and ANOVA (Thomas et al., 1991), which indicate the proportion of the total variability explained by the factor, were computed for all analyses (APA, 1994; Dunn, 2000).

Since, multivariate procedures and subsequent univariate ones are parametric techniques, thus, the assumptions of normality should be met. Accordingly, a Kolmogorov-Smirnov statistic with Lilliefors significance level, for testing normality of distributions was conducted prior to analyses. The assumption for normally distributed data was met, thus analyses could further proceed (Tabachnick & Fidell, 1996).

In addition, prior to any multiple comparison procedure, a Levene's test was conducted for the examination of equality of variance between the groups analyzed. Levene's statistic tests the null hypothesis that the variances of the groups are the same, therefore, a significant value of  $p<.05$ , would mean that the variances are significantly different, that is, one assumption of parametric statistics (equal variance) would be violated (Field, 2000; Thomas & Nelson, 1996). No Levene's test that was conducted proved to be significant. Thus, the distributions were not significantly different from normal ones (Field, 2000).

To ensure meaningfulness (Type I error), Games-Howell *post-hoc* tests were conducted for confirmation, since they have a good control over Type I error rate (Field, 2000). Games-Howell statistic was the preferred *post-hoc*, since the design was unbalanced (no completely equal size groups). Thus, this investigation warrants a strong control over Type I error rate in all analyses (Tabachnick & Fidell, 1996).

Games-Howell is a conservative technique for multiple comparisons, because it exerts a tight control on the significance level ( $\alpha$ ), by readjusting it according to the size of the groups that are pair-wise compared. It lacks power, when compared to other *post-hoc* tests, meaning that increases the odds of committing a Type II error rate. In other words, since it is conservative, an existing difference might not be detected. However, such approach is advocated for examination of differences especially in comparative studies (Babbie, 1998).

It should be noted that the interview data were analyzed by developing categories on teachers' responses. To this, responses were dissecting and general categories emerged. The data from the interviews used to crosscheck the ITLB lesson codings and thus their analysis into detail written form were not the aim of this research.

#### **4.4.1. Data Analysis on the First Research Hypothesis**

Data were analyzed according to nationality. Exploratory factor analyses using varimax rotation with principal component analysis (PCA) extraction with Kaiser Normalization were conducted to verify the validities of PE-TRIQ I & II. Cronbach's (1951) alpha coefficients were calculated for each revealed factor structure (reproduction, assimilation, discovery and production) in both countries. In addition, parallel scale reliability method was employed, which assumes that all items have equal variances and equal error of variances across replications. Descriptive statistics were computed for all PE-TRIQ I & II subscales.

Multivariate analysis of variance (MANOVA) by means of a general linear model (GLM) was conducted separately for the teachers' samples, to examine whether any significant main effects could be displayed between the revealed factor structure (dependent variables) and the characteristics of PE teachers' gender, years of teachers' teaching experience, postgraduate studies, pupils' socioeconomic status at which teachers taught, and the school grade (independent variables). The interaction effects of nationality (city) x pupils, years of experience x postgraduate studies, postgraduate studies x gender x years of experience and nationality x years x postgraduate studies were examined.

Follow-up univariate analyses of variance (ANOVAs) were conducted to the significant multivariate effects revealed, in order to identify whether any differences in the PE teachers' represented importance (PE-TRIQ I) and frequency of employment (PE-TRIQ II) on each revealed factor/subscale (dependent variable) could be attributed to the characteristics described (*vide supra*). Games-Howell adjustments were made to keep the overall error rate under .05 (Field, 2000).

##### **4.4.1.1. Data Analysis on the Second Research Hypothesis**

Pearson product-moment correlations (zero order) were applied to determine the degree of relationships in the PE teachers' represented importance (PE-TRIQ I) and frequency of employment (PE-TRIQ II) on the revealed factor structure separate for the teacher samples of the present study. The main purpose of the correlation analysis was to determine whether the teachers represented to employ what they initially regarded as important (Ennis & Chen, 1995; Tsangaridou & O' Sullivan, 2003).

#### **4.4.2. Data Analysis on the Third Research Hypothesis**

Descriptive statistics were computed on all eighty-four coded lessons. Teaching styles were constructed on the basis of observed teaching and learning behaviours. Comparisons were made between the teaching styles employed by Greek and Hungarian teachers. A bivariate correlation analysis was employed to determine multicollinearity between the I ITLB categories (dependent variables). MANOVA was conducted to examine whether any differences in the time spent by the teachers in two countries could be attributed to the characteristics of gender, years of teaching experiences, teachers' postgraduate studies, pupils' socioeconomic status and school grade (independent variables). Similarly to the first hypothesis, interaction effects were examined.

Follow-up ANOVAs were performed for the main effects revealed. Consequently, exploratory data analysis was performed. For pairwise comparisons, the *post-hoc* Games-Howell procedure was the preferable follow-up test, as it ensures a good control over Type I error rate (Field, 2000).

#### **4.4.3. Data Analysis on the Fourth Research Hypothesis**

Descriptive statistics were calculated on all 84 lessons. Mean percentages of interactions were calculated and their distribution parameters were formulated for both countries. Interactions were analyzed into groups of verbal and non-verbal behavioural category as investigated and coded (total 10 verbal and non-verbal interactions). Independent samples *t-test* was employed to initially determine any differences on the CAFIAS interactions by the teachers in Athens and Budapest. PE teachers' teaching style employments were structured and displayed based on the CAFIAS verbal and non-verbal interaction codings.

A bivariate correlation analysis was employed to determine multicollinearity between the CAFIAS interactions (dependent variables). MANOVA, by means of a GLM, was conducted to examine whether any differences in the CAFIAS interactions (dependent variables) by the teachers in two countries could be attributed to the characteristics of gender, years of teaching experiences, teachers' postgraduate studies, teaching strategies employed, pupils' socioeconomic status and school grade (independent variables). Similarly to the first and third hypotheses, interaction effects were examined.

All significant MANOVAs were followed by ANOVAs and subsequent exploratory data analysis with Games-Howell procedure for pairwise comparisons (Stevens, 1996). ANOVAs were performed on each of the five interaction indices, in order to reveal the differences between the CAFIAS coded interactions. This means that the ten interactions were grouped into five opposing behaviours (Cheffers, 1977) (see Figure 18). Finally, ANOVAs separate on the five CAFIAS indices were conducted.

#### **4.4.4. Data Analysis on the Fifth Research Hypothesis**

The semantic instructional framework (SIF), for both countries, was comprised by the four model perceptual factors revealed by the PE-TRIQ I & II. Each of the factor models functions under different teaching styles (I ITLB), which in turn denotes different verbal and non-verbal interactions (CAFIAS). Descriptive statistics were computed for all instruments with triangulation and displayed in an attempt to connect each of the investigated measures of this research design.

The analysis of each factor perceptual model allowed for the construction of the semantic instructional framework as this was captured in both countries. Furthermore, in order to investigate whether each PE teacher's perceptual model mirrors everyday practice, descriptive statistics were computed for all didactic dimensions revealed, that is, reproduction, assimilation, discovery and production.

## **Chapter 5. Results**

### **5.1. Results on the First Research Hypothesis**

Internal consistency is the degree to which people perform similarly throughout all parts of a scale. The PE-TRIQ I (represented importance) & II (represented frequency of employment) internal consistencies were determined by Cronbach's (1951) alpha reliability coefficients and parallel scale method for the revealed four-factor-solution. All PE-TRIQ I & II scales demonstrated reliable internal consistency.

More specifically, alpha reliability of the PE-TRIQ I factor structure ranged from .87 to .98 in the case of Athens and .88 to .96 in that of Budapest. While, the alpha reliability of the PE-TRIQ II scales ranged from .72 to .97 in the case of Athens and .57 to .97 in that of Budapest. Table 9 presents the reliability estimates on PE-TRIQ I & II for both cities.

**Table 9.** PE-TRIQ I & II Alpha Coefficients in Athens and Budapest

PE-TRIQ I & II Factors	PE-TRIQ I (importance)		PE-TRIQ II (frequency of employment) a			
	Athens	Budapest	Athens	Budapest		
Reproduction	.98	.96	.97	.96		
Assimilation	.87	.91	.72	.57		
Discovery	.95	.88	.96	.90		
Production	.95	.94	.97	.95		

Parallel scale reliabilities ranged from .88 to .96 on PE-TRIQ I for Athens and from .87 to .97 for Budapest. Similarly, parallel scale reliabilities ranged from .78 to .97 on PE-TRIQ II for Athens and from .85 to .96 for Budapest. All tests for goodness of fit of each scale (parallel) were also deemed acceptable (Field, 2000). Parallel reliability estimates, means and standard deviations for all PE-TRIQ I scales are displayed in Table 10. Table 11 presents the same measures for PE-TRIQ II. In the PE-TRIQ I parallel scale reliability analyses, the estimated common inter-item correlations ranged from .58 to .86 for Athens, while it ranged from .51 to .72 for Budapest. Subsequently, in PE-TRIQ II, the common inter-item correlations ranged from .40 to .77 for Athens and from .53 to .74 for Budapest.

**Table 10.** Parallel Scale Consistency Estimates, Means and Standard Deviations for each PE-TRIQ I subscales

PE-TRIQ I Factors	Mean		SD		? <sup>2</sup> †		df		Scale reliability	
	A	B	A	B	A	B	A	B	A	B
Discovery	18.1	18.0	5.5	3.7	92.0	101.7	26	26	.96	.88
Production	15.3	18.6	6.2	7.2	143.2	97.1	26	26	.95	.95
Assimilation	17.1	17.0	4.0	4.2	51.0	26.9	13	13	.88	.91
Reproduction	34.2	29.7	8.7	9.0	116.4	112.9	43	43	.98	.96

**Table 11.** Parallel Scale Consistency Estimates, Means and Standard Deviations for each PE-TRIQ II subscales

PE-TRIQ II Factors	Mean		SD		? <sup>2</sup> †		df		Scale reliability	
	A	B	A	B	A	B	A	B	A	B
Reproduction	34.3	30.4	8.7	9.4	126.7	112.7	43	43	.97	.96
Production	14.1	17.9	7.0	7.5	169.7	117.3	26	26	.96	.94
Discovery	17.4	21.6	5.6	5.3	81.7	62.1	26	26	.96	.91
Assimilation	15.5	15.9	3.4	3.8	28.4	56.4	13	13	.78	.85

Note. ?<sup>2</sup> denotes chi-square estimation, † p<.005; df refers to the degrees of freedom; scale reliability presents the parallel method; A=Athens; B=Budapest

Exploratory factor analyses using varimax rotations with PCA examined the structure of the 28 items designed to measure teachers' representations on instruction. Stevens

(1996) recommended interpreting only factor loadings with an absolute value greater than .40, which explain around 16 percent of the variance. Following Stevens's suggestions, in the present analysis, the minimum loading used to identify items was .40.

A four-factor solution with eigenvalues greater than 1 (Kaiser, 1960) emerged, in both cases of PE-TRIQ I & II, accounting for 85.5% of total variance for Athens and 79.3% for Budapest on the PE-TRIQ I (importance). Subsequently, 83.4% of total variance accounted for Athens and 80.4% for Budapest on the PE-TRIQ II (frequency of employment).

The Kaiser-Meyer-Olkin (KMO) coefficient was taken into consideration in the analyses process. The results indicated that since KMO coefficients were greater than 0.5, thus, it could be assumed that the "present study samples were adequate" (Field, 2000, p. 445). Specifically, KMO was found on PE-TRIQ I .792 for Athens and .751 for Budapest, all at  $p < .001$ . Consistently, KMO on PE-TRIQ II was found .784 for Athens and .754 for Budapest, all at  $p < .001$ . The anti-image correlation matrices, both for PE-TRIQ I & II analyses indicated, that most of the off-diagonal elements representing the partial correlations between the variables were small ( $p < 0.05$ ), indicating that "the samples were adequate for the given variables examined in each factor" (Field, 2000, p. 446).

The criterion of the Bartlett's Test of Sphericity (BTS) was found for PE-TRIQ I 1959.890 for Athens and 1531.363 for Budapest. Additionally, for PE-TRIQ II, BTS was found 1707.904 for Athens and 1668.739 for Budapest, all at  $p < .0001$ . All BTS measures had 378 degrees of freedom. BTS results showed that the present data were adequate to follow with the factor analyses (Nunnaly, 1978).

Communalities ( $h^2$ ), displayed in Table 12, for PE-TRIQ I and in Table 13 for PE-TRIQ II, are a measure of variance explained by the extracted factors, were all found to be well above 0.5 (Field, 2000). Based on MacCallum et al (1999) indications, as communalities become lower the importance of sample sizes increases. In this respect, for the present analyses, all communalities were revealed well above 0.6. In short, Guadagnoli and Velicer (1988) supported that even relatively small sample sizes (less than 60) may be perfectly adequate.

As presented in Table 12, which includes the PCA, in the case of PE-TRIQ I for Athens, the first factor included 7 items indicating an instructional emphasis towards discovery of knowledge. The second factor consisted of 7 items, suggesting production of knowledge. The third factor comprised of 9 items, referring to reproduction of knowledge. While, the fourth factor included 5 items, emphasizing knowledge achieved through assimilation.

The PE-TRIQ I revealed exactly identical solutions and number of items in each factor for Budapest, except for their order, that is, the first factor included 7 items, denoting discovery (similarly to Athens), the second factor included 7 items, referring to production (as in the case of Athens), the third factor comprised of 5 items, indicating assimilation and the fourth included 9 items, suggesting reproduction of knowledge (Table 12).

The PCA (Table 13) for PE-TRIQ II for Athens revealed that the first factor included 9 items, referring to reproduction, the second factor included 7 items, emphasizing production, the third factor consisted of 7 items, indicating discovery and the fourth factor included 5 items, referring to assimilation of knowledge.

Finally, the PCA analysis of PE-TRIQ II for Budapest revealed exactly identical factor structure and number of items with that of Athens. Specifically, the first factor included 9 items, referring to reproduction, the second factor included 7 items, emphasizing production, the third factor consisted of 7 items, indicating discovery and the fourth factor included 5 items, referring to assimilation of knowledge (Table 13).

**Table 12.** Principal Component Analysis (PCA) for PE Teachers' Representations on Instruction--PE-TRIQ I-Represented Importance -- Following Varimax Rotation

PE-TRIQ I 28 Items	Athens				Budapest				$h^2$
	Factor1 (Disc)	Factor2 (Prod)	Factor3 (Repro)	Factor4 (Assim)	Factor1 (Disc)	Factor2 (Prod)	Factor3 (Assim)	Factor4 (Repro)	
<b>Discovery (Disc) Factor 1</b>									
3. Learning: step-by-step through questions asked...	.90				.84	.55			.74
4. Learning: discovery of the unique solution for a task...	.82				.78	.54			.80
20. Communication: teacher guides learners to recall previous knowledge...	.63				.91	.60			.83
22. Evaluation: teacher regulates subsequent teaching acts...	.67				.70	.65			.65
23. Evaluation: teacher finds out knowledge gaps...	.85				.89	.49			.75
24. Evaluation: teacher checks the prerequisite knowledge...	.71				.88	.41			.50
27. Mistakes: teacher explains the procedure...	.86				.85	.74			.60
<b>Production (Prod) Factor 2</b>									
5. Learning: discovery/creation of multiple solutions...		.92			.92	.77			.84
6. Learning: teacher guided planning of a program...		.93			.94	.86			.92
7. Learning: free planning of a program...		.90			.92	.78			.87
16. Learners' development: teacher delegates some decisions on preparation and learners' take them on conduct and evaluation...		.61			.57	.42			.83
17. Learners' development: when learners take all decisions...		.85			.89	.84			.81
25. Evaluation: teacher assists learners finding their mistakes...		.64			.83	.60			.80
28. Mistakes: incomplete transformations of previous knowledge...		.66			.91	.53			.85
<b>Reproduction (Repro)</b>									
1. Learning: demonstration of a task, while learners' shadow it...			.74		.92				.58 .86
2. Learning: observation and imitation of a task...			.51		.97				.50 .91
8. Teaching: learners work all together under teacher's commands...			.70		.92				.35 .74
9. Teaching: learners' work individually—practising on a task...			.54		.91				.54 .77
13. Development: teacher decides on preparation, conduct and evaluation			.58		.87				.39 .79
14. Development: teacher only delegates some decisions regard to conduct			.63		.89				.83 .82
18. Communication: teacher suggests activities without explaining...			.51		.92				.42 .85
21. Evaluation: teacher assesses development by a grade...			.67		.91				.50 .88
26. Mistakes: assumed as products of carelessness, or confusion...			.51		.88				.59 .92
<b>Assimilation (Assim)</b>									
10. Teaching: reciprocal effort				.77	.78				.80
11. Teaching: self-check				.81	.73				.87
12. Teaching: selection of the difficulty level (inclusion)				.65	.74				.71
15. Development: teacher decides on preparation, pupils on other parts...				.41	.85				.80
19. Communication: teacher agrees with the learners and explains...				.55	.86				.67
% of variance	31.0	25.8	16.7	12.0		21.4	20.3	19.0	18.4
Eigenvalues	8.7	7.2	4.6	3.3		6.0	5.6	5.3	5.1

**Table 13.** Principal Component Analysis (PCA) for PE Teachers' Representations on Instruction-PE-TRIQ II-Represented Frequency of Employment -- Following Varimax Rotation

PE-TRIQ II 28 Items	Athens				Budapest				$h^2$
	Factor1 (Repro)	Factor2 (Prod)	Factor3 (Disc)	Factor4 (Assim)	Factor1 (Repro)	Factor2 (Prod)	Factor3 (Disc)	Factor4 (Assim)	
<b>Reproduction (Repro) Factor 1</b>									
1. Learning: demonstration of a task, while learners' shadow it...	.80				.87	.49			.78
2. Learning: observation and imitation of a task...	.73				.97	.55			.95
8. Teaching: learners work all together under teacher's commands...	.81				.90	.73			.84
9. Teaching: learners' work individually —practising on a task...	.54				.84	.52			.78
13. Development: teacher decides on preparation, conduct and evaluation	.64				.70	.78			.80
14. Development: teacher only delegates some decisions regard to conduct	.85				.84	.74			.89
18. Communication: teacher suggests activities without explaining...	.50				.66	.54			.90
21. Evaluation: teacher assesses development by a grade...	.87				.90	.72			.79
26. Mistakes: assumed as products of carelessness, or confusion...	.70				.93	.73			.89
<b>Production (Prod) Factor 2</b>									
5. Learning: discovery/creation of multiple solutions...		.88			.95		.85		.84
6. Learning: teacher guided planning of a program...		.87			.93		.92		.96
7. Learning: free planning of a program...		.93			.95		.91		.88
16. Learners' development: teacher delegates some decisions on preparation and learners' take them on conduct and evaluation...		.47			.74		.45		.89
17. Learners' development: when learners take all decisions...		.86			.93		.95		.92
25. Evaluation: teacher assists learners finding their mistakes...		.67			.81		.66		.81
28. Mistakes: incomplete transformations of previous knowledge...		.72			.93		.77		.79
<b>Discovery (Disc) Factor 3</b>									
3. Learning: step-by-step through questions asked...			.77		.89			.87	.80
4. Learning: discovery of the unique solution for a task...			.69		.87			.51	.82
20. Communication: teacher guides learners to recall previous knowledge...			.46		.86			.50	.58
22. Evaluation: teacher regulates subsequent teaching acts...			.89		.90			.82	.84
23. Evaluation: teacher finds out knowledge gaps...			.85		.96			.50	.86
24. Evaluation: teacher checks the prerequisite knowledge...			.60		.85			.37	.60
27. Mistakes: teacher explains the procedure...			.71		.80			.48	.79
<b>Assimilation (Assim) Factor 4</b>									
10. Teaching: reciprocal effort				.77	.70				.60
11. Teaching: self-check				.89	.80				.48
12. Teaching: selection of the difficulty level (inclusion)				.76	.78				.46
15. Development: teacher decides on preparation, pupils on other parts...				.53	.43				.66
19. Communication: teacher agrees with the learners and explains...				.42	.72				.78
% of variance	59.2	11.1	7.7	5.4		56.2	12.4	6.5	5.3
Eigenvalues	16.5	3.1	2.1	1.5		15.7	3.4	1.8	1.5

For the examination of teachers' differences, a one-way MANOVA was applied for the examination of the effects of a vector of independent factors on the PE-TRIQ I & II revealed factor structures. By means of a GLM multivariate procedure, the dependent variables were the four revealed PE-TRIQ I & II factors (separate for each GLM), while the variables of teachers' years of teaching experience, gender, postgraduate studies, pupils' socioeconomic status and school grade at which teachers' taught were the factors (independent variables).

The MANOVA conducted on PE-TRIQ I (represented importance), revealed significant multivariate main effects for the factors of **teachers' postgraduate studies**, Wilk's  $\lambda = .524$ ,  $F(4, 50) = 11.34$ ,  $p=.001$ ,  $\eta^2=.47$ , and **pupils' socioeconomic status** at which teachers' taught, Wilk's  $\lambda = .671$ ,  $F(12, 132) = 1.79$ ,  $p=.005$ ,  $\eta^2=.12$ . Non-significant main effects were found for teachers' years of experience, gender, school grade and the factor of nationality (city).

Significant multivariate effects were revealed for the interaction of gender x teaching experience x postgraduate studies, Wilk's  $\lambda = .455$ ,  $F(24, 150) = 1.85$ ,  $p=.013$ ,  $\eta^2=.18$ . Specifically, the interaction of gender x years x postgraduate studies,  $F(6, 53) = 4.22$ ,  $p=.002$ ,  $\eta^2=.32$  and city x years x postgraduate studies, even though it did not reveal a main effect,  $F(6, 53) = 2.70$ ,  $p=.023$ ,  $\eta^2=.24$  were found significantly different for the second factor, denoting production.

Following Field's (2000) suggestions that "the power of MANOVA increases and decreases as a function of correlations between dependent variables" (p. 338), while "the univariate test is relatively more powerful than the multivariate test" (p. 339), follow up ANOVAs were applied for each PE-TRIQ I factor separately. By means of a GLM univariate procedure, the dependent variable was each revealed PE-TRIQ I factor, while the independent variables found to have significant multivariate effects were included in the model.

Specifically, teachers **with postgraduate studies** were found significantly different in their represented importance for the first PE-TRIQ I factor, implying discovery of knowledge,  $F(1, 53)=13.05$ ,  $p=.001$ ,  $\eta^2=.20$ , compared to teachers without postgraduate studies. Teachers in both countries with postgraduate studies seemed to regard discovery as an important cluster. Conversely, teachers **without postgraduate studies**

were found significantly different for the third PE-TRIQ I factor, denoting reproduction of knowledge,  $F(1, 53)=13.06, p=.001, ?^2=.20$ . Additionally, **pupils' socioeconomic status** at which teachers taught was significantly different for the second PE-TRIQ I factor, denoting production of knowledge,  $F(3, 53)=4.6, p=.006, ?^2=.21$ . Specifically, Games-Howell *post-hoc* statistic revealed that teachers employed with pupils from high and high/middle socioeconomic background in Budapest regarded as more important the cluster of production. On the contrary, teachers employed with pupils from low/middle and low backgrounds in Athens regarded it reproduction as more important ( $p<.05$ ).

Although a non-significant multivariate main effect was revealed for the independent factor of **years of experience**, it was found significantly different for the second PE-TRIQ I factor, implying production,  $F(3, 53)=4.43, p=.007, ?^2=.20$ . Moreover, Games-Howell *post-hoc* exploratory analysis revealed that teachers having 0-5 and 6-15 years in Budapest seemed to regard it more important, compared to their colleagues in Athens with the same years. However, teachers in Athens having 16-25 years regarded it more important than the teachers having the same experience in Budapest. Both cities' teachers having 26-35 years of experience have showed increased represented importance on production ( $p=.05$ ).

