

## Teachers' Use of Teaching Styles : A Comparative Study between Greece and Hungary

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*The main purpose of this study was to describe the teaching styles employed by 42 (22 males, 20 females) Greek and 42 (23 males, 19 females) Hungarian teachers. 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). Descriptive statistics were computed for all 84 observed lessons. Employing multivariate analysis of variance (MANOVA) techniques, the results indicated significant main effects for the factors of city, Wilks lambda= 0.634,  $F(4, 57) = 1.93$ ,  $p=0.033$ ; PE teachers' postgraduate studies, Wilks lambda= 4.81,  $F(4, 57) = 3.61$ ,  $p= 0.001$ ; and pupils' socioeconomic status, Wilks lambda=.266,  $F(4, 170) = 1.87$ ,  $p=0.002$ . Follow-up univariate analyses (ANOVAs) and post-hoc Bonferroni procedures were conducted for the factors in question. Greek teachers of the present study sample tended to spend most of their time using direct teaching styles, compared to Hungarian teachers that tended to use indirect along with direct styles.*

*key words* : Personal Teaching Theory, Novice vs. Experienced Teachers

### Introduction

Physical education (PE) teachers have developed, in the course of time, their "personal teaching theories" (Bromme, 1984, p. 178), and compiled their personal repertoires of teaching styles that they prefer to use (Salvara, 2001). This study aimed at revealing this teaching repertoire, as well as finding out whether it can satisfy pupils' learning styles adequately. There exist several studies suggesting that pupils present heterogeneity (Salvara, 2001, p. 127; 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). 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).

Four contrasting general learning types have been defined in current literature. Dunn and his colleagues (Dunn et al., 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 acquire cognitive and motor skills that will enable them to distinguish evidence from fantasy and reality from illusion (Gagne, 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, 2001, 2002a).

Investigating instruction has many difficulties, given the complexity of teaching circumstances (Pieron, 1994). PE teachers need to make decisions in ever-changing situations and perceive pertinent elements of given instructional situations, as well as decide upon appropriate teaching styles to be used in order to meet curricular objectives. During the last two decades a great percentage of research studies have been focused on the investigation of teaching and learning behaviours (Gustart & Springings, 1989; Silverman, 1991; Fejgin & Haneby, 1999). Teachers are accountable for what happens in the class, and they are the primary decision makers (Salvara, 2002b); they define the tasks for pupils (Pieron, 1994). A small but growing number of studies in PE have investigated the effects of teaching behaviour on pupil learning and the teaching styles' use in instruction (Goldberger, 1992; Byra & Marks, 1993; Ernst & Byra, 1997; Cai, 1998; Byra & Jenkins, 1998; Curtner-Smith et al., 2001). However, there has not been a published research with respect to teachers' use of teaching styles in Greece and Hungary. Comparative studies within European countries have long been used in research (Curtner-Smith et al., 2001; Salvara et al., 2002c; Haag, 1986). In this perspective, this study 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, p.43). In the present study, comparison is "balanced", since similar data were used for the analysis (Haag, 1986, p. 43). Consistently, Haag (1986) supported that the clear

evidence and distinction of foreign PE contributes to a better understanding of national realities.

There have been many conceptual frameworks that have attempted to describe instructional processes (Flanders, 1970; Mancini, 1974; Mosston, 1966). Based on research from the last 30 years along 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 unpublished thesis developed lately (Salvara, 1997). The significance of such investigation stems from the evidence that data-based linkages can be established between selected teaching styles and aspects of learners' development (Goldberger, 1983; Salvara, 2001). 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 the need for overall pupil development in the 21st century (Salvara, 1997).

Among the Greek curriculum purposes, dominant position is held by the psychomotor purpose (Presidential Decree 377/1995). It is the one that principally represents Greek curriculum elements