Although, the independent factor of **gender** did not reveal any significant multivariate effects, a tendency was observed,  $F(1, 74)=3.82, p=.054, ?^2=.50$ . Males in both counties, either with or without postgraduate studies represented with increased importance on discovery, compared to females.

For the MANOVA conducted on PE-TRIQ II (represented frequency of employment), significant multivariate effects emerged for the factor of **teachers' postgraduate studies**, Wilk's  $?=.52, F(4, 50)=11.55, p=.001, ?^2=.48$ . Non-significant multivariate main effects were found for teachers' years of experience, gender, pupils' socioeconomic status, school grade and the factor of ethnicity (city).

Significant multivariate effects were revealed for the interactions of nationality (city) x pupils' socioeconomic status, Wilk's  $?=.594, F(12, 132)=2.40, p=.008, ?^2=.16$ , years x postgraduate studies, Wilk's  $?=.668, F(12, 132)=1.81, p=.05, ?^2=.13$ , and city x teaching experience x postgraduate studies, Wilk's  $?=.475, F(24, 175)=1.73, p=.02$ ,

?<sup>2</sup>=.17. Non-significant effect was found for the interaction of gender x teaching experience x postgraduate studies.

By means of a GLM univariate procedure, the dependent variable was each revealed PE-TRIQ II factor, while the independent variables found to have significant multivariate effects were included in the model. Significant univariate effects emerged for teachers **without postgraduate studies** on the first PE-TRIQ II factor, denoting reproduction,  $F(1, 75)=11.74, p=.000, ?^2=.26$ , and for teacher **with post-studies** on the second (production) factor,  $F(1, 75)=3.55, p=.05, ?^2=.04$ .

Even though, a non-significant main effect was found for teachers' years of experience and pupils' socioeconomic status, they both revealed significant univariate effects. Specifically, the independent factors of **years of teaching experience**,  $F(3, 75)= 4.57, p=.005, ?^2=.11$ , and **pupils' socioeconomic status** at which teachers' taught, were found significantly different,  $F(3, 75)= 5.36, p=.002, ?^2=.17$ , on the first PE-TRIQ II factor, implying reproduction of knowledge.

The *post-hoc* Games-Howell test revealed significant differences for the independent variable of years of teaching experience. Specifically, teachers having 16 to 25 ( $p=.001$ ) and 26 to 35 ( $p=.001$ ) years, differed significantly in their represented frequency of employment for the reproduction cluster (first factor) with teachers having 0 to 5 ( $p=.001$ ) and 6 to 15 ( $p=.022$ ) years. That is, teachers, in both cities, with 0-5 and 6-15 showed an increased represented frequency of employment towards the reproduction cluster.

Furthermore, significant differences were found for the pupils' socioeconomic status at which teachers' taught. Specifically, teachers' represented frequency of employment for the reproduction cluster differed significantly for the pupils' belonging to high ( $p=.001$ ) and high/medium ( $p=.001$ ) classes, compared to teachers teaching pupils of low/medium and low classes.

### **5.1.1. Results on the Second Research Hypothesis**

Pearson product-moment correlations (zero order) were applied to determine the degree of relationships, between teachers' represented importance (PE-TRIQ I) and frequency of employment (PE-TRIQ II). Specifically, the purpose was to examine whether the teachers employed what they regarded as important in instruction. Table 14 displays the

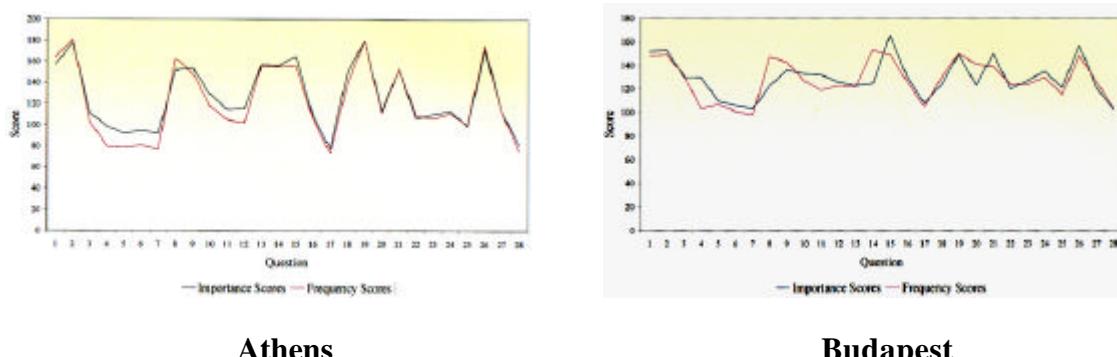
one-tailed correlations between teachers' in Athens and Budapest represented importance and frequency of employment.

**Table 14.** Pearson Product-Moment Correlations (Zero Order) on Teachers' Represented Importance (PE-TRIQ I) and Frequency of Employment (PE-TRIQ II)

Factors/clusters	PE-TRIQ I & PE-TRIQ II	
	Athens	Budapest
Reproduction	.748	.735
Assimilation	.656	.757
Discovery	.835	.251*
Production	.868	.870

Note. All at  $p < .05$ ; \* $p = .05$

Examination of the Table 14 indicates that in all cases teachers, in both cities employed in instruction what they regarded as important. Figures 8 and 9 display the convergence of PE teachers' representations in Athens and in Budapest, respectively, between the 28 items of the PE-TRIQ I (importance) and the PE-TRIQ II (frequency of employment).



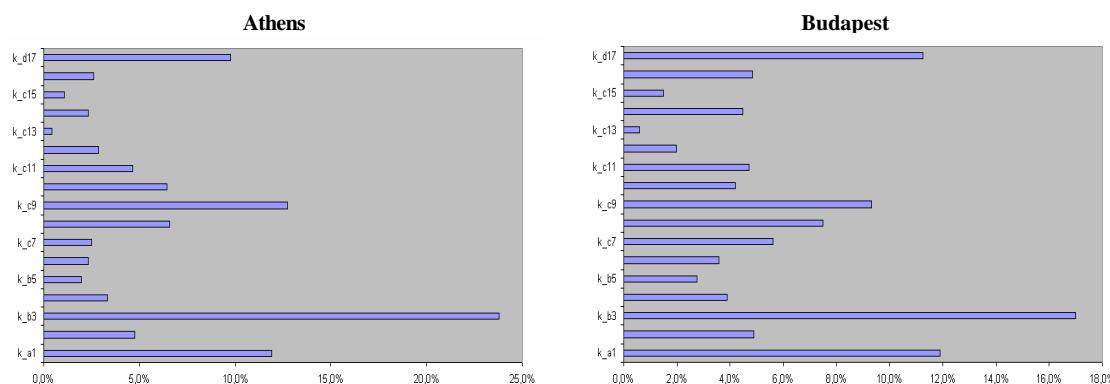
**Figures 8 & 9.** PE-TRIQ I & II Items—Teachers' Represented Importance and Frequency of Employment

## 5.2. Results on the Third Research Hypothesis

The descriptive data in Table 15 present the percentages of intervals in which teachers in Athens and Budapest employed each of the teaching and learning behavioural categories as recorded with the ITLB instrument. Figures 10-11 presents the time allocation of the categories in both cities.

**Table 15.** Time Allocation of Teaching and Learning Categories of I ITLB by Teachers in Athens and Budapest

Teaching& Learning Behavioural Categories (I ITLB Instrument)	Athens				Budapest			
	M	SD	Total (min)	%	M	SD	Total (min)	%
<b>Introduction</b>								
Orientation of pupils' thought (A1)	4.76	3.07	200	11.9	4.74	3.40	199	11.9
Questioning situation (A2)	1.90	3.53	80	4.8	1.95	3.21	82	4.9
<b>Continuation</b>								
Observation and imitation of the exercise pattern (B3)	9.52	5.82	400	23.8	6.76	5.52	284	17.0
Discovery under PE teacher's guidance (B4)	1.33	4.99	56	3.3	1.55	4.89	65	3.9
Discovery with pupils' effort (B5)	0.79	3.56	33	2.0	1.10	4.01	46	2.8
Creation of multiple solutions (B6)	0.93	4.20	39	2.3	1.43	5.22	60	3.6
Planning of an individual program (B7)	1.00	3.70	42	2.5	2.24	5.60	94	5.6
<b>Reconstruction</b>								
Work with whole class in a uniform manner (C8)	2.64	7.31	111	6.6	2.98	7.44	125	7.5
Individual work (C9)	5.10	8.24	214	12.7	3.71	7.27	156	9.3
Reciprocal work (C10)	2.57	5.91	108	6.4	1.67	5.22	70	4.2
Work at a selected difficulty level (C11)	1.86	5.14	78	4.6	1.88	5.88	79	4.7
Work with self-control (C12)	1.14	4.18	48	2.9	0.79	3.57	33	2.0
Discovery application work (C13)	0.17	1.08	7	0.4	0.24	1.54	10	0.6
Work with checking discovery's reliability (C14)	0.93	2.91	39	2.3	1.79	4.46	75	4.5
Work with checking the reliability of multiple solutions (C15)	0.43	1.99	18	1.1	0.60	2.23	25	1.5
Conduct of the individual program (C16)	1.05	3.91	44	2.6	1.93	4.90	81	4.8
<b>Output</b>								
Pupils' evaluation (D17)	3.90	1.25	164	9.8	4.48	1.02	188	11.2
<b>Total</b>			<b>1681</b>				<b>1672</b>	



**Figure 10 & 11.** Time Allocation of I ITLB Teaching and Learning Behavioural Categories

It was found, in the case of **Athens** (Table 15 and Figure 10) that all teaching and learning behavioural categories were allocated with a highly unequal distribution between them. Specifically, ‘pupils’ thinking orientation’ (A1=11.9%), during introduction, consumed 2.43 times more instructional time, compared to the ‘questioning situation’ (A2=4.8%). During continuation to instruction, the ‘observation and imitation of the pattern’ consumed twice as much instructional time (B3=23.8%), compared to the time consumed by altogether the ‘discovery under PE teacher’s

guidance,’ the ‘pupils’ discovery’ effort,’ the ‘creation of multiple solutions,’ and the ‘individual program’ (B4, 5, 6, 7=10.1%).

During reconstruction to instruction, the ‘work with whole class,’ the ‘individual work,’ the ‘reciprocal work,’ the ‘work with selection of difficulty level,’ and the ‘work with self-control’ (C8, 9, 10, 11, 12=33.2%) consumed 5.19 more instructional time than the ‘discovery application work,’ the ‘work with checking on the discovery’s reliability,’ the ‘work with checking on the multiple solutions’ reliability,’ and the ‘conduct of the individual program’ (C13, 14, 15, 16=6.4%). During output to instruction, the ‘pupils’ evaluation’ consumed a total of 9.8% (D17) instructional time.

In the case of **Budapest** (Table 15 and Figure 11), it was found that all teaching and learning behavioural categories were allocated with a balanced distribution between them. Specifically, the ‘orientation of pupils’ thought’ (A1=11.9%), during introduction, consumed 2.43 times more instructional time, compared to the ‘questioning situation’ (A2=4.9%). During continuation to instruction, the ‘observation and imitation of the pattern’ consumed double instructional time (B3=17%), compared to the time consumed by altogether the ‘discovery under PE teacher’s guidance,’ the ‘discovery with learners’ effort,’ the ‘creation of multiple solutions,’ and the ‘individual program’ (B4, 5, 6, 7=15.9%).

During reconstruction to instruction, the ‘work with whole class,’ the ‘individual work,’ the ‘reciprocal work,’ the ‘work with selection of difficulty level,’ and the ‘work with self-control’ (C8, 9, 10, 11, 12=27.7%) consumed 2.43 more instructional time than the ‘discovery application work,’ the ‘work with checking on the discovery’s reliability,’ the ‘work with checking on the multiple solutions’ reliability,’ and the ‘conduct of the individual program’ (C13, 14, 15, 16=11.4%). During output to instruction, the ‘pupils’ evaluation’ consumed a total of 11.2% (D17) instructional time.

An examination of the data in Table 15 indicates that Hungarian teachers tended to employ more indirect teaching and learning behaviours along with direct, compared to teachers from Athens that seemed to employ more teacher-centred behaviours.

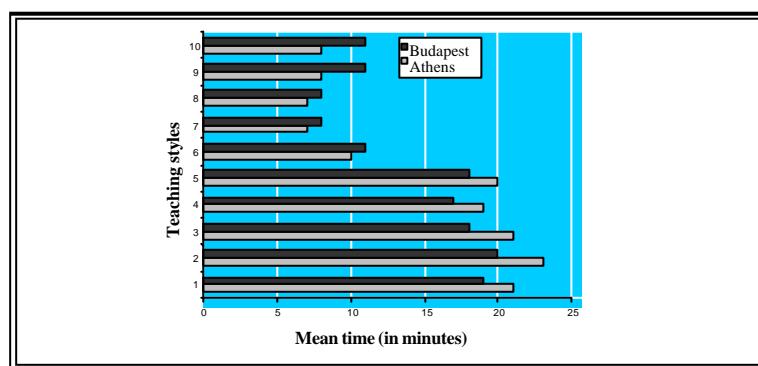
The mean values and percentages of intervals as coded with I ITLB are presented in Table 16. This table shows the employment of teaching styles by the teachers in Athens and Budapest. Examination of Table 16 indicates that although teachers in both

countries spent the larger proportion of their time in reproductive and assimilative teaching styles. It is evident that Hungarian teachers attributed more of their time to discovery and productive styles, compared to the time spent by their Greek colleagues in the same behavioural clusters.

**Table 16.** Mean Values and Percentages for Each Teaching Style Employment by Teachers in Athens and Budapest

Teaching Styles & I ITLB categories	Athens			Budapest		
	M	Total (min)	%	M	Total (min)	%
<b>Reproductive styles</b>						
Command (1) A1+B3+C8+D17	21	875	14	19	796	14
Practice (2) A1+B3+C9+D17	23	978	16	20	827	14
<b>Assimilation styles</b>						
Reciprocal (3) A1+B3+C10+D17	21	872	14	18	741	13
Self-check (4) A1+B3+C12+D17	19	812	13	17	704	12
Inclusion (5) A1+B3+C11+D17	20	842	14	18	750	13
<b>Discovery styles</b>						
Guided discovery (6) A1+B4+C13+D17	10	427	7	11	462	8
Convergent discovery (7) A2+B5+C13+D17	7	284	5	8	326	6
<b>Productive styles</b>						
Divergent production (8) A2+B6+C15+D17	7	301	5	8	355	6
Individual program (9) A2+B7+C16+D17	8	330	5	11	445	8
Self-teaching (10) A2+B7+C16+D17	8	330	5	11	445	8
<b>Total</b>	<b>144</b>	<b>6051</b>		<b>141</b>	<b>5851</b>	

Figure 12, shows that the most favourable teaching style by the teachers in both countries was the practice style (2). In this figure, is evident the employment of teaching styles by the teachers in both countries. Direct teaching styles seemed to predominate.



**Figure 12.** Teaching Styles Employment by Teachers in Athens and Budapest

A bivariate correlation analysis was employed to determine multicollinearity between the I ITLB categories. In Table 17, the results indicated that in most cases the correlations between the I ITLB categories were low to moderate. Therefore, multicollinearity did not seem to be of a problem (Field, 2000).

**Table 17.** Bivariate Correlations between I ITLB Categories

	A1	A2	B3	B4	B5	B6	B7	C8	C9	C10	C11	C12	C13	C14	C15	C16	D17
<b>A1</b>	1	-.858	.717	-.068	-.372	-.373	-.508	-.005	.254	.340	.136	.205	-.002	-.267	-.363	-.501	-.106
<b>A2</b>	-.858	1	-.816	.160	.474	.368	.520	-.223	-.331	-.222	-.198	-.145	.044	.401	.347	.473	.102
<b>B3</b>	.716	-.816	1	-.416	-.354	-.355	-.483	.113	.332	.309	.240	.210	-.217	-.511	-.346	-.477	-.189
<b>B4</b>	-.068	.160	-.416	1	-.074	-.074	-.101	-.114	-.169	-.113	-.101	-.74	.599	.463	-.072	-.100	-.006
<b>B5</b>	-.372	.474	-.354	-.074	1	-.063	-.086	-.097	-.143	-.096	-.086	-.063	-.039	.678	-.061	-.085	.046
<b>B6</b>	-.373	.368	-.355	-.074	-.063	1	-.086	-.097	-.144	-.096	-.086	-.063	-.039	-.091	.965	-.085	.092
<b>B7</b>	-.508	.520	-.483	-.101	-.086	-.086	1	-.132	-.196	-.131	-.117	-.086	-.053	-.124	-.084	.937	-.008
<b>C8</b>	-.005	-.223	.113	-.114	-.097	-.097	-.132	1	-.220	-.148	-.132	-.097	-.059	-.140	-.094	-.130	-.089
<b>C9</b>	.254	-.331	.332	-.169	-.143	-.144	-.196	-.220	1	-.219	-.196	-.143	-.088	-.207	-.140	-.193	.146
<b>C10</b>	.340	-.222	.309	-.113	-.096	-.096	-.131	-.148	-.219	1	-.131	-.096	-.059	-.139	-.094	-.129	-.234
<b>C11</b>	.136	-.198	.240	-.101	-.086	-.086	-.117	-.132	-.196	-.131	1	-.086	-.053	-.124	-.084	-.116	-.009
<b>C12</b>	.205	-.145	.210	-.074	-.063	-.063	-.086	-.097	-.143	-.096	-.086	1	-.039	-.091	-.061	-.085	-.127
<b>C13</b>	-.002	.044	-.217	.599	-.039	-.039	-.053	-.059	-.088	-.059	-.053	-.039	1	-.056	-.038	-.052	-.134
<b>C14</b>	-.267	.401	-.511	.463	.678	-.091	-.124	-.140	-.207	-.139	-.124	-.091	-.056	1	-.089	-.122	.146
<b>C15</b>	-.363	.347	-.346	-.072	-.061	.965	-.084	-.094	-.140	-.094	-.084	-.061	-.038	-.089	1	-.083	.063
<b>C16</b>	-.501	.473	-.477	-.100	-.085	-.085	.937	-.130	-.193	-.129	-.116	-.085	-.052	-.122	-.083	1	.021
<b>D17</b>	-.106	.102	-.189	-.006	.046	.092	-.008	-.089	.146	-.234	-.009	-.127	-.134	.146	.063	.021	1

A one-way MANOVA was applied, for the examination of the main effects of a vector of factors on the categories of I ITLB employed by the PE teachers. By means of a GLM multivariate procedure, the dependent variables were the effects of I ITLB, while the variables of ethnicity (nationality), teachers' postgraduate studies, years of teaching experience, pupils' socioeconomic status at which teachers' taught, teachers' gender and school grade were the factors (independent variables).

A tendency was observed for the factor of **city**, Wilks'  $\lambda = .540$ ,  $F(17, 37) = 1.85$ ,  $p=.051$ ,  $\eta^2 = .46$ . Significant multivariate main effects emerged for the factors of **PE teachers' postgraduate studies**, Wilks'  $\lambda = .346$ ,  $F(17, 37) = 4.11$ ,  $p= .000$ ,  $\eta^2 = .65$ ; of **pupils' socioeconomic status**, Wilks'  $\lambda = .144$ ,  $F(51, 110) = 1.99$ ,  $p=.001$ ,  $\eta^2 = .48$ ; of PE teachers' **gender**, Wilks'  $\lambda = .460$ ,  $F(17, 37) = 2.55$ ,  $p=.008$ ,  $\eta^2 = .54$ , and years of **teaching experience**, Wilks'  $\lambda = .158$ ,  $F(51, 110) = 1.86$ ,  $p=.003$ ,  $\eta^2 = .46$ . Non-significant main effect was found for school grade.

The interaction of years of experience x postgraduate studies was factor significant, Wilks'  $\lambda = .156$ ,  $F(51, 110) = 4.11$ ,  $p= .016$ ,  $\eta^2 = .43$ . Specifically, it was found significantly different for the A1 (orientation of pupils' thought) category,  $F(3, 53) = 3.49$ ,  $p=.022$ ,  $\eta^2 = .16$ .

Follow-up ANOVAs (univariate GLM procedures) indicated that teachers **with postgraduate studies** revealed significant univariate effects on the categories of A2 (questioning),  $F(1, 73)=9.36$ ,  $p=.003$ ,  $\eta^2 = .14$ , for which teachers in Athens showed a slightly increased preference; of B5 (discovery with pupils' effort),  $F(1, 73)=6.02$ ,

$p=.017$ ,  $\eta^2=.07$ , on which teachers in Budapest spent more time than the teachers in Athens; of C14 (checking discovery's solution),  $F(1, 73)=9.34$ ,  $p=.003$ ,  $\eta^2=.11$ , on which teachers in Budapest spent more time on.

Conversely, teachers **without postgraduate studies** revealed significant univariate effects on the categories of A1 (orientation of pupils' thought),  $F(1, 73)=8.91$ ,  $p=.004$ ,  $\eta^2=.11$ , on which teachers in Budapest spent slightly more of their instructional time, compared to the teachers in Athens; of B3 (observation and imitation of a task) category,  $F(1, 73)=21.47$ ,  $p=.000$ ,  $\eta^2=.23$ , on which teachers in Athens spent more time, compared to Hungarian teachers, and on the category of C11 (selection of difficulty level),  $F(1, 73)=5.64$ ,  $p=.020$ ,  $\eta^2=.07$ , on which teachers in Athens and Budapest spent similar proportions of time.

Subsequently, **nationality** was factor significant on the D17 (evaluation) category,  $F(1, 73)=5.98$ ,  $p=.017$ ,  $\eta^2=.08$ . Specifically, teachers in Budapest spent more of their instructional in evaluating than the teachers in Athens. Female teachers were significantly different in their time spent on B7 (planning of individual program),  $F(1, 53)=8.12$ ,  $p=.006$ ,  $\eta^2=.13$ , compared to their male colleagues. Female teachers in Budapest spent a bit more of their instructional time, compared to the female teachers in Athens.

**Years of teaching experience** was also factor significant on the C8 (work with the whole class),  $F(3, 73)=6.40$ ,  $p=.001$ ,  $\eta^2=.21$ . Teachers, of both cities, having 0-5 years spent more time on C8, than teachers having 6-35 years. Additionally, teachers in Budapest having 0-5 and 6-15 were significantly different in their time spent on B7 (planning of individual program),  $F(3, 53)=3.45$ ,  $p=.023$ ,  $\eta^2=.16$ , compared to their colleagues from Athens. However, teachers having 26-35 years in Athens spent more time in B7 category than the teachers in Budapest with the same years of experience. All differences were examined with Games Howell *post-hoc* statistic, at a  $p<.05$ .

From all the data set, it becomes clear that novice teachers, in general, tended to employ more direct instructional approaches, compared to the more experienced teachers that showed that experience does play role in employing different styles according to the given situation. It should be noted that Hungarian novices showed a tendency towards indirect instruction, compared to Greeks.

Finally, **pupils' socioeconomic status** was factor significant on the categories of A1 (orientation of pupils' thought),  $F(3, 73)=5.06, p=.003, \eta^2=.17$ . Specifically, teachers in both cities (slightly more the teachers in Budapest) spent most of their time on A1 category teaching pupils from low/middle class. Teachers, in both cities, teaching pupils of high class spent more time on A2 (questioning) category,  $F(3, 73)=6.43, p=.001, \eta^2=.21$ , compared to the teachers teaching pupils belonging to the other classes. Furthermore, teachers, in both cities, teaching pupils from low/middle class, spent more time on B3 (observation and imitation of a task),  $F(3, 73)=21.47, p=.029, \eta^2=.11$ , and C8 (work with the whole class),  $F(3, 73)=5.38, p=.002, \eta^2=.18$ , compared to their colleagues teaching pupils from other classes.

However, the C8 (work with the whole class) category was preferred by the teachers in Budapest, who applied it in all socioeconomic classes in a balanced manner, compared to the teachers in Athens, who applied it more for the pupils of low class.

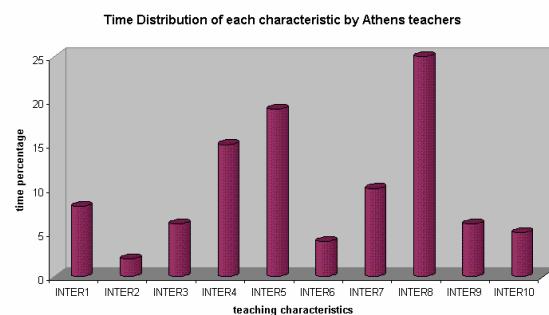
Teachers, in both cities, teaching pupils from high class, spent more time on C15 (checking the reliability of multiple solutions on a task) category,  $F(3, 73)=3.21, p=.031, \eta^2=.11$ , compared to their colleagues teaching pupils from other classes. All differences were examined with Games Howell *post-hoc* statistic, at a  $p<.05$ . From all the PE-TRIQ data set, it became evident that teachers teaching pupils belonging to low and medium socioeconomic classes tent to employ more direct teaching styles, while teachers teaching pupils belonging to upper/medium and high classes tent to apply more indirect teaching approaches.

### **5.3. Results on the Fourth Research Hypothesis**

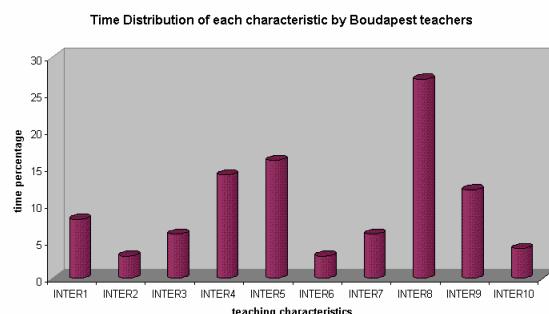
Table 18 displays the mean percentages on teaching-learning interactions, as coded with CAFIAS. Figures 13-14-15 present the distribution of CAFIAS interactions.

**Table 18.** Descriptive Statistics on CAFIAS Verbal and Non-Verbal Interactions

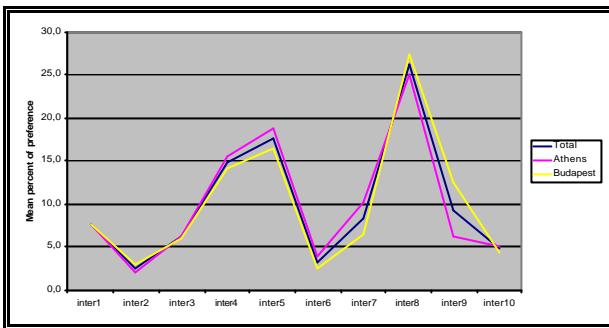
Num	Interactions	Athens Mean (%)	Budapest Mean (%)
1	Teacher praises (acknowledges success, approves, rewards, nods, strikes gently with the hand as a sign of congratulation, applauds)	7.50	7.62
2	Teacher accepts ideas and feelings of learners (agrees, repeats, accepts, takes part in the game, inclines head, smiles without a nod)	2.00	2.98
3	Teacher asks questions (closed, open, wrinkles face, raises eyebrows, opens mouth, touches chin, looks in the eyes)	6.10	6.02
4	Teacher informs, recommends, describes (verbally, through questions, by demonstration, by sketching, looks in the eyes)	15.48	14.14
5	Teacher guides learners (gives commands, instructions, explain roles, configures performance criteria, sets problems, gives feedback, shakes head, points out with the finger, whistles)	18.64	16.31
6	Teacher disapproves (criticizes, threatens, deplores, rejects, raises pitch of voice, scowls, smiles mockingly, assigns task to another learner, ignores)	3.81	2.55
7	Learners respond mechanically (reproduce the task all together, one-by-one, answer closed questions, move heads expressionlessly, laugh convulsively)	10.05	6.45
8	Learners respond thoughtfully (apply the observation model individually, uniformly, reciprocally, by selecting the difficulty level, answer open questions, discover, touch chin, tap with fingertips, have thoughtful look on their face)	25.12	27.31
9	Learners develop initiatives (ask unsolicited questions, take decisions, provide feedback to each other, create, design individual program, sigh )	6.21	12.36
10	Learners are in a state of confusion (are naughty, noisy, sit down doing nothing, keep silent)	5.10	4.26



**Figure 13.** CAFIAS Coding for Teachers in Athens



**Figure 14.** CAFIAS Coding for Teachers in Budapest



**Figure 15.** Distribution of CAFIAS Interactions for Both Teacher Samples

Independent samples *t-test* was initially employed to determine whether any significant difference existed between the teachers in Athens and Budapest time allocation on the teaching-learning interactions (Feld, 2000).

Teachers in Athens were significantly different in their time spent on Inter5 (teacher guides learners),  $t(82)=1.58$ ,  $p=.05$ , and on Inter6 (teacher disapproves),  $t(82)=3.87$ ,  $p=.000$ , compared to their Hungarian colleagues. Furthermore, learners in Athens were found significantly different for their displayed behaviours, on Inter7 (learners respond mechanically),  $t(82)=1.67$ ,  $p=.005$ , and Inter10 (learners are in a state of confusion),  $t(82)=1.70$ ,  $p=.047$ , compared to their pupil mates in Budapest. Conversely, pupils in Budapest were significantly different on Inter9 (learners develop initiatives),  $t(82)=1.70$ ,  $p=.047$ , compared to their pupil mates in Athens.

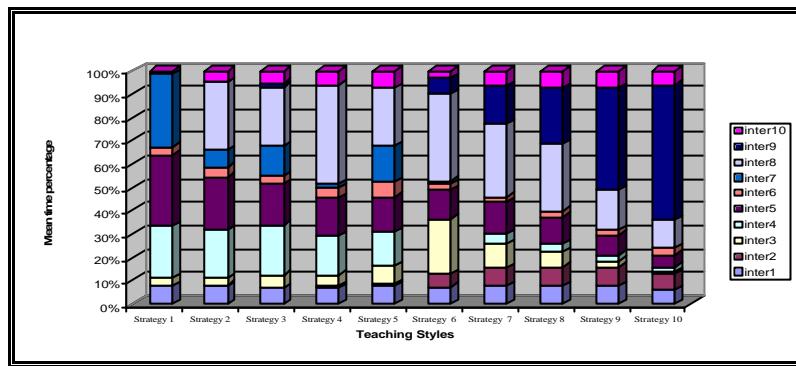
Table 19 displays the teaching styles preferred by the teachers in Athens and Budapest, in terms of the coded CAFIAS interactions. Figures 16-17 present the CAFIAS interactions employed by the teachers in Athens and Budapest, in conjunction to each teaching style. Examination of the Table 19 indicates the characteristic interactions for each teaching style, employed by the teachers in both cities.

**Table 19.** Distribution of CAFIAS Characteristics on Teaching Styles

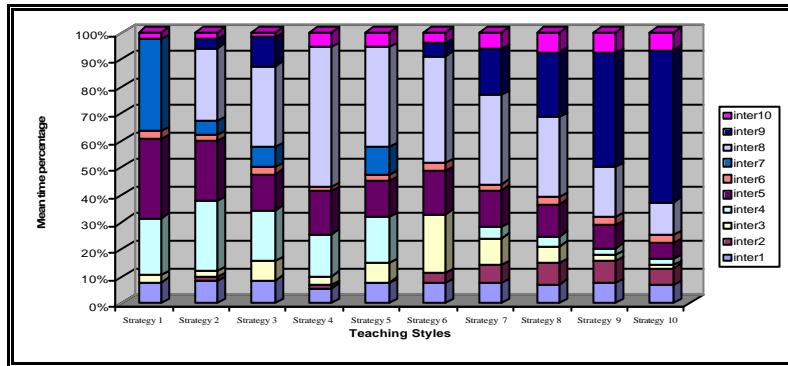
CAFIAS Interactions	Command		Practice		Reciprocal		Self-Check		Inclusion	
	Ath	Bud	Ath	Bud	Ath	Bud	Ath	Bud	Ath	Bud
1. Teacher praises learners...	8,0	7,8	7,8	8,1	7,1	8,7	7,0	5,5	7,6	7,5
2. Teacher accepts ideas/emotions...	0,0	0,0	0,3	1,7	0,0	0,0	0,7	1,0	1,2	0,3
3. Questioning...	3,4	2,8	3,3	2,0	5,4	6,7	4,7	3,5	7,6	7,3
4. Teacher informs, introduces, describes...	22,2	21,0	20,5	25,9	21,3	19,0	16,7	15,5	14,2	16,8
5. Teacher guides learners...	30,2	29,0	22,8	22,1	17,6	13,2	16,7	16,0	15,4	13,3
6. Teacher disapproves...	3,4	3,3	4,1	2,4	3,4	2,8	4,0	1,5	6,2	2,0
7. Pupils respond mechanically...	31,4	33,8	7,3	5,1	13,1	7,2	2,0	0,0	15,4	10,5
8. Pupils answer after thinking...	0,0	0,0	29,3	26,8	25,1	30,2	42,3	51,5	24,8	37,0
9. Pupils develop initiatives...	0,0	0,0	0,3	3,4	1,6	10,5	0,0	0,0	0,0	0,0
10. Pupils are confused...	1,4	2,5	4,6	2,5	5,3	1,8	6,0	5,5	7,6	5,5

**Table 19 continued**

CAFIAS Interactions	Guided Discovery	Convergent Discovery	Divergent Production	Individual Program	Self-Teaching	
1. Teacher praises learners...	Ath M 7,3	Bud M 7,3	Ath M 7,5	Bud M 7,3	Ath M 7,5	Bud M 7,5
2. Teacher accepts ideas/emotions...	5,3	3,8	8,0	7,0	8,5	8,0
3. Questioning...	23,7	22,0	10,0	9,7	6,5	6,0
4. Teacher informs, introduces, describes...	0,0	0,0	4,5	4,0	3,5	3,7
5. Teacher guides learners...	12,3	15,8	13,5	13,7	11,5	12,0
6. Teacher disapproves...	3,0	2,8	2,5	2,3	2,5	2,5
7. Pupils respond mechanically...	1,0	0,0	0,0	0,0	0,0	0,0
8. Pupils answer after thinking...	37,3	39,8	31,0	33,0	28,5	29,7
9. Pupils develop initiatives...	6,7	5,0	16,5	16,7	24,0	24,0
10. Pupils are confused...	3,3	3,8	6,5	6,3	7,5	7,5



**Figure 16.** CAFIAS Interactions on Teaching Styles by the Teachers in Athens



**Figure 17.** CAFIAS Interactions on Teaching Styles by the Teachers in Budapest

An examination of Table 19 and Figures 16-17 indicate the differences between Greek and Hungarian teaching-learning interactions with regard to teaching styles. Not surprisingly, teachers differed in their interactions displayed on all teaching styles. A bivariate correlation analysis was employed to determine multicollinearity between the CAFIAS categories. In Table 20, the results indicated that in most cases the

correlations between the CAFIAS categories were low to moderate. Therefore, multicollinearity did not seem to be of a problem (Field, 2000).

**Table 20.** Bivariate Correlations Between the CAFIAS Categories

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>INTER1</b>	1	-.167	-.093	.129	.133	.102	.099	-.060	-.136	-.294
<b>INTER2</b>	-.167	1	.207	-.787	-.613	-.165	-.544	.008	.779	.498
<b>INTER3</b>	-.093	.207	1	-.512	-.293	.081	-.211	.342	-.129	-.026
<b>INTER4</b>	.129	-.787	-.512	1	.646	.138	.526	-.239	-.640	-.487
<b>INTER5</b>	.133	-.613	-.293	.646	1	-.008	.641	-.350	-.669	-.528
<b>INTER6</b>	.102	-.165	.081	.138	-.008	1	.293	-.267	-.194	.203
<b>INTER7</b>	.099	-.544	-.211	.526	.641	.293	1	-.726	-.456	-.354
<b>INTER8</b>	-.060	.008	.342	-.239	-.350	-.267	-.726	1	-.175	.130
<b>INTER9</b>	-.136	.779	-.129	-.640	-.669	-.194	-.456	-.175	1	.420
<b>INTER10</b>	-.294	.498	-.026	-.487	-.528	.203	-.354	.130	.420	1

A one-way MANOVA was applied, for the examination of the main effects of a vector of factors on the interactions of CAFIAS employed by the PE teachers. By means of a GLM multivariate procedure, the dependent variables were the main effects of CAFIAS, while the variables of city, teachers' postgraduate studies, years of teaching experience, school grade, pupils' socioeconomic status at which teachers' taught and teachers' gender were the factors (independent variables).

Significant multivariate effects emerged for the factors of PE teachers' **gender**, Wilks'  $\lambda=.622$ ,  $F(9, 45) = 3.03$ ,  $p=.006$   $\eta^2=.38$ , of **pupils' socioeconomic status**, Wilks'  $\lambda=.309$ ,  $F(27, 132) = 2.42$ ,  $p=.000$ ,  $\eta^2=.33$ , of **postgraduate studies**, Wilks'  $\lambda=.519$ ,  $F(9, 45) = 4.62$ ,  $p=.000$ ,  $\eta^2=.48$ . Non-significant main effects were found for the factors of city, years of teaching experience and pupils' grade.

The interactions of city x pupils' socioeconomic status was factor significant, Wilks'  $\lambda=.427$ ,  $F(27, 132) = 1.65$ ,  $p= .033$ ,  $\eta^2=.25$ . Specifically, it was found significantly different for the Inter2, that is, for the teachers to accept ideas and feelings of learners,  $F(3, 53)=3.97$ ,  $p=.013$ ,  $\eta^2=.18$ .

Follow-up ANOVAs (univariate GLM procedures) on the multivariate main effects revealed, indicated that teachers **with postgraduate studies** presented significant univariate effects on Inter2 (accepting ideas and feelings of learners),  $F(1, 76)=19.15$ ,  $p=.000$ ,  $\eta^2=.20$ , on which teachers in Budapest showed an increased preference. Additionally, teachers with post-studies were significantly different for Inter9, that is, Hungarian pupils developed initiatives,  $F(1, 76)=9.23$ ,  $p=.003$ ,  $\eta^2=.11$ , compared to Greek pupils. Conversely, teachers in Budapest, either with and without postgraduate

studies, spent more time evaluating (Inter10),  $F(1, 76)=5.68, p=.02, ?^2=.07$ , compared to their Greek colleagues. In contrast teachers **without postgraduate** studies were found significantly different for Inter4 (informing, recommending and describing),  $F(1, 76)=20.6, p=.000, ?^2=.21$ , on which teachers in Athens spent more time than the teachers in Budapest, and pupils' in Athens responded mechanically (Inter7),  $F(1, 76)=5.70, p=.019, ?^2=.07$ , compared to the pupils in Budapest.

**Males** in Athens and in a bit less extent in Budapest, spent more of their time in Inter5 (teacher guides learners),  $F(1, 53)=4.13, p=.047, ?^2=.07$ , compared to their female colleagues. Inter8 (learners respond thoughtfully) was found significantly different for males in Budapest and in lesser extent in Athens,  $F(1, 53)=5.24, p=.026, ?^2=.09$ , compared to their female colleagues. Furthermore, Inter9 (learners develop initiatives) was found significantly different for **females** in Budapest and in much lesser extent in Athens,  $F(1, 53)=10.14, p=.002, ?^2=.16$ , compared to their male colleagues.

Interestingly, though the independent factor of **city (ethnicity)** was not a main effect, teachers in Athens spent more time on Inter6 (disapproving pupils),  $F(1, 76)=15.14, p=.000, ?^2=.17$ , compared to Hungarians.

Teachers in Athens and Budapest, similarly, **teaching pupils** of high class accepted pupils' ideas and emotions (Inter2),  $F(3, 76)=6.06, p=.001, ?^2=.19$ , compared to all other classes. Conversely, teachers in Athens and in a lesser extent teachers in Budapest, teaching pupils of low class spent more time on informing, recommending and describing (Inter4),  $F(3, 76)=6.43, p=.001, ?^2=.21$ . Additionally, they spent more time guiding low class pupils (Inter5),  $F(3, 76)=12.16, p=.000, ?^2=.33$ . Teachers in Athens teaching pupils of high class disapproved on a much greater extent (Inter6),  $F(3, 53)=3.33, p=.026, ?^2=.16$ , compared to their Hungarian colleagues. Teachers in Budapest had balanced disapproval levels for all socioeconomic classes.

Interestingly, the low class pupils responded mechanically (Inter7),  $F(3, 76)=5.06, p=.003, ?^2=.17$ , while, the pupils of medium and high classes, both in Athens and Budapest, responded thoughtfully (Inter8),  $F(3, 76)=6.15, p=.001, ?^2=.19$  during instruction. Teachers in Budapest were significantly different for Inter9, that is, learners developed initiatives during instruction,  $F(3, 53)=4.48, p=.007, ?^2=.21$ , compared to their colleagues in Athens, on all pupils' socioeconomic classes. Learners were in a state

of confusion (Inter10),  $F(3, 53)=5.68, p=.002, ?^2=.24$ , in the case of teachers in Athens, teaching the high and upper/middle classes, while in that of Budapest when teaching the low/middle and low classes. All differences were examined with Games Howell *post-hoc* statistic, at a  $p<.05$ . Again, from all the data set, became evident that teachers teaching pupils belonging to low and medium socioeconomic classes tended to employ more direct teaching styles, while teachers teaching pupils belonging to upper/medium and high classes tended to apply more indirect teaching approaches.

Although school grade and years of teaching experience did not reveal significant multivariate main effects, however both showed significant subjects effects for specific CAFIAS interactions. Specifically, teachers in Athens guided learners on a greater extent (Inter5),  $F(2, 53)=4.07, p=.023, ?^2=.14$ , compared to their Hungarian colleagues, for all **school grades** examined, that is fourth, fifth and sixth grades. Teachers of all years of experience in Athens asked questions to the learners more frequently,  $F(3, 53)=2.81, p=.048, ?^2=.14$ , compared to their Hungarian colleagues. Opposing, teachers in Budapest were significantly different for Inter9, that is, learners develop initiatives during instruction,  $F(3, 53)=4.62, p=.006, ?^2=.21$ , compared to their colleagues in Athens, on all experience in **years subgroups**. All differences were examined with Games Howell *post-hoc* statistic, at a  $p<.05$ .

Figure 18 displays the indices of the ten CAFIAS interactions (Cheffers et al., 1974). Index1 implies the difference of teacher and learners contribution to instruction. Index2 indicates the direct versus indirect instruction. Index3 presents the difference of negative and positive teacher reinforcement. Index4 describes the difference between teachers' guidance and pupils' initiative. At last, Inter5 compares pupils' mechanical and thoughtful responses. Table 21 displays the descriptive statistics on CAFIAS indices.

<b>Index1:</b> $Diff1 = (Y_{inter1} + Y_{inter2} + Y_{inter3} + Y_{inter4} + Y_{inter5} + Y_{inter6}) / (Y_{inter7} + Y_{inter8} + Y_{inter9} + Y_{inter10})$
<b>Index2:</b> $Diff2 = (Y_{inter3} + Y_{inter4}) / (Y_{inter1} + Y_{inter2} + Y_{inter5} + Y_{inter6})$
<b>Index3:</b> $Diff3 = (Y_{inter6}) / (Y_{inter1} + Y_{inter2})$
<b>Index4:</b> $Diff4 = (Y_{inter5}) / (Y_{inter9})$
<b>Index5:</b> $Diff5 = (Y_{inter7}) / (Y_{inter8})$

**Figure 18.** CAFIAS Indices (dependent variables)

**Table 21.** Descriptive Statistics on Indices

CAFIAS Indices	Athens	Budapest
	Mean	Mean
Index1	7.0476	-.7619
Index2	-10.3810	-9.2857
Index3	5.6905	8.0476
Index4	12.43	3.95
Index5	-15.07	-20.86

ANOVAs separate for each of the **five indices** (dependent variables) were the preferred statistic, in order to investigate the effect of a vector of factors (teacher and pupil characteristics) on the indices. Teachers in Athens were significantly different for **Index1** (teacher vs. learners' contribution to instruction),  $F(1, 73)=4.31, p=.042, ?^2=.06$ , compared to their Hungarian colleagues. Interestingly, teachers in Athens without post-studies were also significantly different for Index1,  $F(1, 73)=4.30, p=.042, ?^2=.06$ , compared to Hungarians, either with or without post-studies. Teachers in Athens and in a lesser extent teachers in Budapest teaching pupils of low socioeconomic class were significantly different from their colleagues who taught other socioeconomic pupils' classes,  $F(3, 73)=6.13, p=.001, ?^2=.21$ .

Teachers without post-studies, both in Athens and Budapest, were significantly different from their colleagues with post-studies on **Index2** (direct versus indirect instruction),  $F(1, 73)=7.47, p=.008, ?^2=.09$ . Teachers in Budapest were significantly different for **Index3** (negative vs. positive reinforcement),  $F(1, 73)=11.66, p=.001, ?^2=.14$ , compared to their Greek colleagues. Teachers in Budapest and in lesser extent teachers in Athens teaching pupils of high class were significantly different for Index3,  $F(1, 73)=5.61, p=.001, ?^2=.34$ , compared to their Greek colleagues.

Teachers in Athens were found significantly different on **Index4** (teachers' guidance vs. pupils' initiative),  $F(1, 73)=5.36, p=.023, ?^2=.07$ , compared to their Hungarian colleagues. Teachers without post-studies seemed to apply greater guidance on pupils, without to allow for pupils' initiative behaviour,  $F(1, 73)=3.98, p=.05, ?^2=.05$ . Both cities teachers employed greater guidance on low class pupils,  $F(3, 73)=4.17, p=.009, ?^2=.15$ , however teachers in Athens showed a higher tendency. **Index5** (mechanical vs.

thoughtful pupils' response) seemed to be observed by low class pupils on both cities, F (1, 73)=5.36,  $p=.002$ ,  $?^2=.19$ .

#### 5.4. Results on the Fifth Research Hypothesis

The revealed semantic instructional framework (SIF) consists of four perceptual models/clusters on instruction. Each model is expressed and functions with different teaching styles, while presenting different interactions. The results displayed were structured with the method triangulation, that is, from the 'mapping' of all instructional research instruments data gathered (Babbie, 1998). The construction of the SIF is presented for each revealed instructional perceptual model.

Each perceptual cluster is presented on the basis of the assumptions made on the fifth research hypothesis, that is, teachers would employ during instruction what they initially thought as important (Ennis & Chen, 1995) and that those teachers inclined on one cluster, would, therefore, also employed it.

Table 22 presents the mean values for the perceptual model of **reproduction** in both countries as presented with PE-TRIQ I & II.

**Table 22.** Reproduction Perceptual Model (PE-TRIQ I & II)

Reproduction Model	Athens (N=17)		Budapest (N=14)	
	PE-TRIQ I (impo)	PE-TRIQ II (freq)	PE-TRIQ I (impo)	PE-TRIQ II (freq)
<b>Structural Perceptions for...</b>				
<b>Learning</b>				
-Performance and reproduction of the task	4.04	4.71	4.21	3.83
-Observation and imitation of the task				
<b>Instruction</b>				
-Whole class, for reproduction of the task	4.15	4.42	3.50	4.18
-Individually, for reproduction of the task				
<b>Pupils' Development</b>				
-PE teacher takes all instructional decisions regarding preparation, conduct and evaluation	4.27	4.18	3.25	3.82
<b>Communication</b>				
-PE teacher indicate tasks without further explanation	3.94	3.53	2.71	3.21
<b>Evaluation</b>				
-PE teacher provides immediate feedback, characterizing the response to the role with a mark or characterization (proven)	4.14	4.36	4.43	3.93
<b>Manipulation of pupils' mistakes</b>				
-Perceived as products of inattention and carelessness, corrected by practise	4.29	4.65	3.80	4.14
Total	<b>4.20</b>	<b>4.31</b>	<b>3.80</b>	<b>3.85</b>

Table 23 presents the mean values for the perceptual model of **reproduction** in both countries as presented with I ITLB and CAFIAS.

**Table 23.** Reproduction Teaching Styles

Teaching and Learning Behavioural Categories (I ITLB)	Reproduction Cluster		Command & Practice		
	Allocation of Total Instruction Time %		CAFIAS Interaction Analysis		
	Athens	Bud	Categories	Athens	Bud
<b>A. Introduction</b> Orientation of learners' thoughts					
Orientatio n of learners' thoughts	5.24	5.18	1. Praises learners 2. Accepts ideas/emotions 3. Questioning 4. Informs, introduces, describes 5. Guides learners 6. Disapproves	3.17 --- 6.33 8.50 5.00 1.57	8.08 --- 4.34 8.26 4.53 0.88
<b>B. Continuation</b> Demonstration of task					
Demonstration of task	11.73	8.69			
<b>C. Reconstruction</b> <b>Reproduction of the pattern :</b> (1) whole class or (2) individual					
whole class or (2) individual	19.95	15.72			
<b>D. Output</b> Evaluation of learners on reproduced role					
Evaluation of learners on reproduced role	3.99	4.05	7. Respond mechanically 8. Answer after thinking 9. Develop initiatives 10. Are confused	9.44 4.50 --- 1.48	7.31 3.69 --- 1.56
<b>Total Time (in the total of 1.680 min coded)</b>	<b>40%</b>	<b>34%</b>	Total Time (in the total of 33.600 tri-sec coded)	<b>40%</b>	<b>34%</b>

*Table 23 continued*

Note: Indices of higher than 1, indicate an emphasis of the first scale of index; indices lower than 1, display the emphasis on the second scale, while indices equal to 1, depict balanced scales.	CAFIAS Interaction Indices	Athens	Bud
Teacher/Learners 1-2-3-4-5-6/7-8-9-10	1.67	1.62	
Direct/Indirect teacher expressions 3-4/1-2-5-6	1.50	1.63	
Negative/Positive reinforcement 6/1-2	0.67	0.67	
Guidance/Learners' Initiative 5/9	5.00	5.00	
Mechanical/Thoughtful Response 7/8	1.80	1.75	

Table 24 presents the mean values for the perceptual model of **assimilation** in both countries as presented with PE-TRIQ I & II.

**Table 24.** Assimilation Perceptual Model (PE-TRIQ I & II)

Assimilation Model	Athens (N=15)		Budapest (N=12)	
	PE-TRIQ I (impo)	PE-TRIQ II (freq)	PE-TRIQ I (impo)	PE-TRIQ II (freq)
<b>Structural Perceptions for...</b>				
<b>Learning</b>				
-Observation and imitation for assimilation of the task	4.87	5.00	4.83	5.00
<b>Instruction</b>				
-Reciprocal, -Self-check and -Selection of difficulty level	4.00	3.20	4.08	3.83
<b>Pupils' Development</b>				
-PE teacher takes all instructional decisions regarding preparation, while learners have parts of conduct and evaluation	3.37	3.33	3.38	3.28
<b>Communication</b>				
-PE teacher agrees with the learners on the what and how the task will occur	5.00	5.00	4.50	4.42
<b>Evaluation</b>				
-PE teacher provides indirect feedback, characterizing the response to the role with a mark or characterization (proven)	4.00	4.13	4.67	4.17
<b>Manipulation of pupils' mistakes</b>				
-Perceived as products of insufficient coding of the task, while correction is achieved through practice	4.93	4.87	4.92	4.67
<b>Total</b>	<b>4.36</b>	<b>4.26</b>	<b>4.40</b>	<b>4.22</b>

Table 25 presents the mean values for the perceptual model of **assimilation** in both countries as presented with I ITLB and CAFIAS.

**Table 25.** Assimilation Teaching Styles

Teaching and Learning Behavioural Categories (I ITLB)	Assimilation Cluster [Reciprocal, Self-Check & Inclusion]				
	Allocation of Total Instruction Time %		CAFIAS Interaction Analysis		
	Athens	Bud	Categories	Athens	Bud
<b>A. Introduction</b>					<b>A. PE teacher...</b>
Orientation of learners' thoughts	6.49	4.94	1. Praises learners	2.65	2.21
<b>B. Continuation</b>					2. Accepts ideas/emotions
Observation, imitation and assimilation to the task	12.08	8.04	3. Questioning	1.86	1.70
<b>C. Reconstruction</b>					4. Informs, introduces, describes
Assimilation of the pattern: (1) reciprocal, (2) self-check, or (3) inclusion	13.93	12.86	5. Guides learners	6.36	4.48
<b>D. Output</b>					6. Disapproves
Evaluation of learners on assimilation to the role	3.21	2.92	7. Respond mechanically	6.21	3.88
<b>Total Time (in the total of 1.680 coded)</b>	<b>36%</b>	<b>29%</b>	8. Answer after thinking	1.33	1.36
			9. Develop initiatives	5.93	4.10
			10. Are confused	8.71	8.29
			<b>Total Time (in the total of 33.600 coded)</b>	<b>0.83</b>	<b>1.50</b>
				<b>36%</b>	<b>29%</b>

*Table 25 continued*

Note: Indices of higher than 1, indicate an emphasis of the first scale of index; indices lower than 1, display the emphasis on the second scale, while indices equal to 1, depict balanced scales.	CAFIAS Interaction Indices	
	Athens	Bud
Teacher/Learners 1-2-3-4-5-6/7-8-9-10	1.05	0.93
Direct/Indirect teacher expressions 3-4/1-2-5-6	0.80	0.71
Negative/Positive reinforcement 6/1-2	0.33	0.50
Guidance/Learners' Initiative 5/9	6.00	4.00
Mechanical/Thoughtful Response 7/8	0.75	0.50

Table 26 presents the mean values for the perceptual model of **discovery** in both countries as presented with PE-TRIQ I & II.

**Table 26.** Discovery Perceptual Model (PE-TRIQ I & II)

Discovery Model	Athens (N=5)		Budapest (N=7)	
	PE-TRIQ I (impo)	PE-TRIQ II (freq)	PE-TRIQ I (impo)	PE-TRIQ II (freq)
<b>Structural Perceptions for...</b>				
<b>Learning</b>				
-A series of questions, step-by-step for explanation of the task	4.20	3.80	4.43	4.07
-Identification of the problem, discovery of the unique solution				
<b>Pupils' Development</b>				
-PE teacher and learners have mutual part on preparation, conduct and evaluation	3.20	3.10	3.07	3.21
-PE teacher and learners have mutual part on preparation, while learners take decisions regarding conduct and evaluation				
<b>Communication</b>				
-PE teacher guides learners through discovery	4.20	4.40	3.71	4.57
<b>Evaluation</b>				
-PE teacher controls the following teaching actions (constructive)	3.27	3.80	4.14	4.10
<b>Manipulation of pupils' mistakes</b>				
-Perceived as products of cognitive gaps, while correction is achieved through explanation of procedure	4.60	4.40	4.57	4.86
<b>Total</b>	<b>3.89</b>	<b>3.90</b>	<b>3.98</b>	<b>4.16</b>

Table 27 presents the mean values for the perceptual model of **discovery** in both countries as presented with I ITLB and CAFIAS.

**Table 27.** Discovery Teaching Styles

Teaching and Learning Behavioural Categories (I ITLB)	Discovery Cluster [Guided & Convergent Discovery]				
	Allocation of Total Instruction Time %		CAFIAS Interaction Analysis Categories	Allocation of Total Instruction Time %	
	Athens	Bud		Athens	Bud
<b>A. Introduction</b> Questioning	2.14	3.15	<b>A. PE teacher...</b> 1. Praises learners 2. Accepts ideas/emotions 3. Questioning 4. Informs, introduces, describes 5. Guides learners 6. Disapproves	0.54 0.76 1.67 0.21 1.57 0.33	1.24 0.86 2.79 0.29 2.48 0.36
<b>B. Continuation</b> -Questions step-by-step and explanation of the task -Discovery of the unique solution	5.30	6.61			
<b>C. Reconstruction</b> (1) discovery application, or (2) control of the discovered solution	2.74	5.00	<b>B. Learners...</b> 7. Respond mechanically 8. Answer after thinking 9. Develop initiatives 10. Are confused	1.00 2.64 1.26 0.50	1.50 4.64 2.05 0.36
<b>D. Output</b> Evaluation of learners on the discovery procedure	1.31	1.90	<b>Total Time (in the total of 33.600 coded)</b>	<b>11%</b>	<b>17%</b>
<b>Total Time (in the total of 1.680 coded)</b>	<b>11%</b>	<b>17%</b>			

*Table 27 continued*

Note: Indices of higher than 1, indicate an emphasis of the first scale of index; indices lower than 1, display the emphasis on the second scale, while indices equal to 1, depict balanced scales.	CAFIAS Interaction Indices	
	Athens	Bud
Teacher/Learners 1-2-3-4-5-6/7-8-9-10	0.94	0.93
Direct/Indirect teacher expressions 3-4/1-2-5-6	0.59	0.56
Negative/Positive reinforcement 6/1-2	0.25	0.17
Guidance/Learners' Initiative 5/9	1.25	1.21
Mechanical/Thoughtful Response 7/8	0.38	0.32

Table 28 presents the mean values for the perceptual model of **production** in both countries, examined with PE-TRIQ I & II.

**Table 28.** Production Perceptual Model (PE-TRIQ I & II)

Production Model	Athens (N=5)		Budapest (N=9)	
	PE-TRIQ I (impo)	PE-TRIQ II (freq)	PE-TRIQ I (impo)	PE-TRIQ II (freq)
<b>Structural Perceptions for...</b>				
<b>Learning</b> -Identification of the problem, discovery of multiple solution, verified by practice	4.40	4.47	4.44	4.59
-Guided planning of individual program for the creation of multiple solutions				
-Free planning of individual program, verified by practice on task				
<b>Pupils' Development</b> -PE teacher takes some decisions on preparation, while, learners take all decisions regarding conduct and evaluation	4.50	4.50	4.39	4.18
-Learners take all decisions regarding preparation, conduct and evaluation				
<b>Communication</b> -PE teacher guides learners to recall previous knowledge, analyzes tasks	4.80	4.60	4.89	4.44
<b>Evaluation</b> -PE teacher helps learners to identify their mistakes	4.60	3.80	4.33	4.56
<b>Manipulation of pupils' mistakes</b> -Perceived as products of wrong or incomplete transformation of previous knowledge	4.60	4.60	4.48	4.33
<b>Total</b>	<b>4.58</b>	<b>4.39</b>	<b>4.48</b>	<b>4.33</b>

Table 29 presents the mean values for the perceptual model of **production** in both countries as presented with I ITLB and CAFIAS.

**Table 29.** Production Teaching Styles

Production Cluster [Divergent Production, Guided & Learners' Style Individual Program]					
Teaching and Learning Behavioural Categories (I ITLB)	Allocation of Total Instruction Time %		CAFIAS Interaction Analysis Categories	Allocation of Total Instruction Time %	
	Athens	Bud		Athens	Bud
<b>A. Introduction Questioning</b>	2.20	3.63	<b>A. PE teacher...</b> 1. Praises learners 2. Accepts ideas/emotions 3. Questioning 4. Informs, introduces, describes 5. Guides learners	0.86 0.98 0.45 1.10 0.69	1.55 1.71 0.67 1.62 1.83
<b>B. Continuation</b> -Creation of the multiple solution -Guided free program -Free program	4.05	9.11	6. Disapproves	0.74	0.67
<b>C. Reconstruction</b> (1) discovery application of multiple solutions, or (2) application of the program	3.89	6.25	<b>B. Learners...</b> 7. Respond mechanically 8. Answer after thinking 9. Develop initiatives 10. Are confused	0.65 2.00 3.60 0.88	1.07 3.62 6.58 1.62
<b>D. Output</b> Evaluation of learners on the production procedure	1.45	2.44	<b>Total Time (in the total of 33.600 coded)</b>	<b>12%</b>	<b>21%</b>
<b>Total Time (in the total of 1.680 coded)</b>	<b>12%</b>	<b>21%</b>			

*Table 29 continued*

CAFIAS Interaction Indices	Athens	Bud
Teacher/Learners 1-2-3-4-5-6/7-8-9-10	0.68	0.62
Direct/Indirect teacher expressions 3-4/1-2-5-6	0.47	0.40
Negative/Positive reinforcement 6/1-2	0.40	0.21
Guidance/Learners' Initiative 5/9	0.19	0.28
Mechanical/Thoughtful Response 7/8	0.33	0.30

*Note: Indices of higher than 1, indicate an emphasis of the first scale of index; indices lower than 1, display the emphasis on the second scale, while indices equal to 1, depict balanced scales.*

## Chapter 6. Discussion

The aim of the **first hypothesis** was to establish PE-TRIQ I & II as the bases on which the representations of physical educators on instruction could be further analyzed and subsequent research intervention could be bound by quantitative criteria. Specifically, the main purpose was to investigate teachers' representations on instruction and examine whether these could be attributed to the four instructional clusters included in the PE-TRIQ items. This was based upon the perception that teacher representations encounter theories for the organization of instruction (Bolhuis, 2002), assuming that their knowledge and beliefs influence the activities they select during instruction (Ennis & Chen, 1995).

The first hypothesis aimed also at investigating the Greek and Hungarian teacher similarities or differences *per se*, on the instructional clusters. Additionally, the aim was to examine whether these similarities or differences could be attributed to a vector of independent factors including ethnicity, teachers' gender, years of teaching experience, school grade, postgraduate studies and pupils' socioeconomic status at which teachers' taught.

In this respect, the results of the exploratory factor analyses cast support on the applicability of PE-TRIQ I & II for physical educators in Athens and Budapest. PE-TRIQ I & II analyses yielded four meaningful and internally consistent factors, in all the cases, within the two cultures examined in this study (Tables 12 and 13). The results provide preliminary psychometric support for the PE-TRIQ I & II.

More specifically, the PCA analyses resulted in the development of two 28-item, 4 factor, multidimensional PE teachers' representations on instruction. The **reproductive factor** indicated knowledge declared and imposed by the PE teacher. The **assimilative factor** reflected knowledge achieved with a teacher-pupil agreement (distribution of roles). The **discovery factor** was composed of items that represented knowledge achieved through logic reasoning (how, why, when and for what reason). Finally, the **productive factor** was indicative of knowledge reconstructed by means of transformation leading to the construction of new knowledge. The present findings support that teachers regarded as important and frequently to employ in a greater or lesser extent all four teaching clusters.

For the PE-TRIQ I exploratory factor analyses (Tables 12 and 13), it seems that the clusters of reproduction and assimilation composed in the case of Athens the third and fourth factor structure, while in the case of Budapest, the opposite order was observed. Further research on PE-TRIQ I is warranted, in order to find the possible reasons of this reversion. However, similar reversions have been reported to other studies that were conducted across nations (McBride, 1993).

Regarding the reliability of the scales, examination of Cronbach's alpha and parallel reliability coefficient, showed that all scales were reliable. Alpha coefficients are displayed on Table 9 for all revealed factor structures. Accepting a value of alpha .60 as reliable (Papaioannou, 1994), the present results indicated satisfactory internal

consistencies, except for the assimilation factor displaying an alpha of .57 for PE-TRIQ II in the case of Budapest. However can be deemed as borderline acceptable (Papaioannou, 1994). Tables 10 and 11 presented the parallel scale reliability method and descriptive statistics for all factors on PE-TRIQ I & II. The results add to the initial assumptions of reliability of the PE-TRIQ I & II subscales.

Despite the significant factor loadings presented in the PE-TRIQ I & II analyses, Clark and Watson (1995) suggested, that the factor analysis could only provide us with suggestions as a tool, which by no means can substitute well-defined theoretical frameworks and subsequent systematic observation procedures. Parallel to this, Guadagnoli and Velicer (1988) reported that when sample sizes are around 100, then it is sufficient to discuss on loadings of .50 and above. However, Alexopoulos (1998) suggested that loading of .40 could be deemed acceptable. This might not hold true for the given research design, since if it is to accept reports and suggestions, larger sample sizes should primarily be regarded in future research on PE-TRIQ I & II.

From the results displayed in Tables 12 and 13, it appears that almost all loadings within the present analysis exceeded the value of .40, while several items were lower than .50. In this perspective, given that a four-factor solution was achieved, in all cases, this supports that PE-TRIQ I & II fully substantiate theory (Mosston & Ashworth, 2002). Most low loaded items appeared to be within the discovery and production clusters (Table 12 and 13). This could be partly explained by the small sample size acquainted in the present analyses, or could be partly due to the fact that the production cluster have been claimed as “virgin territory” in instruction (Goldberger, 1992, p. 44) and sport pedagogy research (Byra, 2002; Rink, 2001).

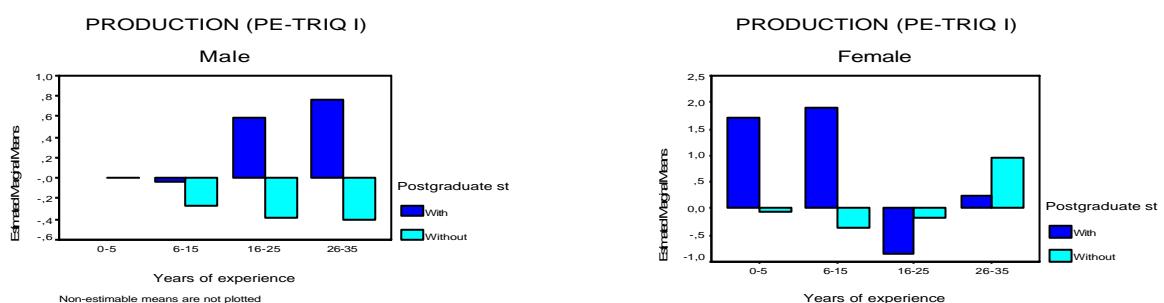
The results on PE-TRIQ I MANOVA and subsequent ANOVAs revealed that the teachers having done post-studies and the teachers having from 26 to 35 years of experience seemed to regard more important the clusters of discovery and production respectively. Opposing, teachers without post-studies preferred the reproduction cluster. This finding is in agreement with a study made by Housner et al. (1993), which revealed that experienced and well-educated teachers preferred indirect instructional approaches.

No accurate assumption could or should be made for the finding of PE teachers' represented importance on the cluster of production with regard to the independent

factor of pupils' socioeconomic status. It would be inaccurate to draw a conclusion from the teachers' PE-TRIQ I responses. However, opposite perceived importance was revealed for the teachers in Athens and Budapest. To this, production was regarded as more important for teachers in Budapest teaching high and upper/middle class pupils, while for those in Athens teaching low/middle and low classes.

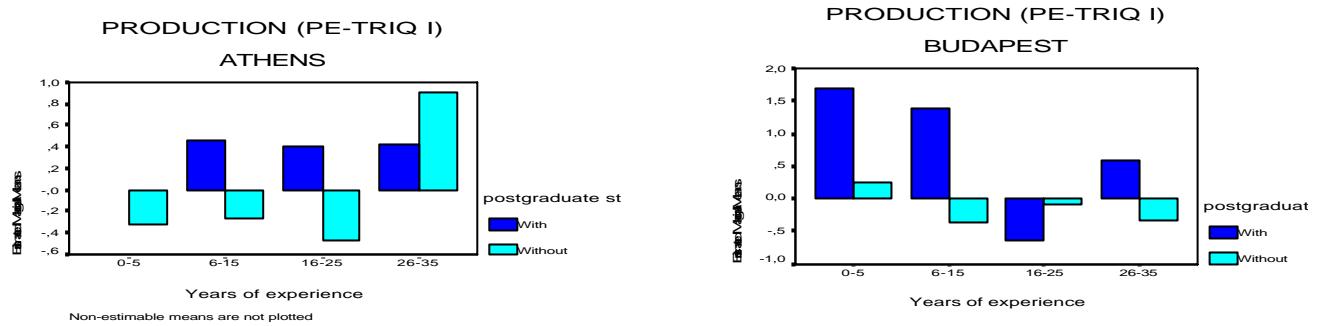
Interestingly, male teachers represented as more importantly the cluster of discovery, compared to females. This finding is refuting to a study made by Byra and Jenkins (1998). However, to the best of author's knowledge, no published research has cross-examined, yet, the teachers' perceptions regarding the instructional clusters with respect to gendered differences. Acknowledging that it would be inaccurate to draw conclusions from single survey responses, crosschecking this trend with systematic observation instruments seemed more appropriate.

Figures 19-20 display the interaction effect of gender x years x postgraduate studies for the second PE-TRIQ I factor (production). Males having from 16 to 35 years of experience seemed to regard production as more important, while females from 3 to 15 years predominated. An opposite trend could be observed for female teachers having 26 years of experience or more. Additionally, post-studies do play role in male and female indirect approaches (Tsangaridou & O' Sullivan, 2003).



**Figures 19 & 20.** gender x years x postgraduate studies

Figures 21-22 present the interaction effect of city x years x postgraduate studies on the second PE-TRIQ I factor (production). It is evident that teachers with postgraduate studies represented as more importantly the cluster of production. It is quite peculiar that teachers having more than 25 years of experience regarded it important in Athens, while this finding could be observed in Budapest for those having few years.



**Figures 21 & 22.** city x years x postgraduate studies

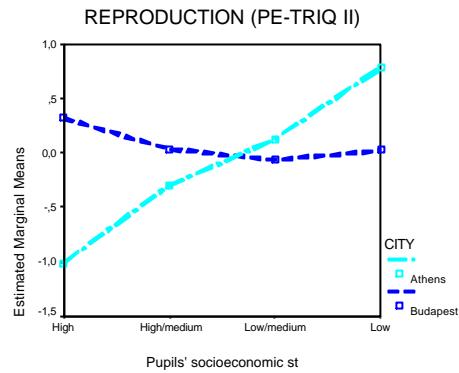
This might be due to the recent NCC of Hungary or to the fact the PETE is far more developed area in Hungary, since it is implemented from the third PE year of study in the Faculty of PE and Sport Sciences, compared to the newly structured study program of Greece (Salvara, LeBlanc, Bognár & Biró, 2002). This supports what Rovegno and Bandhauer (1997b) and Ward (1999) suggested about curricular contextual reforms. In parallel, Ward (1999) implied that knowledge is socially constructed and that professional debate among teachers is a vital ingredient in their acceptance of curricular reform.

The results on PE-TRIQ II MANOVA and subsequent ANOVAs revealed that, teachers with post-studies regarded production as the cluster that they frequently employed. This finding is in agreement with the PE-TRIQ I results. That is, an agreement between teachers represented importance and frequency of employment for indirect instructional approaches. Similarly to PE-TRIQ I results, the teachers without post-studies represented to employ more frequently the reproduction cluster.

Novice teachers represented to employ more frequently direct instructional approaches, since they preferred reproductive sessions (command or practice styles). Reproduction cluster, that is, direct approach, seemed to be the represented instructional approach for Hungarian teachers teaching pupils belonging to high and high/medium classes. Perhaps this is due to undisciplined pupils (Macfadyen, 2000). However, this cannot be said for teachers in Athens. Systematic observation (3<sup>rd</sup> and 4<sup>th</sup> hypotheses) would further add clarity to this opposing finding.

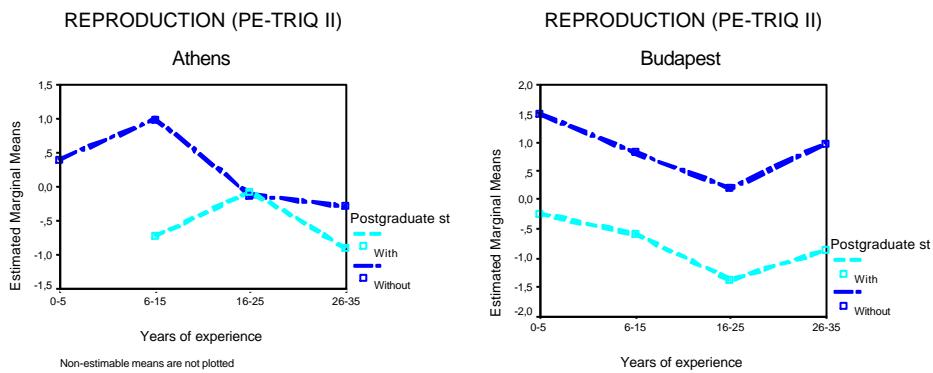
Figure 23 displays the interaction effect of city x pupils' socioeconomic status for the PE-TRIQ II first (reproduction) factor. Teachers in Budapest seemed to have a balanced represented employment of the reproduction cluster along all socioeconomic classes.

Again, however, a small tendency is observed for the high class. Teachers in Athens differentiated, since they represented to teach directly low class pupils. This finding is in accord with Curtner-Smith et al. (2001) study results that found similar trends between urban and rural PE teachers.



**Figures 23.** city x pupils' socioeconomic status

Figures 24-25 present the interaction effect of city x years of experience x postgraduate studies for the PE-TRIQ II first (reproduction) factor. It is evident that novice teachers represented a preference toward reproduction. Interestingly, teachers in Budapest, having more than 26 years of experience, represented to frequently employ reproduction. A possible explanation of this trend could be that the influences of school environment, occupational socialization and the newly formed NCC or even teachers' representations that change with difficulty (Abric, 1996; Tsangaridou & O' Sullivan, 2003).



**Figures 24 & 25.** city x years of experience x postgraduate studies

The results of the first hypotheses underscore the need for a broader based testing of PE-TRIQ I & II. Future studies should include more culturally based investigations.

This approach marks the first attempt in studying representations and teaching styles within PE context. The vast majority of researchers in the field of PE instruction have mentioned in their future suggestions, the significance of the continued investigation on the PE teachers' beliefs (Calderhead, 1996; Lee, 1997; Shulman, 1986; Tsangaridou, 2002), so that their perceptual models could be constructed with substantial reasoning (Reynolds, 2000).

Despite the shortcomings, four patterns of instructional clusters were identified, closely related to current literature (Mosston & Ashworth, 2002). It is noteworthy that both post-studies and years of experience do affect teachers' beliefs, as initially assumed. Research confirmed the results of early work that assert that teachers beginning their careers show deficiencies in the knowledge of the subject matter to be taught and, thus, in their PCK. However, Hungarian female teachers, having from 3 to 5 years of experience, did show a trend towards production cluster. Is this an influence of the newly reformed Hungarian Curriculum? Or is this an influence of the developing PETE in Hungary?. Todorovich and Curtner-Smith (2002) reported similar gendered results on their study of gendered effects on pupils' goal orientations.

There is some evidence that the novice teacher level of integration of subject matter knowledge into practice is poor (Dodds, 1994; Housner, 1990; Siedentop, 2002a). Similarly, a study on teachers' PCK, irrespective of the amount of experience in teaching (Schempp et al., 1998), which examined 10 teachers ranging from beginning teachers to teachers with 26 years of experience, found differences. However, yet, no published study examined teachers with more than 26 years of experience. The findings pointed out that expertise in subject matter knowledge helps teachers to (i) better recognize problems in pupil learning, (ii) plan more easily and in greater detail, (iii) develop instructional styles, and (iv) to have an increased level of comfort and enthusiasm. For those with responsibility for managing physical educator activities, hopefully these findings could have immediate relevance.

Interestingly, the interaction of teaching experience and postgraduate studies seemed also to be one of the factors influencing teachers' represented importance with regard to discovery and production models. These findings are in line with a study made by Salvara and Biró (2002b) reporting similar tendencies. Undoubtedly, the interaction

effect requires further research and analysis, in order for pertinent conclusions to be stated.

In the **second hypothesis**, it was assumed that teachers represented importance would be closely related to their represented frequency of employment within each teacher sample volunteered. From the results displayed in Table 14 and in Figures 8-9, appeared that teachers in Athens and Budapest employed what they represented as important in instruction. This result is in accord with Ennis and Chen (1995), who suggested that, teachers practise in the PE classrooms what they think important. A weak correlation was revealed on the discovery factor for Budapest, though significant. This finding requires further research on PE-TRIQ for Hungary, given that inadequacies in the translation might have occurred (McBride et al., 1986). However, Amade-Escot (2000) pointed out that agreement in one's beliefs and actual practice could only attributed to experienced teachers. Within this research samples, **both novice and experienced teachers confirmed the initial assumptions of convergence**. To this, Kulinna and Silverman (1999) investigated the relationship between teachers belief system and what was taught in their classes. Similarly, to this study samples, the relationship between their belief systems and perceived actions was determined.

The main purpose of the **third hypothesis** was (i) to demonstrate the teaching styles employed by the teachers in Athens and Budapest as coded with the I ITLB. (ii) To identify which of the teaching styles are in the spotlight, involved in the personal teaching theory, and the point of the spectrum at which the teachers in the countries have arrived in conjunction with National Curricula. (iii) To reveal, whether the teaching styles employed, can satisfy pupils' overall personality development, involving psychomotor, cognitive, social, emotional and moral perspectives. Finally, (iv) to examine whether the presented similarities or differences could be attributed to the independent factors of post-studies, gender, school grade, years of experience and pupils' socioeconomic status at which teachers' taught.

The main strength of the I ITLB data analyses was that it produced detailed data on Greek and Hungarian teachers' practices within the revealed spectrum of teaching styles examined. The results indicated that both Greek and Hungarian teachers spent most of their time using reproductive and assimilative teaching styles. Even though, Hungarian

teachers used productive teaching styles, still direct teaching styles seemed to predominate in instruction (see Table 16 and Figure 12).

The teaching styles falling into discovery and production clusters that require learners to go beyond what they already know (Byra, 2002; Goldberger 1992; Greenspan, 1992), were virtually absent from the teaching repertoire, though, especially Hungarian teachers did show an increased employment frequency.

The teaching style used for the vast majority of time by both teacher samples was the practice style, given that teachers in Athens attributed 978 minutes out of 6.051 minutes observed, while teachers in Budapest attributed 827 minutes of their instructional time out of 5.851 minutes coded.

This finding is in accord with the study made by Curtner-Smith et al. (2001) in which the practice style was found to predominate in their samples. Similarly, to Curtner-Smith et al. (2001), this research author speculated that the reasons direct styles predominated might have been (i) environmental, including the influence of other colleagues (school environment), (ii) political implying the focus on the later NCC and IPEPTH policy texts (1995), or as a result of (iii) occupational socialization. According to Alberti (1980) direct approaches in instruction might be due to (iv) neo-behaviourist views on the instructional organization.

It was additionally assumed that a vector of teacher characteristics might also comprise some of additional reasons. However, it would be premature to determine which the primary reason for such teaching styles employment was. All independent factors, according to the author, seemed to affect the practices adopted by the PE teachers of the two countries.

Postgraduate studies seemed to be one of the main factors influencing teaching styles employment by the PE teachers of this study's sample, as this was speculated in the research hypothesis. This is in accord with studies that speculated similar influences (Byra & Sherman, 1993; Howarth, 2000). It appears that, well-educated teachers applied more pupil-centred approaches. They also included greater high order questioning and critical thinking on pupils (Amade-Escot, 2000). It was found for the present samples, that the styles belonging to the discovery and production clusters were their preferred practices. This finding is in line with the results on PE-TRIQ I & II.

Conversely, teachers without post-studies, in both cities, spent more time on the reproductive and assimilative instructional cluster, that is, direct approach.

Years of teaching experience were also a main factor in influencing teaching styles selection. However, a difference was found only for the application of ‘work with whole class,’ which is mainly included in the reproductive and assimilative teaching styles (Mosston & Ashworth 2002). Novice teachers seemed to employ in a greater extent teaching styles that belong to the reproductive and assimilative clusters. In their study, Housner et al. (1993) indicated that, “experienced teachers have richer, more well-instantiated cognitive representations of the subject matter, instructional strategies, classrooms, and the nature of children than do inexperienced teachers” (p. 291). However, novice teachers in Budapest spent more time on the category of ‘planning an individual program,’ which is found in productive cluster.

Results indicated that the teachers in Budapest ( $M=4.48$ ) spent a bit more of their time in ‘evaluating’ category, compared to the time teachers in Athens ( $M=3.90$ ) attributed to evaluation. To this, it is noteworthy that although this difference is significant, it is not that indifferent in the total time in minutes, coded as 164 minutes for the Greek teachers and 188 minutes for the Hungarian teachers (see Table 15) with the time-analysis.

However, since field notes were made, due to the given possibility of crosschecking the observations through the videotapes, and the availability of the interview took immediately after the ITLB coding procedure protocol, Hungarian teachers primarily elected to evaluate what occurred during the lesson and tended to make suggestions regarding specific changes that they thought would improve the lesson. Support for this assumption also gained from a study made by Graham et al. (1993). Additionally, this finding is consistent with a past work of Berliner (1986), who noted that by evaluating, teachers tended to “look inside” (p. 12) learners’ work to determine the effect of each specific lesson’s events on learners’ performance (Dunkam & Makszin, 1990).

From all the data set and author’s logical speculation on the resulted time-analysis, while systematically observing, it was revealed that evaluation for the teachers with post-studies or with increased experience in years typically consisted of asking why and how questions, using a variety of interaction strategies and prompt at providing evaluation and assistance without intruding on the learner and the activity. In contrast,

novice teachers, often stopped and redirected learners' behaviours and asked test-like questions, in the form of evaluating, rather than elaborating on the pupils' engagement or offering clues to encourage them to respond.

It is also not surprising, that according to Borko and Livingston (1989), neophytes have not acquired the PCK or pedagogical reasoning skills necessary to interpret classroom life in a meaningful way. The richer and more insightful observations of experts-novice comparisons was conducted by Sabers et al. (1991) concluding that experts monitored, understood, and interpreted events in greater detail and with more insight than did beginners.

These findings are in parallel with a study made by de Kruif et al. (2000), who reported similar trends between White and African American teachers. Other researchers (McWilliam et al., 1999) most recently investigated how learners' engagement differed as a function of teacher directive evaluation and found that it did not influence engagement. The variety of findings across studies does not necessarily mean that one or the other is incorrect. It seems to be possible, however, that different combinations of evaluative behaviours might lead to a variety of learners' outcomes (de Kruif et al., 2000).

Interestingly, it was found that both teacher samples teaching pupils belonging to high and upper/medium socioeconomic classes tended to employ more indirect teaching styles embodied to the discovery and production clusters. On the contrary, teachers teaching pupils belonging to low socioeconomic classes tended to employ more direct teaching styles, accounted for the reproduction and assimilative clusters. No accurate assumption could be made concerning this finding, because there is no, yet, empirical research to support such a trend. To this, Wright (2001) examined longitudinally the socialization of physical educators and found similar results for their Singaporean sample. Further research is required to determine the principal reasons for such finding. However, it seems accurate to conclude that differences were found between Hungarian teachers' represented frequency of employment (PE-TRIQ II) and the actual setting (I ITLB).

Female teachers in Budapest and in a lesser extent in Athens were found to employ more the category of 'planning an individual program,' compared to their male

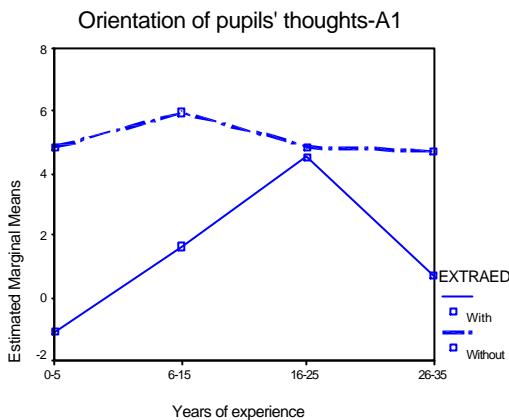
colleagues. This finding is in line with studies made by Wright (1999) on gendered practices in PE, and Evans et al. (1996) on teachers and the social construction of gender. Additionally, this finding is in accord with d'Arripe-Longueville et al. (2002) who found that their male teachers adopted higher ego-involved goals and trained more physically, whereas females adopted higher task-involved goals and received more demonstrations and vernal instructions. However, a gender difference on a single I ITLB category could not possibly adhere to generalizations on gender practices. It seems that male teachers preferred the discovery cluster (PE-TRIQ results), while female teachers the productive one. Both, however, showed indirect instructional tendencies.

From the analyses of the data, the differences revealed between Greek and Hungarian teachers' teaching styles selections reflect the differences in the National Curricula. In Greece, the PE programs focus on psychomotor learning, emphasizing subject matter orientations. Greek teachers had not expanded their instructional variability in such extent (Salvara & Biró, 2002b).

This might be due, as alluded in the review of literature, 2.1.2.3 section, referring to the comparison of the National Curricula, to the emphasized subject disciplinary curriculum (IPEPTH, 1995). On the contrary Hungarian PE programs target at physical condition on an 'open' approach. Plainly, Hungarian teachers seemed to expand the range of teaching styles they used in consistence with the National Core Curriculum (1995) contextual 'openness' in instruction (Hamar, 1998). As hypothesized, Hungarian teachers did employ more indirect teaching approaches. Hungarians seem to follow the today's focus on higher order questioning and critical thinking (Bolhuis, 2002), and to adhere to the concept of NCC, that knowledge is an expression of social construction.

Given Goldberger's (1992) contention that the cluster of production has been claimed to be virgin territory in instruction, teachers in the two countries can be characterized as being on a good instructional level, if one takes into consideration the form with which the teaching products were presented with the time analysis in both countries.

Figure 26 presents the interaction of years x postgraduate studies that revealed significant differences on the I ITLB categories of A1 'orientation of pupils thought.'



**Figures 26.** years x postgraduate studies

Examination of the Figure 26, for the A1 category, indicates that experienced and well-educated teachers spent less time in orienting learners' thoughts, with an exception of teachers from 16 to 25 years of experience. In contrast, teachers without post-studies had balanced orientation levels, though teachers with 6 to 15 years showed a slight increase in their time spent on A1. However, to this finding, it might be possible that the teachers with 16 to 15 years applied more indirect teaching styles, where orientation in complex tasks seems necessary for learners to understand and spent more time on task during the conduct of the lesson. Not surprisingly, well-educated teachers seemed cautious losing valuable time on task (Ennis & Chen, 1995; Woods et al., 2000).

Interestingly, all ten teaching styles, examined were used by the teachers in both countries, given the formulated spectrum, in contrast to the findings reported by Curtner-Smith et al. (2001), where some productive styles were completely absent from their samples of Wales teachers. From the analysis of I ITLB, the spectrum is presented in Table 30, analytically for all ten teaching styles. It should be noted that this managerial spectrum construction was created after the analyzed videotapes in both cities (Salvara, 2001b) based on well-defined theory (Mosston & Ashworth, 2002).

However, it seems that for teaching to contribute to pupils' overall development, which includes all aspects of social, motor, affective, moral and cognitive personality dimensions, discovery and productive styles are required in an increased application, if we meant to contribute to the learners' development. Effective teaching practices are more likely to result in effective contribution of learners' styles (Boyce, 1992; Salvara & Biró, 2002b).

Of particular importance is the way teachers' education promotes the use of discovery and productive styles in PETE. The emphasis in schools has changed from decade to decade, from behaviouristic to constructivist approaches, although changes in teaching methodologies or pedagogy in higher education have been far less noticeable.

Given the fact that this study did not include PETE as a factor that might influence teachers' practices, it cannot, therefore be assumed as one of the principal factors accounting for the examined teachers' selections. It would be interesting to ascertain whether PETE programs in the two countries could focus on fostering positive teachers' attitudes towards all teaching styles. In their study, Biró et al. (1981) investigated PETE and promoted valuable implications for teacher education in Hungary.

**Table 30.** Structuring the Spectrum of the Ten Employed Teaching

Teaching Styles Targets	1 <sup>st</sup> phase	2 <sup>nd</sup> phase	3 <sup>rd</sup> phase	4 <sup>th</sup> phase
<b>Learners perform as a body:</b> The aim is for the learners to move through organized movement tasks in a uniform and coordinated fashion	Notification of the subject and explanation of teacher-learner roles	Presentation of the exercise tasks and notification of the signals	Reproduction of the tasks following the signals with feedback by the teacher	Evaluation and response to the execution
<b>Learners perform individually:</b> The aim is for the learners to follow an observational pattern working individually—making for themselves a series of decisions about the sequence, duration and repetitions	Notification of the subject and explanation of teacher-learner roles	Presentation of the exercise tasks—configuration of the execution	Execution of the task and feedback by the teacher	Evaluation to the assimilative executed task
<b>Learners perform reciprocally:</b> The aim is for the learners to follow an observation pattern working reciprocally, distributing the roles of the performer and the doer	Notification of the subject and explanation of roles	Presentation of the exercise and configuration of the task	Distribution of the performer and doer roles	Evaluation to the assimilative executed task
<b>Learners perform by self-control:</b> The aim is for the learners to follow a task by self-control (criteria card) making decisions on the sequence, duration and repetitions	Notification of the subject and explanation of roles	Presentation of the exercise and configuration of the criteria	Execution of the pattern with self-control (using the card or oral feedback)	Evaluation of the response to the role as assimilated to the pattern
<b>Learners perform by selecting the level of difficulty:</b> The aim is for the learners to follow a task designed at multiple difficulty levels, selecting the level and execute and evaluate themselves using the criteria card (or immediate feedback). Pupils to decide whether to proceed to another level or remain at their practised one	Notification of the subject and explanation of roles	Presentation of the exercise task and configuration of the criteria	Selection of the difficulty level, perform the task and provide feedback	Evaluation of the response to the role as assimilated to the pattern
<b>Learners discover with teacher's guidance:</b> The aim is for the learners to discover by answering a series of questions, step-by-step	Notification of the first question and explanation of the roles	Learners' critical thinking	Quest for the 1 <sup>st</sup> answer—feedback; 2 <sup>nd</sup> and 3 <sup>rd</sup> questions presentation, quest and feedback	Performance of the discovered task or parts of a task
<b>Learners discover individually:</b> The aim is for the learners to discover the unique solution to a specific problem task, using cognitive processes (comparing, contrasting, drawing conclusions) following a converging inventiveness	Notification of the subject and explanation of roles	Learners' critical thinking	Quest for the discovery of the unique solution	Verification of the solution through movement

*Table 30 Continued*

Teaching Styles Targets	1 <sup>st</sup> phase	2 <sup>nd</sup> phase	3 <sup>rd</sup> phase	4 <sup>th</sup> phase
<b>Learners create multiple solutions either individually or in groups:</b> The aim is for the learners to create multiple solutions, using cognitive processes (comparing, contrasting, drawing conclusions) following a diverging inventiveness	Notification of the problem and explanation of the roles	Learners' critical thinking	Quest for and discovery of multiple solutions	Verification of the solutions through movement
<b>Learners shape their own program:</b> The aim is for the learners to shape their own program (a series of exercises), explore a task, make all the decisions regarding the conduct, perform it and evaluate it. The teacher is in an auxiliary role, giving feedback when needed	Notification of the subject and explanation of roles	Decisions on the general field and selection of the subject-matter. Pupils' critical thinking after teacher's questions	Planning the exercise series—experimental implementation, readjustment and classification in categories with a view to discover multiple solutions	Implementation of the solutions to verify their reliability

In the **fourth hypothesis**, it was assumed that each teaching style would present different teaching-learning CAFIAS interactions, as employed by the teachers in Athens and Budapest, which was initially identified with the I ITLB. It was additionally assumed that teachers in Athens and Budapest would be differentiated in their teaching-learning interactions on a vector of independent factors, that is, gender, school grade, teaching experience, postgraduate studies and pupils' socioeconomic status at which teachers taught.

From the initial Independent *t-test* CAFIAS interactions results, it became apparent that pupils in Budapest were able to develop pupil initiatives during the PE classes. In contrast, teachers in Athens disapproved pupils, while their pupils responded mechanically and were found at a state of confusion for greater amount of time. In addition, teachers in Athens were differentiated for guiding pupils with greater mean percentages, compared to their Hungarian colleagues.

As expected, teachers in Athens and Budapest displayed different allocated time on the CAFIAS interactions for each of the teaching styles they employed. Examination of the Table 19 indicates that along the **reproductive teaching styles**, that is, command and practice styles, it is evident, for both the teachers in Athens and Budapest, a complete absence of the interaction implying acceptance of pupils' ideas and emotions. However, Hungarian teachers, within the practice style, did accept pupils' ideas and emotions (1.7 versus the 0.3 for the teachers in Athens). Interestingly, teachers guided pupils for very long periods of time along the reproduction cluster.

In the **assimilation teaching styles**, that is, reciprocal, self-check and inclusion, teachers, similarly to reproductive ones, did not accept pupils' ideas and emotions. Pupils developed initiatives only along peer tutoring. It is evident that pupils engaged in cognitive operations, which are internalized actions of the mind, such as contrasting, comparing, classifying, reversibility and assimilating (Ginsburg & Opper, 1988). According to the Piagetian theory, as a learner assimilates an event in the environment, structure is given to that environment (Yongue, 1998). Teachers guided pupils for less and less time.

In the **discovery teaching styles**, that is, guided and convergent discovery, pupils developed initiatives, responded thoughtfully to the teacher' questioning. However, in Athens, when pupils were engaged in the discovery of the unique solution (guided discovery style), did respond mechanically (1.0 versus the 0.0 for the pupils in Hungary).

In the **production teaching styles**, that is, divergent production, individual guided-program and free planning under teachers' guidance, teachers' acceptance of learners' ideas and emotions was found at a greatest mean percentage, compared to the other three clusters. Despite the excepted high pupils' confusing levels (ranging from 6.0 to 7.8 mean percentage), however, pupils engaged in cognitive operations, they responded thoughtfully and they received less teacher guidance.

The results of MANOVA and subsequent ANOVAs on CAFIAS, similarly to the initial independent *t-test* results, revealed that Hungarian teachers, especially the well-educated ones, accepted ideas and feelings of learners, while their learners were given the possibility to develop initiatives. Conversely, teachers in Athens without further education, spent more of the instructional time to inform, recommend and describe, while their pupils responded mechanically.

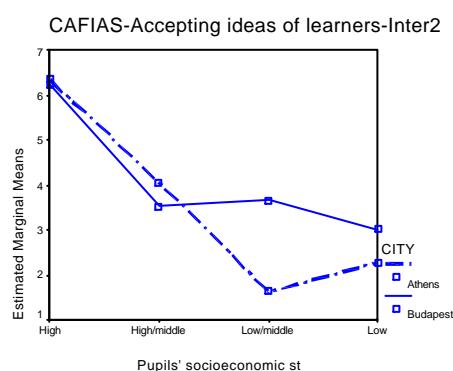
Male teachers in Athens predominated for guiding pupils, while female teachers in Budapest, followed by females in Athens, allowed for more pupil initiatives, compared to their male colleagues. It can be concluded, given the previous findings of gendered practices, for the male teachers on discovery and for the female teachers on production that, guidance seems necessary for the pupils to discover, while initiative seems necessary for the pupils to produce.

More specifically, within the results of the PE-TRIQ I (teachers' represented importance), male teachers represented as more important the cluster of discovery. Therefore, guidance is a prerequisite for pupils' guided discovery. Additionally, since I ITLB results support the finding that females applied the planning of individual program for pupils, it is logical that the pupils developed initiatives during these sessions.

Similarly to the I ITLB categories time analysis, the CAFIAS results on the independent factor of pupils' socioeconomic status support that both cities teachers accepted the ideas and feelings of high-class pupils, who, in turn, responded thoughtfully. In contrast, both cities teachers, on a greater or lesser extent, informed, recommended, described and guided low-class pupils, who, in turn, responded mechanically.

Interestingly, differences were found on the teachers' disapproval levels on pupils. Teachers in Athens disapproved more, generally, and in specifically, the high-class pupils. The opposite could be observed for the Hungarian teachers, that is, they disapproved more the low-class pupils. Logically a new question aroused: Is this a matter of undisciplined pupils? (Spray, 2002).

Pupils' confusion/misconception levels seemed to differentiate. For the case of Athens, pupils belonging to high and upper/medium classes predominated, while the exactly opposite could be observed for the case of Budapest, that is, low/middle and low class pupils were found to be more confused during instruction. This finding is an accord with the disapproval level findings, reported by Hare and Graber (2000). Figure 27 displays the interaction of pupils x socioeconomic status on the second CAFIAS interaction, which involves teachers' acceptance of learners' ideas and thoughts.



**Figure 27.** city x pupils' socioeconomic status

Examination of the Figure 27 indicates that both teachers' samples accepted the ideas of pupils from high and upper/medium socioeconomic classes. Teachers in Athens were much lower in the acceptance of pupils' emotions belonging to low and low/middle classes, compared to their Hungarian colleagues.

The ANOVAs on the CAFIAS indices cast further support the results. Generally, one could conclude that teachers in Athens employed more teacher-centred approaches, compared to their Hungarian colleagues that preferred learner-centred approaches on a much greater extent. It is noteworthy that, although teachers in Athens imposed more questioning on pupils, did not offer them with the possibility to develop initiatives.

In accord to all previous findings, experienced and well-educated teachers were found to employ more critical thinking on pupils. Similarly to a study made by Chen and Rovegno (2000), who reported that the mutual influences of experience and knowledge gained throughout PE teachers' career combine to generate pertinent and innovative professional knowledge in action, this research author also believes that there is no one factor affecting teachers' beliefs and practices.

Other researchers, similarly to this research, on their studies of experienced teachers confirmed that teacher PCK enrichment and development also depend on the individual personal frame of mind and attitudes of the teacher, essential to maintaining innovation over a length of time (Rovegno & Bandhauer, 1997a).

The results of the fourth hypothesis on CAFIAS time-analysis, add insight to the I ITLB findings and further underscore the fact, that although similar teaching styles were adopted by a given teacher group, these were composed by different teaching-learning interactions.

In the **fifth hypothesis**, it was assumed that the teachers' revealed perceptual models would be related to the revealed spectrum of teaching styles. From the triangulation of all research instruments, it was additionally assumed that differences between the allocations of instructional time spent by the teachers in the two countries to each employed cluster would exist. It was further expected to find similar findings between teachers' represented importance and frequency of employment and their real classroom practices with regards to the revealed perceptual models along the Semantic Instructional Framework (SIF).

The results for the PE-TRIQ I (importance) & II (frequency of employment) on the **reproduction cluster** displayed in Table 22, indicate that teachers in Athens presented an agreement of 4.20 to 4.31, while teachers in Budapest presented an agreement of 3.80 to 3.85 between their represented importance and frequency of employment on the reproduction model. **Reproduction cluster appears to be the preferred instructional approach amongst 17 teachers in Athens and 14 teachers in Budapest.**

In this vein, the time-analysis of instruction coded with the I ITLB and CAFIAS systematic observation protocols, presented in Table 23, demonstrates the phases of the reproduction cluster. Teaching and learning behavioural categories and interaction analysis results indicated that the reproduction styles accumulated 40% of teaching time in Athens and 34% in Budapest. Positive reinforcement (CAFIAS index3), pupils' absence of initiatives (I ITLB), increased teachers' guidance (I ITLB) and increased time on task (I ITLB), despite that the teachers informed and described (CAFIAS) for a great amount of time (8.50 for Athens and 8.26 for Budapest) were some of the revealed characteristics of this cluster.

Additionally, teacher-centred approach dominated (CAFIAS index1) (1.67 for Athens and 1.62 for Budapest), while increased mechanical responses (CAFIAS) from the pupils were found to be the highest among all clusters (9.44 for Athens and 7.31 for Budapest). Pupils' mechanical responses could be additionally confirmed by the CAFIAS index5 (1.80 for Athens and 1.75 for Budapest). This finding was stronger for Hungarians, given the results of the 2<sup>nd</sup> hypothesis on the teachers' assumed convergence between perceived beliefs and actions. **It seems that reproduction styles have a viable position on teachers' representations in both countries. However, Greek teachers seemed to favour reproduction more than Hungarians.**

The PE-TRIQ I & II results on the **assimilation** cluster that are displayed in Table 24, indicate that teachers in Athens involved an agreement of 4.36 to 4.26 between their represented importance and frequency of employment. Similarly, teachers in Budapest presented an agreement of 4.40 to 4.22. It seems that both cities teachers showed a decreased represented application of the assimilation cluster, compared to their initial response on its importance. However, **assimilation teaching styles appeared to be preferred by 15 teachers in Athens and 12 in Budapest.**

Consistently, the time-analysis of instruction coded with I ITLB and CAFIAS systematic observation protocols, presented in Table 25, demonstrates the phases of the assimilation cluster. Teaching and learning behavioural and interaction analysis results indicated that the assimilation styles accumulated 36% of teaching time in Athens and 29% in Budapest.

For this cluster, the teacher-pupil interaction relations are mixed, that is, the teacher-centred approach seemed to decrease, especially for Hungarian teachers (CAFIAS index1) (1.05 for Athens and 0.93 for Budapest). Pupils began to develop initiatives (CAFIAS) (0.83 for Athens and 1.50 for Budapest) (Brady, 1998). However, in both the reproduction and assimilation cluster, a complete absence of teachers' acceptance of pupils' ideas and emotions could be observed.

Interestingly, teachers' questioning (CAFIAS) seemed to decrease (1.86 for Athens and 1.70 for Budapest), compared to the reproduction cluster (6.33 for Athens and 4.34 for Budapest). However, the quality of questions might have been different, since pupils' responded thoughtfully (CAFIAS) along the assimilation cluster (8.71 for Athens and 8.29 for Budapest), compared to their responses during reproduction (4.50 for Athens and 3.69 for Budapest). Thoughtful pupils responses could be additionally confirmed by CAFIAS index5 (0.75 for Athens and 0.50 for Budapest). Less time on task could be observed (I ITLB). **It seems that assimilation styles, also, have a viable position on teachers' representations in both cities. However, Greek teachers, similarly to reproduction, showed increased favouring towards assimilation.**

The results for the PE-TRIQ I & II on the **discovery cluster**, displayed in Table 26, indicated that teachers in Athens involved an agreement of 3.89 to 3.90 between their represented importance and frequency of employment. Similarly, teachers in Budapest presented an agreement of 3.98 to 4.16. Teachers in Athens showed a decreased represented employment of the discovery cluster, compared to their initial response on its importance. The opposite could be observed for Hungarian teachers. However, the **discovery teaching styles appeared to be preferred by 5 teachers in Athens and 7 in Budapest.**

In this vein, the time-analysis of instruction coded with I ITLB and CAFIAS systematic observation protocols, presented in Table 27, displays the phases of the discovery

cluster. Interaction analysis results indicated that the discovery styles consumed 11% of teaching time in Athens and 17% in Budapest. In the discovery cluster teacher interventions became indirect (0.59 for Athens and 0.56 for Budapest) and positive reinforcement (0.25 for Athens and 0.17 for Budapest) predominated, as could be seen by the CAFIAS index2 (direct versus indirect instruction) and index3 (negative versus positive reinforcement) respectively. Learners-centred approach dominated (CAFIAS index1) (0.94 for Athens and 0.93 for Budapest).

Pupils developed initiatives (CAFIAS) (1.26 for Athens and 2.05 for Budapest) either through guided or divergent discovery (Byra, 2000). Teachers accepted pupils' emotions and ideas (CAFIAS) (0.76 for Athens and 0.86 for Budapest). Teachers' disapproval levels on pupils were very low (CAFIAS) (0.33 for Athens and 0.36 for Budapest), while pupils mechanical responses were significantly decreased (1.00 for Athens and 1.50 for Budapest). **It is evident that Hungarian teachers favoured the discovery cluster, compared to the teachers from Athens.**

The results for the PE-TRIQ I & II on the **production cluster**, displayed in Table 28, indicate that teachers in Athens involved an agreement of 4.58 to 4.39 between their represented importance and frequency of employment. Similarly, teachers in Budapest presented an agreement of 4.48 to 4.33. Both cities teachers showed a decreased represented employment of the production cluster, compared to their initial response on its importance. However, **the teaching styles of production appeared to be preferred by 5 teachers in Athens and 9 teachers in Budapest.**

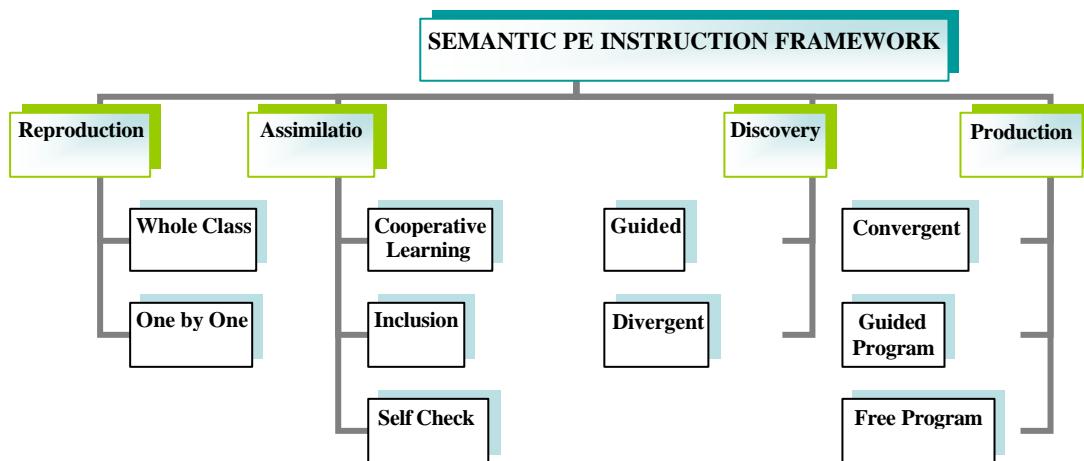
The time-analysis of instruction coded with ITLB and CAFIAS systematic observation protocols, presented in Table 29, which displays the phases of the production cluster. Interaction analysis results indicated that the production styles consumed 12% of teaching time in Athens and 21% in Budapest. Interaction relations, in this cluster, were focused towards the learner (CAFIAS index1) (0.68 for Athens and 0.62 for Budapest). Teacher interventions were indirect (CAFIAS index2) (0.47 for Athens and 0.40 for Budapest), while, similarly to discovery, positive reinforcement (CAFIAS index3) predominated (0.40 for Athens and 0.21 for Budapest). Production styles establish critical thinking of learners (Byra, 2002; Ernst & Byra, 1998), as shown by the CAFIAS

index5 (0.33 for Athens and 0.30 for Budapest) and CAFIAS interaction (9), (2.00 for Athens and 3.62 for Budapest).

Despite the fact that time on task was significantly decreased (I ITLB), surprisingly, pupils' confusion or silence levels were found lower (CAFIAS, 0.88 for Athens and 1.62 for Budapest), compared to reproductive and assimilative teaching styles (pupils confusion and silence levels ranged from 1.05 to 1.76 for Budapest and from 1.48 to 1.73 for that of Athens. **Production cluster appeared to be favoured on a greater extent by the Hungarian teachers, compared to their colleagues in Athens.**

From the analyses of all the instruments used to investigate teachers' representations on instruction, undoubtedly, all the ten teaching styles were employed in a greater or lesser extent. However, the number of PE teachers in each city under examination, was different and this could add strength to the initial assumption that Hungarians were expected to employ more indirect approaches.

The major thrust of the data would support the notion that perceptions and practices towards reproductive and assimilative teaching styles appear to be strongly supported by both groups of teachers regardless to their education and years of experience. Moreover, Figure 28 presents the revealed SIF on teachers' representations for both levels of structure and function.



**Figure 28.** Teachers' SIF on the Function and Structure of Representations

The categorization of the clusters in four perceptual models, within SIF, was based on teachers' perceptions and practices for instructional conduct, cognitive structure, learning, communication, performance, evaluation, handling of learners' mistakes and development with which the clusters of reproduction, assimilation, discovery and production were structured (PE-TRIQ analyses) and became differentiated (Salvara & Biró, 2002b). From the analyses of the fifth hypothesis, undoubtedly, teachers' representations formulate four different instructional frameworks. Each SIF model has a different theoretical framework on instruction and learners involvement.

In short, teaching styles belonging to **reproduction** are organized mainly on the basis of behaviourism (Skinner, 1963; Kelly, 1999; Kelly et al., 2000). These styles are constructed according to the transmission-teaching model found in empiricism. Knowledge is acquired through observation. In this perspective, knowledge development is accounted as accumulation, whereas its success criterion is the effectiveness on task.

Along the reproductive cluster, 'pupils perform exercises in a uniform and coordinated manner' (Mosston and Ashworth, 2002; Salvara, 2001b). These styles aim at having pupils perform exercises with the form of organized movement phases in a uniform and coordinated fashion reproducing the pattern shown by the teacher: 'do what I do.' Pupils respond to all of the teacher's decisions including objectives, exercises-sequence, start and stop time, pace and rhythm, intervals, duration and feedback.

The approach in this cluster is oriented towards the physical educator and dominant are the teacher-pupil relationships. The interest of this cluster focuses on the development of precision, synchronization and homogeneity in performance (Mosston and Ashworth, 2002), and guides pupils directly based on specific objectives, with many exercise repetitions according to the logic of 'small steps,' with direct feedback and the use of amplifiers in instruction.

Despite its advantages, the reproduction cluster offers only one correct way of execution and its emphasis is on the outcome. Nevertheless, pupils act mechanically by memorizing, shadowing and reproducing the pattern shown by the teacher without thinking (Curter-Smith et al., 2001; Salvara, 2001b). Communication is one-directional with absolute domination of teacher's verbal and non-verbal commands and with the

special emphasis given on the transmission of the message itself. According to Entwistle (1987), this approach is rather superficial and its only premise is ‘for the job to be done.’ Teachers make all decisions and control all instructional events (Piéron, 1994), on a teacher-centred approach.

Teaching styles belonging to **assimilation** are organized on the basis of cognitive behaviourism (Bandura, 1986). Assimilation is based on the observation and imitation of the pattern, during which pupils record the task, codify it and finally, restructure its original limits (Bandura, 1977). Pupils function with the help of “cognitive operations such as comparing/contrasting and drawing conclusions” (Byra & Marks, 1993, p. 298).

In the assimilation cluster, ‘pupils perform working individually, reciprocally, with self-check or with the selection of difficulty-level in a given task’ (Mosston and Ashworth, 2002). This cluster aims at having learners assimilate with the exercise pattern and make a series of decisions regarding exercises-sequence, duration, number of repetitions following a pattern, which includes: (i) individual work: learners make the decisions and the teacher offers feedback where appropriate; (ii) reciprocal work: a pair of learners or more distribute between them the exchanging roles of doer and observer; (iii) self-check: learners decide on their progress on a given task and make all decisions; (iv) selection of difficulty level (inclusion): learners select the level of difficulty on a given task and decide whether to move on a higher level or remain at the same level.

The approach in this cluster is mixed. The orientation in the first phase of instruction is towards the physical educator and dominant are the teacher-pupil relationships, while, in the second phase of instruction, is oriented towards pupils, whereas inter-pupil relationships dominate (Slavin, 1991). The assimilation cluster also offers alternative solutions on task execution (Mosston and Ashworth, 2002), while it’s main focus is the initial development of emancipation with the shift of decisions from teacher to pupils. It formulates social behavioural abilities, while introducing to pupils peer tutoring (Ernst and Byra, 1998).

Pupils regulate their behaviour by selecting different task levels, applying pre-organized performance plans, self-evaluating, developing initiatives and personal achievement goals (Siedentop, 1985). Pupils begin to act while thinking with the help of “cognitive operations such as comparing, contrasting and drawing conclusions” (Byra and Marks,

1993, p. 298). Communication between teacher and pupils is two-directional. In this style, teacher and pupils' verbal and non-verbal interventions acquire a balanced relation. Despite the fact that the teacher in this style is heading as a model for comprehension, she/he also cooperates with pupils in task development (Zeincher, 1992).

Teaching styles included in the **discovery** cluster are organized around the information-processing model, that is, learning with guided discovery (Bruner, 1977; Gagné, 1985), which is aiming at developing critical thinking. These styles are constructed according to the discovery-teaching model found in cognitivism. The mind has *a priori* cognitive categories of intellect, thus, with logic can recall and confirm existed knowledge structures (Lambert, 1996).

In the discovery cluster, 'pupils discover the how's and why's of tasks under PE teacher's guidance or solve a task working individually' (Mosston and Ashworth, 2002). This cluster aims at having learners (i) discover movement structures, while answering a series of questions planned by the teacher, step-by-step, following a course anchored from general/whole to specific/parts, or (ii) discover a unique solution to a given problem using cognitive operations such as contrasting, comparing, categorizing, hypothesizing, drawing conclusions and performing the discovered movement, and (iii) perform the discovered movement for the verification of its solution.

In this cluster, the approach is mutual. Decisions are made by a combination of teacher and pupils' efforts (Mosston and Ashworth, 2002). According to Papaioannou and Goudas (1999), this style is based on Socratic obstetrics, while its main interest is the creation of a questioning, exploring, verifying climate through movement. Based on Mosston and Ashworth (2002), the basic motive of this style is for the pupils to discover, under the guidance of the teacher a unique solution, while working on closed cognitive systems in a convergent learning process.

Pupils act while thinking. They regulate their behaviour with the series of questions or with the verification of solution's correctness using cognitive imagine (Martens, 1987), and finally recognizing their mistakes (Mosston and Ashworth, 2002). Communication between teacher and pupils becomes two-directional and looped. Teacher and pupils' verbal and non-verbal interventions lean towards the pupils. Teacher provides pupils

with the initiative to apply this cluster that makes learning and knowledge transfer easier (Zeincher, 1993).

Finally, the teaching styles attributed to the **production** cluster are organized on the basis of constructivist views (Piaget, 1967; Rink, 2001, p. 123 for a review). These styles construct the model of educative teaching. In this view, “pupils learn by actively constructing knowledge, weighing new information against previous understanding, thinking about and working through discrepancies, while coming to new understanding” (O’ Neil, 1992, p. 4).

In the production cluster, ‘pupils create multiple solutions working individually or in groups, or planning individual exercises programs in cooperation with the teacher or by themselves’ (Mosston and Ashworth, 2002). This cluster aims at having pupils (i) create multiple solutions on a given task using cognitive operations such as contrasting, comparing, categorizing, hypothesizing, drawing conclusions following a divergent learning process; or (ii) plan an individual exercise program targeted at examining a problem with learners, making a series of decisions concerning selection of exercises, collection of information, verification of solutions on a subject selected by the teacher (Salvara, 2001b; Salvara & Biró, 2002b).

The pupils basically introduce the approach of this style. Dominant are the inter-pupil relations. Basic feature of this style is the arousal of pupils’ creative thought and its main focus is the development of pupils’ autonomy and individuality. Moreover, production framework focuses on the search of alternative solutions with the use of divergent learning mechanisms (Mosston and Ashworth, 2002), such as decision making, while planning individual programs; and acquiring deep knowledge, while using search processes: cognitive apprehension, quest, discovery and verification (Mosston and Ashworth, 2002).

Pupils’ actions are conscious based on pre-set aims that are being questioned through feedback processes and are also based on developed corrective actions, which regulate their behaviour. Communication between teacher and pupils is looped. Teacher and pupils’ verbal and non-verbal interventions lean towards the pupils. Additionally, pupils develop initiatives (Byra, 2000; Mellor, 1992). Table 31 displays the construction of SIF. From all the data set, and for both samples, a strong relationship between teachers

belief system and actions toward physical education was established (Kulinna & Silverman 1999).

**Table 31.** Diagrammatic Depiction of the Teaching Styles in Four Clusters-Semantic Instructional Framework

Perceptions for:		Teaching Clusters			
		Reproduction	Assimilation	Discovery	Production
<b>Instructional Conduct</b>		Logic of small steps with whole class or individual work under teacher's commands	Reciprocal, self-check or selection of difficulty level (inclusion)	Intuitive and analytic thought (how's and why's of tasks)	Counterbalance (transformation and reconstruction of existed knowledge for the discovery of multiple solutions or programs)
<b>Cognitive Structure</b>		Motor tasks in small units displayed linearly	Continuous thinking on the task	Cognitive and motor tasks in units that present an entirety, displayed spirally; Divergent thought	Cognitive and motor tasks in units with structure, displayed loopy; Convergent thought
<b>Learning</b>		Exercising with stimulus-response using external reinforcement that develop the response	Observation and imitation of the pattern (codifying, selecting and assimilate)	Information processing (problem raised; selection of solution; control for its verification)	Transformation of knowledge from the old to the new
<b>Communication</b>		Message transmission from teacher to learners	Mixed; teacher-centred initially; thereafter pupil-centred	Discovery with the participation of both teacher and pupils	Production of exercises by the learners
<b>Performance</b>		Emphasis on the outcome; reproducing the task	Emphasis on the outcome; assimilating the task	Emphasis on the process	Emphasis on the production
<b>Evaluation</b>		Emphasis on demonstrating evaluation; using a mark or a	Emphasis on progress—whether the executed task agrees to the pattern	Emphasis on processing evaluation—whether understanding and discovering tasks	Emphasis on educational evaluation—whether creating tasks
<b>Pupils' Mistakes</b>		Accounted as carelessness and corrected with practice	Perceived as a scale to the assimilation on the task and corrected with practice	Accounted as cognitive gaps, controlled by information structuring and corrected with practice	Accounted as incomplete transformations of prior knowledge, corrected with the balance process and controlled with practice
<b>Pupils' Development (Introduction: I; Conduct: C and Evaluation: E) L: learners T: teacher</b>		Participation of Teacher and Learners During Instruction:			
<b>Motivation</b>		I=T C=T E=T Ego/performance orientation	I=T C=T & L E=T & L Ego/Task/mastery orientation	I=T & L C=T & L E=T & L Task/mastery orientation	I=T & L C=L E=L Task/mastery orientation

## Chapter 7. Conclusions, Implications & Future Research

The results of this research must be interpreted carefully in terms of design limitations. First, the small sample, even though PE-TRIQ I & II, ITLB, and CAFIAS research instruments were triangulated for all 84 PE teachers that participated. Second, the comparative nature of the study, and the environment created to study these subjects

makes generalizations from this research difficult. Third, and more importantly, because each subject was questioned, interviewed, and observed during instruction for one lesson with two systematic observation instruments, there is some concern about variance in PE teachers' thoughts and decisions from the one lesson to the next (Byra & Sherman, 1993).

Pedagogical inquiry has tended to produce research that has yielded conflicting findings (Borich, 1986; Sharpe & Hawkins, 1992). This has, in part, created a legitimate challenge regarding teacher effectiveness research as a viable academic endeavour in elementary PE (Lawson, 1989). Behavioural research on instructional effectiveness has historically viewed teacher behaviour in terms of isolated components, with little attention paid to field-like or serially dependent nature of instructional variables-in-context (Graham & Heimerer, 1981; Sharpe & Hawkins, 1992).

Given the recommendations that "the teaching act be brought back into pedagogical research by focusing on those processes related to instruction and by generating quantitative data from live observations of those processes," (Sharpe & Hawkins, 1992, p. 172), this research approach hopefully could add meaningful insight into teacher effectiveness avenue, paralleled to the movement toward systemic behaviour methods (Metzler, 1992).

In this vein, according to Metzler (1989), research and development models that can better integrate the content being taught, the observable content, behavioural processes, and observable pupil outcomes, and assist in looking for ways to improve those components within a particular instructional setting, are the research models which hold promise for furthering PCK.

The results of didactic conceptions of beginner and experienced teachers or those having post-studies have identified a number of dominant features related to instructional approaches. A trend for employing more indirect instructional approaches appeared for the more experienced and well-educated teachers amongst the participants of this research. To this, the role of teacher education cannot be identified precisely (Amade-Escot, 1998). However, it seems possible to improve certain aspects of the beginning teacher's didactic conceptions in initial teacher education through reflective practice (Amade-Escot, 1998).

Similarly to previous studies (Housner & Griffey, 1985; Livingston & Borko, 1989; Macdonald, 1999; Salvara, LeBlanc, Bognár & Biró, 2002; Van der Mars et al., 1995), two conclusions can be drawn about less and more experienced or well-educated teachers. **First**, less and more experienced teachers select different instructional approaches. The more experienced PE teachers tend to be more inquisitive, while employing teaching styles. **Second**, less experienced teachers employed the more discipline-like styles, that is, direct approaches. Additionally, data suggest that participants' school experience as well as their lived experiences, including the national curricula, and the influence of other colleagues, despite the years they taught or their education, play a powerful role in the formation of their beliefs about teaching in PE.

Also, similarly to d'Arripe-Longueville et al. (2002) pupil-observed teacher sample, experienced and thus more skilled PE teachers of both Athens and Budapest samples gave more detailed demonstrations and verbal information to pupils than did the novice groups. This certainly limits pupils' misconceptions and further adds clarity to learners' understanding of the content (Hare & Graber, 2000). Subsequently, experienced teachers instructions were at most times, explicit, focused and in an open-ended form, encouraging pupils to work at their own pace. It should be noted that the large number of pupils in each class also affected the design of this research. In author's view, it restricted the ability to gain in-depth understanding of learners' behaviours existed within the entire class. Fortunately, the videotaped sessions and the multiple data collection techniques helped to compensate for this problem.

These findings are supported by relevant research conducted either on laboratory or naturalistic settings (see Piéron, 1994, 1998, for a review). The objective of these studies was a re-organization of instruction towards 'in-depth learning' so that pupils' motivation would develop (Winfield et al., 1998).

Confirmation stems from research on the role of certain learning conditions, which are based on (i) cooperative learning (Kis, 1986; Ntoumanis, 2001); (ii) the possibilities for selection of difficulty level by the pupils (Goudas et al., 1995; Hassandra et al., 2002); (iii) the application of the constructs of TARGET acronym-the structural features of task, reward, evaluation, authority, grouping and timing structures of the achievement context (Ames, 1992a, 1992b; Silverman, 1994; Treasure and Roberts, 2001); (iv)

undermine of pupils' sense of independence that is affected by the degree of their participation in decision-making and pupils' involvement in instruction (Salvara, 2001b); and (v) the use of evaluation as a control strategy or as a learning process for the identification and correction of mistakes by the pupils.

Additionally, according to Hassandra et al. (2002), a teaching style that provides pupils with opportunities to make choices appears to have a positive effect on their intrinsic motivation. In this vein, Ntoumanis (2001) reported that cooperative learning affected pupils' motivational orientation positively. Parallel to this, Papaioannou and Goudas (1999) suggested for teachers to use cooperative instruction, to employ a variety of teaching styles and to promote decision making among pupils.

A recent study made by Dyson (2002), which investigated the implementation of cooperative learning in an elementary PE program demonstrated that, cooperative learning instructional format holds much promise for PE, given that the teacher and pupils held similar perceptions on cooperative learning, concerning with the goals of lessons, learner roles, accountability and communication skills. Consonant with this study, therefore, the present research adds to these results, showing that PE lessons should be structured in a way that pupils could be given the opportunity to satisfy their needs (Carey, 1978; Mosston & Ashworth, 2002).

Given that teachers' effectiveness includes the development of pupils' motivation (Kis, 1986), then it becomes evident that when alternatives in a domain increase, the learner begins to develop his or her own domain-related goals, chooses and employs more adequate strategies and shows increasing ability to cooperate independently (Bolhuis, 2002). Unfortunately, learning in most schools is still, to a large extent, individual learning (Slavin, 1995). Today the focus of sport pedagogy on critical thinking and constructivist approaches facilitates life-long (Bolhuis, 2002) active learning (Salvara, 2002a) and promotes pupil-centred approaches in reported studies.

Therefore, from a practical perspective, results suggest that in order to reduce possible withdrawals from the PE classes and enhance learning/task orientations, PE teachers should promote discovery and production teaching styles in instruction (Wittrock, 1986). Despite the fact that, during the last three decades the developments in national curricula have moved on from teacher-centred approaches (Cobb, 1994) to pupil-

centred ones (Peterson, 1979; Jewett & Bain, 1987), on field gaps seem to exist. The relatively recently established ecological curriculum models stress the need for social change and for the personal search for meaning in PE (Jewett, 1994).

Related to issues involving the amount of information the learner needs are those related to teacher clarity (Rink, 2001). Part of the justification for the identification of more explicit teaching styles as more effective is related to the notion of teacher clarity (Kennedy et al., 1978). There is a tendency for advocates of, and particularly at, indirect teaching styles to confuse being clear expectations for what learners should be doing with telling pupils exactly what to do. According to Rink (2001) "...using an indirect teaching style does not abdicate a teacher for being clear or having clear expectations for performance" (p. 119).

Traditional command and direct teaching styles play a very important role in teaching certain aspects of PE at any age. However, it is important to select the appropriate style for a specific purpose. What is required is a coherent and planned overall strategy in the direction towards learning in PE. Teachers should not slavishly adhere to the characteristics of particular teaching styles. Rather, they should follow the principles that underpin a particular methodology. The decision to select a particular style should be based upon the needs of the learner, rather than the dominant or favoured style of the teacher (Lee, 1998).

Hungarian teachers, compared to Greeks, showed an increased employment of indirect teaching styles. This finding reflects the NCC of Hungary and its innovative contextual framework in real settings. It is quite evident that PE teachers in Budapest have assimilated the program messages into their beliefs about teaching PE relative to elementary content, teaching effectiveness, and the importance of planning (Matanin & Collier, 2003), given that even Hungarian novice teachers with an experience ranged from 3 to 5 years showed a tendency towards indirect instruction.

However, it is noteworthy, that each style has its advantages and disadvantages that are peculiar to each. No one style should be employed exclusively (Tan & Tan, 1997). Research on direct teaching styles has found that the practice and reciprocal styles (assimilation cluster) to be effective in motor skills acquisition (Goldberger et al., 1982). The practice style, however, in particular proved to be the most effective in

teaching a psychomotor task. This was because it was able to provide maximum time on task as well as systematic feedback from the teachers.

Similarly, when the objective was to develop social skills, then the reciprocal style was appropriate (Byra & Marks, 1993; Goldberger, 1992). Cox (1986), compared the command and reciprocal styles in terms of pupils' learning. The results revealed that a greater number of positive feedback statements were given and fewer antisocial behaviours exhibited in teaching episodes conducted in the reciprocal style versus teaching episodes conducted in the command style.

Reciprocal style has proved to enhance the self-image of learners (Dougherty & Bonanno, 1987). The image of being an instructor and assisting in the learning process can be rewarding experience for the learner (Ernst & Byra, 1998; Goldberger, 1992). This system of instruction was pioneered in the late 18<sup>th</sup> and early 19<sup>th</sup> century (Salmon, 1932) and it was frequently employed during math and language classroom settings (Byra & Marks, 1993). Peer tutoring is an instructional format in which pupils work together in small structured heterogeneous groups to master content (d'Arripe-Longueville et al., 2002; Tjeerdsma, 1998). It can be conducted in dyads, triads, and small groups (Mosston & Ashworth, 2002). To this, Dyson (2001) examined cooperative learning in an elementary physical education setting and interpreted both teachers and pupils' experiences. Both, teachers and pupils held similar perceptions of the cooperative program. It was found that this type of teaching "allowed pupils of all ability levels to improve motor skills, work together as a team, help others improve their skills, and take responsibility for their own learning" (p. 264).

Research on the inclusion style of teaching, over the past decade, indicated that it includes all learners at the appropriate level. Inclusion style allows for individual skill differences amongst the learners. It provides all learners an opportunity to enter an activity, to meet new challenge (Byra & Jenkins, 1998). Despite its advantages, Goldberger (1992) indicated that, "[the] inclusion style was [found] effective in terms of overall group improvement, it was not as productive as the practice style and was not particularly effective for exceptional pupils" (p. 43). All aforementioned styles were thoroughly employed by both teacher samples volunteered for this research.

Moving to the productive cluster of styles, much less is known about the effects of each styles on pupil learning outcomes, since all research linkages on teaching and learning are, yet, within the reproductive cluster (McCullick & Byra, 2002). However, spectrum research has been conducted for more than three decades and has provided PETE researchers with a framework to systematically study teaching and learning in PE (Byra, 2000). Recently, a teacher action research made by Salvara, Jess, Abbott and Biró (2003), on the effects of the four clusters, that is, reproductive, assimilative, discovery and productive, on 75 6th grade Northern Greek PE pupils' goal orientations, indicated that the discovery and productive clusters affected learners positively, that is, pupils perceived their motivational orientations towards task when taught within a discovery or productive PE setting. Still, it is promising that recent studies have begun to address productive styles (Hall & McCullick, 2002), though, yet, very few.

According to Penney and Chandler (2000), "...we need to stress the link between the individual and the society, and the active role of PE in the development of both. In this strand, individual participation and individual health is thus placed in the context of societies and collective agendas would need to be addressed in the curriculum" (p. 39). Curriculum theory, though still a young area, holds excellent promise to further our understanding of the pedagogical knowledge base (Ennis, 1996). To this, Siedentop (2002b) stressed ecological perspectives in teacher research. A practical remark would be that "quantity" in a curriculum does not guarantee quality. It appears that today's focus on critical thinking and constructivist education facilitates the application of a variety of teaching styles so that learners' needs could be satisfied and their overall personality (emotional, cognitive, motor, moral and social aspects) can be developed (Salvara, 2001b, 2001c; Siedentop, 2002).

Over the years, it has become clear that there is no perfect teaching style, but that the most appropriate style depends on the context in which the teaching and learning process is taking place (Boyce, 1992; Mosston, 1992). Subsequently, when delivering a session, teachers need to consider the intended goals of the lesson, the pupils, the environment, themselves, and the tasks being taught (McCaslin & Good, 1996). This means that within one lesson, an experienced teacher is likely to employ different styles as appropriate (Salvara & Biró, 2002b).

However, given the almost universal acceptance of teaching styles, the research evidence to support their appropriateness is both patchy and equivocal (Macfadyen, 2000). Most of this research that has been carried out on the reproductive teaching styles provide some evidence that these are generally successful in helping children to acquire movement skill (Brady, 1998; Silverman, 1991). There is a dearth of data to support the efficacy of the more discovery and productive styles (Byra, 2002; Salvara & Biró, 2002b), primarily because of measuring their intended outcomes, that is, goal orientations, academic-learning-time or discipline strategies and enjoyment (Byra & Marks, 1993; Ernst & Byra, 1998; Cai, 1998; Byra & Jenkins, 1998; Curtner-Smith et al., 2001; Salvara, 2001b).

PE class has its unique contribution to pupil well being (Földesi & Hamza, 1998). The method a teacher adopts could be a major factor that influences this variable (Cai, 1998). Research on teaching styles has reported valuable information about instructional strategies, especially in the domain of pupil psychomotor acquisition (Pettigrew & Heikkinen, 1985). However, it seems that “previous research has often focused exclusively on physical development and ignored the social, emotional, cognitive and moral dimensions” (Cai, 1998, p. 412), despite their importance during learning (Beckett, 1990).

As yet, however, no research to my knowledge has attempted to examine PE teachers’ representations on the spectrum of teaching styles. The little research that has been conducted was undertaken on teaching styles alone (Byra & Marks, 1993; Ernst & Byra, 1998; Cai, 1998; Byra & Jenkins, 1998; Curtner-Smith et al., 2001; Salvara, 2001a; Salvara & Biró, 2002b). Representations have not been studied thoroughly within PE, except for a preliminary recent approach made by Salvara, Bognár, Biró and Salvaras (2002). Consequently, this research has not only led to a greater understanding of factors influencing teachers’ perceptions, but has also resulted in more valid and reliable assessment tools to measure their preferences (PE-TRIQ I & II and I ITLB).

The findings in this research extend previous work in this area and further underscore the importance of the variety of teaching styles employment during instruction. This research marks the first attempt to explore teaching styles employment in Greece and Hungary. Further, it provides valuable information about the factors influencing

instructional practices. In addition, it provides with baseline data for possible future research on teaching styles in a comparative aspect between countries.

Also the findings from this research have implications for practice in PETE. One that teacher educators' need to structure experiences for pre-service and practising teachers that will facilitate development of expertise (Graham et al., 1993). The implications of these findings are significant for the future development of PE, as they would support the suggestion that both PE teachers and PE teacher educators should be looking to create methods of delivery of the learners' inclusion. The author of this research, similarly to Daniel and Bergman-Drewe (1998) and Chen (2001), agrees with advocates of the critical pedagogy and critical thinking movements who suggest that the development of higher-order thinking is neglected in current PE settings and PETE practices.

A final implication for this research concerns the methods used to investigate instruction in Athens and Budapest. Carter et al. (1988) suggested that the multidimensionality of classroom life could only be adequately investigated through multidimensional research designs. Field didactic time-analysis systems employed in the present design have demonstrated promise for extending the body of knowledge regarding instructional efficacy (Sharpe & Hawkins, 1992; Zeichner, 1992).

In short, Sharpe and Hawkins (1992) stated that "a clearer view of the interconnected nature of the many environmental elements in which expert instructors operate, and the behavioural elements which experts successfully orchestrate, should inform teacher educators about more of what is involved in becoming a teacher *pas excellence*" (p. 185).

Put quite simply, there is no single theory of teaching that explains it, and therefore, there can be no single approach during instruction. Each teaching theory is used to support an approach. In this vein, pedagogy researchers have an obligation to develop an understanding of approaches to content and methods for teaching that informs the field objectively (Rink, 2001; Siedentop, 2002a).

The potential outcomes of teacher research are consistent with the new PE era on constructivistic theory and have been cited by several authors who support the inclusion of teacher research in modern pedagogy. Zeichner (1993) maintained that teacher

research could contribute to the process of change in education by promoting individual practitioner development. The findings of this research add strength towards modifications in teacher education for inquiry-based learning approaches. Inquiry-based approaches are supported by the constructivistic theory of learning (Senne & Rikard, 2002).

Constructivism, derived from research in psychology, philosophy and anthropology, “views knowledge as a constructed entity, as something that is created by the learner” (Woods et al., 2000, p. 17). Moreover, constructivistic education “provides the learners the opportunity for concrete, contextually meaningful experience through which they can search for patterns, raise their own questions, and construct their own models, concepts and strategies [styles]” (Fosnot, 1996, p. ix). Most recently, Chen (2001), investigated expert teacher implemented constructivist-oriented teaching strategies to engage pupils’ critical thinking in learning PE. It is quite certain that nowadays poststructuralist discourses have opened up new spaces through which to examine processes of knowledge production (Kelly et al., 2000).

In parallel, Fosnot (1996) suggested that, the educational principles based in constructivism enact the following principles. (i) Learning is not the result of development; learning is development. Thus, teachers need to allow learners to generate initiatives. (ii) Disequilibrium facilitates learning. Mistakes need to be perceived as a result of learners’ conceptions, and, therefore, not minimized or avoided. Challenging, open-ended questions in meaningful contexts need to be exploited, thus, allowing learners to explore and generate knowledge, both affirming and contradictory. (iii) Reflective abstraction is the driving force for learning. Allowing reflection time through a variety of experiences explored may facilitate reflective abstraction (pp. 29-30).

Rink (2001) in her paper suggested that “what is significant about the more recent emphasis on constructivism and social learning is the recognition that teaching and learning do not always have to be explicit and do not always have to be an independent experience” (p. 123). Parallel to Rink (2001), Lee (1997) stated that “constructivist literature views teacher as one who provides support but allows pupils to control their learning” (p. 264). Increasing number of researchers during the last decade claimed that learning is a social activity (Shuell, 1996; McCastlin & Good, 1996), as according to

them learning occurs in the context of relationship between teachers and pupils. Opportunities for social interactions around learning have been shown to improve children' achievement in PE classes (Byra & Marks, 1993).

It has been noted that, “constructivism as a learning theory is extraordinary difficult to turn into pedagogical models” [in real settings] (Richardson, 1999, p. 159). However, the effective constructivist teachers, generally, should be able to use questions to examine and challenge previous learners' knowledge, and, further, to connect this knowledge in relation to what they teach (Darling-Hammond, 1997). Acknowledging learner diversity issues, Kozub et al. (1999) noted that the time has come to the “stepping stone towards accepting learner diversity in PE” (p. 346).

A study made by Hare and Graber (2000), most interestingly, found that “seldom was the case when all pupils in the class learned at the same rate, in the same context, possessed the same prior knowledge, or encountered identical previous experiences” (p. 74). To this, they added, “if teachers begin to acknowledge that learners develop misconceptions that are unique and not always shared by others, they also may begin to recognize that lessons can no longer be structured for the masses” (pp. 74-5). In this vein, it is clear that constructivist theory provide a strong framework for explaining how pupils acquire and reconstruct knowledge (Salvara, Bognár & Biró, 2002).

To that effect, the findings suggest that both countries teachers, especially Hungarians, showed increased constructivistic conducts during their everyday practices. Teachers in Budapest, on a greater extent than their colleagues in Athens, promoted learner-centred approaches. The author's logical speculation is that teacher education in teaching, the influence of other colleagues, the national core curricula, and their teaching experience, including teachers' up-to-date knowledge for effective teaching, all transfer into career habits and representations of teaching as inquiry from which practice becomes informed.

Additional research is certainly needed in the search for the factors influencing teaching styles selections. The teaching styles and behaviours we choose, as teachers, can have a significant impact during the long-term process (Mosston & Ashworth, 2002). Considering Mosston and Ashworth's (1994) words that “every style has a place in the

multiple realities of teaching and learning” (p. 7), we, teachers, should be more careful with our teaching style selections.

PETE according to Lawson (1999) is a “social responsibility with important preconditions” (p. 116). To this he added that PE field integrity could be restored through reunification and transformation of the PETE discipline. A major part for PETE program improvement is collecting and assessing data in PE settings for interpreting educational effectiveness (McCullick, 2000). It is still important to determine whether a conventional PETE program is achieving the standards for which it strives. Prospective teachers have their own notions and perspectives about teaching. But they soon recognize the difference between teaching in their mind and the realities of teaching (JeongAe You, 1998). Future studies should investigate the phenomenon of cognitive changing process among teachers and the implications on pupil learning (Evans & Penney, 1995).

To end with a practical note, we need to continue studying the impact of teaching behavioural variables (Darst et al., 2001) such as pupil-teacher interaction (Ward & Barrette, 2002), teachers’ selection of teaching styles (Curtner-Smith et al., 2001) and questioning strategies employed (Macdonald et al., 2002). Even though the findings of this study are limited and additional investigation is warranted, given that teachers were examined for one PE session, it is my sincere hope that both local and governmental curricula developers would promote indirect teaching methods in their works. Hopefully, this research lays the groundwork for better understanding teachers’ beliefs and actions in real settings.

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## APPENDIX

**Table A. IPEPTH Elementary PE Curriculum (Greece)**

General Units—School Grades	Teaching Units		
1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	
<b>Grades 1 &amp; 2</b> Psychomotor activities targeted at building representations and experiences of pupils' body in relation to the environment	Sense of space & time (tag games)—Visual/motor synchronization and coordination (games within space with the use of equipments (balls, ropes, hoops)—Balance static & dynamic (jump games using all body in different supports)—Music/motor coordination (rhythm using hands, feet, songs)—Greek traditional dances—Imagination/creativity (selection of games and activities, improvisation)	Sense of space & time (tag games with balls, imitations in different directions)—Visual/motor synchronization & coordination (running using hurdles, throwing and kicking equipments)—Balance static & dynamic (running). Imitation and balance games along line and uneven surfaces)—Laterality (use opposite limbs in diagonal movements)—Music/motor coordination (tempo, rhythm education)—Greek traditional dances	Sense of space & time & visual/motor synchronization & coordination (running in pre-set space, mimicry games using concrete tools and space directions in reciprocal work)—Laterality (sideways, forth and backwards changes, relay racing)—Music/motor coordination—Greek traditional dances—Upright posture education (postures, limb-moves, symmetric-asymmetric exercises)—Breathing training (in -out through nose & mouth, blowing balloons)
<b>Grades 3 &amp; 4</b> Completion of psychomotor motor experiences targeted at pupils' body in its relation to environment	Motor skills (games, relays, motor alterations in space and time upon teachers' signal)—Upright posture education (symmetric, asymmetric, upper and lower body, isometric exercises)--- Music/motor education (rhythm and singing)---Greek traditional dances—Introduction into ball games (preparatory tasks for basketball, volley, handball and football)	Motor skills/physical abilities (games with low intensity and short duration, 30m races, flexibility exercises in pairs)—Upright posture education (tasks against lordosis, scoliosis and kyphosis)—Music/motor education—Greek traditional dances—Introduction to ball games (technique) —Track & Field (races, jumps, throws)—Gymnastics (floor elements)—Rhythmic sports gymnastics	Motor skills/physical abilities (run in groups for 3-5 min, tag games, relay races along line, in zigzags)—Upright posture education (isometric, isotonic, symmetric and asymmetric exercises)—Music/motor education (7/8 rhythmic scheme, motor improvisation, songs)—Greek traditional dances—Introduction into ball games (technique)—Introduction into track & field (races, throws and jumps) —Gymnastics (balance beam)
<b>Grade 5</b>	Ball games--Basketball—basic postures—dribble (on place, while moving, zigzags)—passes (chest level, above the head and low)—pivot (with and without ball)—Game rules—Callisthenics—Gymnastics (wall-bars, uneven bars, balance beam)—Greek traditional dances	Ball games--Football (passes, kicks, head passes, rules for the games—Handball (catches, passes, pair tasks)—Greek traditional dances	Ball games—Volleyball (basic positions, catches, passes, machetes, service, games)—Track & field (starts, strides, long & high jump, javelin, discus, shot-put)
<b>Grade 6</b>	Repetition of the 5 <sup>th</sup> grade teaching units Basketball—Defence/offence (man-to-man, team, fakes--championship)—Games—Callisthenics—Gymnastics—Greek traditional dances	Repetition of the 5 <sup>th</sup> grade teaching units Football (goalkeeper, tactical systems—championship)—Handball (team defence and offence—championship)—Greek traditional dances	Repetition of the 5 <sup>th</sup> grade teaching units Volleyball (basic technique elements—position of hands, feet, body, ball control, machete, passes, tactical elements—cooperation, rules—championship)—Track & field (jumps, throws, games)

**Table B.** National Core Curriculum Elementary PE Objectives (Hungary)

General Requirements Each learner is required to:	Curriculum	Detailed Requirements - Each learner is required to:	
		At the end of 4 <sup>th</sup> grade	At the end of 6 <sup>th</sup> grade
<b>Healthy Physical Development</b> To develop in accordance with their age, their circulator, kinetic and respiratory systems	<b>Outdoor Sports</b> Walk, winter sports, use of apparatus (B.M.X. roller-skates, skateboard)	<b>Dexterity</b> To run in the open air consciously and with pleasure <b>Minimum Competence</b> Participation in out-door activities	
To prevent posture disorders through intensive, increasingly conscious exercises	<b>Gymnastics</b> Gym exercises, simple, game type exercises, of 2-4 rhythms, free, with co-player, with apparatus, of set form	<b>Dexterity</b> To perform physical exercises at a reproduction level. <b>Minimum Competence</b> Performance of physical exercises according to the teacher's instructions	
	<b>Gymnastics</b> Free exercises of 2-4-8 rhythms, with apparatus (bench, bars on wall). Application of basic postures and conditioning forms	<b>Dexterity</b> To perform warming-up physical exercises <b>Minimum Competence</b> Knowledge of technical terms and gym commands	
<b>Development of motor culture</b> To run fast and long, to regulate the speed according to the distance and the ground and avoid obstacles. To learn the basic technique of performing the various jumps and throws (casts)	<b>Leaping and Jumping</b> To leap in a variety of manners and conditions. In place and run-up jumps and related games, jumping contests	<b>Dexterity</b> To leap and perform jumps (up and down, successive, diagonally) <b>Minimum Competence</b> Coordinated performance of in situ and run-up jumps	
	<b>Walking and Running</b> Kinds of walk, running. Games and contests ensuring their exercise, swift start-ups	<b>Dexterity</b> To walk and run in a variety of manners and purposes. <b>Minimum Competence</b> To regulate walk and running according to alternating conditions	
	<b>Throwing</b> To throw balls of different sizes from a distance, aiming at a target, by rolling, by casting etc. with the use of one hand or both hands, games and contests of throwing	<b>Dexterity</b> To perform throws in a variety of ways <b>Minimum Competence</b> Selection of the way and performance of the throw according to the size of the ball and the purpose	
	<b>Track &amp; Field</b> Running: start-up, fast, endurance, with leaps and long jumps, high jumps	<b>Dexterity</b> To react to start-up signal, to adjust speed according to the distance, to find the right speed in long and high jumps <b>Minimum Competence</b> Performance of the appropriate movements at the start-up of various kinds of running in the jumps	
	<b>Throws</b> Ball throws from a distance, at a target, and after a 3-4-step run.	<b>Dexterity</b> To discover that running over a longer distance enhances throwing <b>Minimum Competence</b> Throw movements according to the acceptable model	
To learn how to perform simple support and suspension exercises and change position and posture	<b>Support, suspension and balance exercises</b> on the ground, on a bench, on a box, on a rope, on rings, on bars on wall, with exercises in walk types along a line, along low beam, on a bench. Games and contests	<b>Dexterity</b> To learn basic apparatus elements <b>Minimum Competence</b> Ability to balance under many circumstances	
	<b>Gymnastics</b> Support positions in ground exercises, with apparatus (bench etc.). Postures in unusual support positions	<b>Dexterity</b> To feel safe in support positions <b>Minimum Competence</b> Ability to control body in unusual support positions, with assistance, performance of support leaps with assistance	
Their activities to be characterized by creativity in exercises of a variety of types. To have developed participation ability in games at a basic level	<b>Support, suspension and balance exercises</b> on the ground, on a bench, on a box, on a rope, on rings, on bars on wall, with exercises in walk types along a line, along low beam, on a bench. Games and contests <b>Exercises with the use of a ball</b> Simple ways to handle a ball and their application in games. Ball games with simplified rules	<b>Dexterity</b> To create combinations of performances with the aforementioned apparatus <b>Minimum Competence</b> To invent an additional exercise combination <b>Dexterity</b> To play with a ball, with ability to coordinate and co-operate at a basic level <b>Minimum Competence</b> Participation in ball	

		games	
	<p><b>Sports Technical elements:</b> passing the ball with the hands, the feet, kicking of the ball aiming at a target, forward pass, catch of the ball.</p> <p><b>Tactic details:</b> simple ways of offensive, fundamental defensive techniques</p> <p><b>School games</b></p>		<p><b>Dexterity</b> To keep the ball moving, in pose or running position, to accurately throw the ball with either the hands or foot, to pass the ball to another member of the team who is in more advantageous position, to know the basic technique of the sport</p> <p><b>Minimum competence</b> Ability to participate in sports</p>
Their activities to be characterized by creativity in exercises of a variety of types. To have developed the ability to participate in games at a basic level	<p><b>Swimming</b> (if there are facilities). Exercises and games with the water, safety in the water, learning how to swim</p> <p><b>Swimming</b> (if there are facilities). Selection of swimming stroke and games in the water</p>	<p><b>Dexterity</b> To know one stroke of swimming. <b>Minimum Competence</b> Awareness of the danger involved in a swimming pool. Safety in the water</p>	<p><b>Dexterity</b> To know at his skill level the technique of one stroke of swimming <b>Minimum Competence</b> Ability to swim for 10 to 15 meters</p>
To learn attitude systems to prevent risks	<b>Wrestling exercises</b> Traction, push, lifting, removal, lifting up from behind	<p><b>Dexterity</b> To put forth energy and dexterity in wrestling in pairs</p> <p><b>Minimum Competence</b> Wrestling in a civilized manner and athletic spirit</p>	
<b>Development of motor abilities</b> Physical and coordinating abilities and safety of kinetic activities to be characterized by a course of development	<p><b>Support, suspension and balance exercises</b> Balance exercises with exercises in walking along a line, on a low beam, on a bench. Games and contests</p> <p><b>Throws</b> Throwing the ball from a distance aimed at a target, according to the kind of exercise, from pause position and following 3-4-step run, using one hand or both hands</p>	<p><b>Dexterity</b> To develop orientation within the space and dexterity in static and dynamic balance</p> <p><b>Minimum Competence</b> Sense of safety in the support position</p>	<p><b>Dexterity</b> To coordinate his/her throws. <b>Minimum Competence</b> Throwing the small ball at least 18 meters away, for boys, and 16 meters away, for girls</p>
To become able, according to their age and the development of their muscular system to guide their body in the various exercises	<p><b>Support, suspension and balance exercises</b> On the ground, on a bench, on a rope, on rings, on bars on the wall, with exercises involving various types of walking along a line, on a beam, on a bench, games and contests</p> <p><b>Track &amp; Field, jumps, throws</b> Run, start-up, sprint, endurance. Leaps and long and high jumps. Throwing of the ball from a distance against a target, from pause position and from 3 to 4 steps' run-up, with one hand or with both hands</p>	<p><b>Dexterity</b> To put forth strength, according to his/her weight in the support and suspension exercises</p> <p><b>Minimum Competence</b> To keep his/her body in support and suspension exercises</p>	<p><b>Dexterity</b> To run continuously, a boy for 6 minutes, a girl for 5 minutes. To jump from a pause position, the boy over 132-200 cm, the girl over 130-190 cm. To throw the small ball, the boy 18-24m away, the girl 16-22m away</p> <p><b>Minimum Competence</b> Ability to run, a boy for 4 minutes, a girl for 3 minutes. Minimum length of jump from position, a boy 132cm and a girl 130cm. To throw the small ball a boy over a minimum length of 18m and a girl over a minimum length of 16m</p>
Ability to coordinate their movements	<p><b>Gymnastics with apparatus</b> Support positions in ground exercises, with apparatus, such as a bench and posture in a position of shoulder, headstand and handstand support with assistance. Support leaps on apparatus, Swedish box, beam etc. Suspension positions in exercises with ropes and apparatus. Climbing. Cartwheel. Movement in a suspended position</p>		<p><b>Dexterity</b> To feel safe even in reversal positions.</p> <p>To attempt performing a second bridge following a support position. To feel safe in suspended and climbing positions</p> <p><b>Minimum Competence</b> Body control in simple unusual positions, performance of support leaps with assistance, attempt to grab tight once or twice while climbing</p>
	<p>Familiarity with basic exercises and commands for the performance of organizational tasks</p> <p>Exercises concerning basic discipline and simple organization: alignment, walking types, realignment, and turns</p>	<p><b>Dexterity</b> To perform exercises according to commands</p> <p><b>Minimum Competence</b> Performance of exercises with alternation at imitation level</p>	<p><b>Dexterity</b> To find and suggest his/her position in the formation, determine the right distance and space, to regulate the start-up, the</p>

<b>Preservation of the need for exercising</b> To have established the need for healthy life style and systematic activity	<b>Exercises in the open air</b> Exercises in the open air in each season with the use of apparatus (roller skate, board, sledge). Winter sports	<b>Dexterity</b> To learn to endure in bad weather conditions <b>Minimum Competence</b> Able to play games in the open air (hopscotch, tag, ball games)	pacing and stoppages with marking time <b>Minimum Competence</b> Understanding the significance of the exercises. Ability to execute commands
	<b>Gymnastics</b> Free exercises in 2-4-8 phases, with a co-player and with apparatus (bench, bars etc.). Application of the key positions and basic forms of gymnastics <b>Sports in the open air</b> Walking, winter sports with the use of apparatus (BMX, rolling skates, board)		<b>Dexterity</b> To execute warming up exercises <b>Minimum Competence</b> Familiarity with the basic technical terms and commands <b>Dexterity</b> To learn to endure the bad weather conditions <b>Minimum Competence</b> Participation in outdoor activities
<b>Light and therapeutic gymnastics</b> To become aware of their deformations and perform consciously and systematically the individual corrective exercises	<b>Individual corrective exercises and swimming</b>		<b>Dexterity</b> To get used to performing his/her individual corrective exercises and swimming exercises <b>Minimum Competence</b> Knowledge of the correct posture and of the corrective exercises

**Table C.** Categorization of Socioeconomic Status—CIDREE (1999) Categories

<b>High</b>	Industrialists, sale merchants and major businessmen, senior public servants (senior judges, diplomats, university professors, senior military officers)
<b>Upper-Middle (middle bourgeoisie)</b>	Freelancers (scientists, company owners etc.)
<b>Lower-Middle (petit bourgeoisie)</b>	Senior civil servants and private sector employees, bank staff, graduates of universities and technical institutions—Middle and lower employees for the public and private sector, graduates of secondary and primary schools—Shop-keepers, artisans and technicians
<b>Lower</b>	Workers, farmers, cattle-breeders and without any trade

**Table D.** PE-TRIQ I (represented importance) & II (frequency of employment) (Physical Education Teachers' Representations on Instruction Questionnaire)

**PE TRIQ I & II**

Code No: .....

This questionnaire consists of 28 statements and does not include either false or right statements. Their estimated **importance** and employment **frequency** is merely a matter of degree. This means that the content of a statement may be regarded to be important, but may be applied little or not in the least. The questions are:

- *How important do you regard the content of each statement? & How frequent do you employ each statement?*
- Show your assessment aided by the scale:  

Not in the least	A little	Quite	Much	Very Much
☒	☒	☒	☒	☒
  - Work objectively: avoid thinking about which answer is suitable or what the others would like. Show the extent at which you regard the content of each statement importance (PETRIQ I) and the extent at which you employed it (PE-TRIQ II), acting swiftly and spontaneously.
  - Write X in the square that expresses how important and how frequent you employ each statement.

<b>How important do you regard each statement? How frequently do you employ each statement?</b>		<b>At all</b>	<b>A little</b>	<b>Quite</b>	<b>Much</b>	<b>Very much</b>
1.	Learning pursued through demonstration and explanations, aimed at having a task reproduced.	☒	☒	☒	☒	☒
2.	Learning pursued through observation and imitation of a pattern aimed, at having learners follow the task.	☒	☒	☒	☒	☒
3.	Learning pursued through a series of questions asked, step-by-step, aimed at explaining the "how" and the "why" of movements.	☒	☒	☒	☒	☒
4.	Learning pursued by placing the learners in front of a problem, aimed at having one single solution discovered and checked by the movement.	☒	☒	☒	☒	☒
5.	Learning pursued through placing the learners in front of a problem, aimed at having multiple solutions generated, checked by the movement.	☒	☒	☒	☒	☒
6.	Learning pursued through a directed planning of an individual program carried out by the learners themselves in cooperation with the teacher, aiming at having multiple solutions generated,	☒	☒	☒	☒	☒

	checked by the movement.				
7.	Learning pursued through a free planning of an individual program carried out by the learners themselves, with the teacher in an auxiliary role, aiming at having multiple solutions generated, checked by the movement.	☒	☒	☒	☒
8.	Teaching carried out with the learners working in a body, in a uniform and coordinated manner, following the teacher's signal, "do what I do". It aims at having a task reproduced.	☒	☒	☒	☒
9.	Teaching carried out with the learners' individual work, aiming at having learners follow a task.	☒	☒	☒	☒
10.	Teaching carried out by means of reciprocal effort, where one learner performs and another observes and gives aid by the criteria card. It aims at having the learners follow a task.	☒	☒	☒	☒
11.	Teaching carried out by the learners themselves by means of self-check on their working progress, aided by a criteria card.	☒	☒	☒	☒
12.	Teaching carried out at a difficulty level selected by the learners, aided by a criteria card, aiming at having the learners follow a task.	☒	☒	☒	☒
13.	Development of the learners takes place when the teacher takes all decisions regarding preparation, conduct and evaluation, while the learners implement them.	☒	☒	☒	☒
14.	Development of the learners takes place when the teacher takes all decisions for the preparation and the evaluation and delegates decisions regarding the conduct, i.e. the sequence of the exercises, speed and rhythm, repetitions, etc.	☒	☒	☒	☒
15.	Development of the learners takes place when the teacher takes all decisions on the preparation and delegates decisions regarding conduct, i.e. the sequence of the exercises, speed, repetitions, etc., and the evaluation, i.e. they check their progress based on the criteria card.	☒	☒	☒	☒
16.	Development of the learners takes place when the teacher delegates some decisions on preparation and the learners make all decisions on conduct and evaluation.	☒	☒	☒	☒
17.	Development of the learners takes place when the teacher delegates all the decisions on the preparation, the conduct and the evaluation.	☒	☒	☒	☒
18.	Communication in which the teacher suggests activities without explaining.	☒	☒	☒	☒
19.	Communication in which the teacher agrees with the learners on what is to happen and how and explains.	☒	☒	☒	☒
20.	Communication in which the teacher guides the learners, having them to recall previous knowledge, changing the focus, analysing the question into sub-questions, involving an additional pupil in the discussion and elucidates.	☒	☒	☒	☒
21.	Evaluation in which the teacher assesses by means of a grade or characterisation the achievement of the teaching targets.	☒	☒	☒	☒
22.	Evaluation in which the teacher regulates the subsequent teaching actions of instruction.	☒	☒	☒	☒
23.	Evaluation in which the teacher finds out knowledge gaps.	☒	☒	☒	☒
24.	Evaluation in which the teacher checks the prerequisite knowledge, necessary for the subsequent learning steps.	☒	☒	☒	☒
25.	Evaluation in which the teacher assists the learners in finding out and correct their mistakes.	☒	☒	☒	☒
26.	Handling mistakes by means of exercising as they are assumed as products of carelessness, confusion and thoughtlessness.	☒	☒	☒	☒
27.	Handling mistakes by means of explanation of the procedure as they are assumed as presence of knowledge gaps.	☒	☒	☒	☒
28.	Handling mistakes by having the previous knowledge reshaped, as these are assumed incomplete or wrong modifications.	☒	☒	☒	☒

Thank you,  
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*Note. PE-TRIQ I and II were administered separately. For reasons of space economy are presented in this section together.*

## **SUMMARY in English**

This research was conducted to describe and compare the Greek and Hungarian elementary school PE teachers' representations on instruction and the teaching styles they employed through a triangulation multidimensional instrument method. Some of the purposes of this research were to demonstrate the teaching styles employed by the teachers in Athens and Budapest and to identify which of the teaching styles are in the spotlight, involved in the personal teaching theory, and the point of the spectrum at which the teachers in the countries have arrived in conjunction with the National Curricula. Teachers consented to participate were initially examined with the Physical Education Teachers' Representation Questionnaire (PE-TRIQ I & II), responding for their represented importance (I) and frequency of employment (II) on the items, which were distributed with a time-lag of 1 month. Exploratory factor analyses with PCA, using varimax rotations, conducted separate for the teacher samples, resulted in the development of two 28-item, 4-factor, PE teachers' perceptual models. The **reproductive factor** indicated knowledge declared and imposed by the PE teacher. The **assimilative factor** reflected knowledge achieved with a teacher-pupil agreement and distribution of roles. The **discovery factor** was composed of items that represented knowledge achieved through logic reasoning. Finally, the **productive factor** was indicative of knowledge reconstructed by means of transformation leading to the construction of new knowledge. By means of Pearson product-moment correlations, a high convergence was revealed between I & II measures. Lessons taught by teachers to pupils in 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> grades of elementary schools were videotaped and coded with the system designed for Identifying Teaching and Learning Behaviours (I ITLB), with which the Greek and Hungarian teachers' employed spectrum of teaching styles was constructed and compared. Thereafter, the Cheffer's Adaptation of Flander's Interaction Analysis System (CAFIAS), was used for the depiction of teachers-learners interactions along the spectrum and their everyday practices. A structured informal interview followed each session with each of the PE teachers to further add clarity to the observed data. Descriptive statistics were computed for all 84 observed lessons and measures. MANOVA techniques, follow-up ANOVAs, and *post-hoc* Games-Howell procedures, were conducted, separately for each instrument, to examine whether any of the Greek and the Hungarian teacher differences or indifferences could be attributed to the characteristics of teachers' gender, years experience, postgraduate studies, school grade and pupils' socioeconomic status at which they taught. In short, the results indicated that experienced and well-educated teachers had richer, better instantiated cognitive representations of the subject matter, instructional strategies, classrooms, and the nature of children than do inexperienced teachers. Interestingly, it was found that both teacher samples teaching pupils belonging to low class tended to apply more direct teaching styles, while for high class pupils indirect styles were their preferred practices, embodied to the reproduction and production clusters respectively. An oversimplification of this finding should be avoided. Greek teachers tended to spend most of their time using direct teaching styles, compared to Hungarian teachers that tended to use indirect along with teacher-centred approaches. From the analyses of the data, the differences that were revealed reflect the differences in the National Curricula.

**Key Words:** Teacher Reflection, Personal Teaching Theory, Teaching Styles, Novice vs. Experienced, and Well-Educated Teachers, Semantic Instructional Framework, Didactic Action Research.

## ÖSSZEFoglalás

A doktori disszertáció kutatásának a célja az volt, hogy multidimenziós eszközök segítségével leírható és összehasonlítható legyen a görög és a magyar általános iskolás testnevelő tanárok tanítással-oktatással kapcsolatos felfogása és a tanítói-oktatói stílusuk. A kutatás konkrét céljai voltak: a) bemutatni azt a tanítási stílust, amit a tanárok Athénben és Budapesten használnak, b) meghatározni, hogy melyik tanítás stílus a legnépszerűbb a megkérdezettek körében, c) hogyan jelenik meg a tanárok oktatás elméletrol erre vonatkozó véleménye, és d) a tanítási spektrum szempontjából hogyan illeszkednek a két ország tanárai a saját nemzeti tanterveikhez.

Azokat a tanárokat, akik részt vettek a kutatásban, először a Testnevelő Tanárok Felfogását Elemző Kérdoívvel (PE-TRIQ I & II) vizsgáltuk meg, ami a fontosságot (I) és a gyakoriságot (II) jelölte az egyes kérdésekre. Faktor analízis (PCA) eredményeképp két 28 kérdésből álló 4 tényezős testnevelő tanári tevékenység érzékelő-értékelő modellt hoztunk létre. A reprodukтив tényező azt mutatta, hogy a testnevelő tanárok minden tudásszinttel rendelkeznek és vallanak magukának. Az asszimilációs tényező azt jellemzte, hogy a tudás minden szinten jelent meg a tanár-diák egyetértés, (összhang) ütközodés, és a szerepek megosztása terén. A felfedező tényező (discovery) azt a tudást mutatta, amit logikus, önálló gondolkodás mentén szerezhetünk meg. Végül a produktív tényező azt jellemzte, hogy a tudás minden átalakulás mentén és segítségével alakul új tudássá. A PEARSON korreláció magas értéku konvergenciát mutatott a I és II értékek között. Az általános iskola kutatásban részt vevő tanárainak 4., 5., 6.-os óráiról videó felvétteleket készítettünk és a kvalitatív kutatási módszerre jellemző kódolást és kategorizálást az I ITLB eszközzel hajtottuk végre. Ennek segítségével a görög és magyar testnevelő tanárok által alkalmazott tanári stílust meg lehetett határozni és összehasonlítani. Ezek után a CAFIAS (Cheffer's Adaptation of Flander's Interaction Analysis System) módszert használtuk, hogy a tanár-diák interakcióknak a spektrumon való megjelenését és a minden nap használatban való leírhatóságát biztosítsuk. minden megfigyelt órát strukturált interjú követte, hogy az adatok hitelesékké és megbízhatókká váljanak. Részletes leíró statisztikai elemzést hajtottunk végre minden a 84 óra anyagával és értékeivel kapcsolatban. MANOVA, ANOVA és post-hoc Games-Howell statisztikai technikákat használtunk minden eszközre, hogy így vizsgálhassuk meg az egyes különbözőségeket és hasonlóságokat, valamint hogy meghatározhatunk, hogy minden mértékben befolyásolta a tanár neme, tapasztalata, posztgraduális tanulmányai, az iskolai osztály és a diákok szociális-társadalmi-gazdasági háttere az eredményeket. Az eredmények azt mutatták, hogy tapasztalt és magasabb iskolai végzettséggel rendelkező tanároknak gazdagabb és megalapozottabb kognitív felfogásuk van a tananyagról, az oktatási módszerekről, az osztályokról és a gyermekekről, mint a kevesebb tapasztalattal rendelkező tanároknak. Érdekes volt, hogy minden a görög, minden a magyar tanárok inkább direkt (közvetlen) tanári stílust használtak az alacsonyabb szociális-gazdasági rétegből származó diákokkal és indirekt (közvetett) stílust a magasabb társadalmi rétegekből származókkal, ami a reprodukciós és produkciós tényezőket emelte ki elsosorban. Az eredmények leegyszerűsítése hiba volna. A görög tanárok többet használtak direkt tanári stílust, míg a magyarok inkább az indirekt stílust tanári központúsági megközelítéssel. Az elemzésből egyértelme, hogy a nemzeti tantervezek különbözőségei megmutatkoztak a tanári felfogásban és tevékenységeben is.

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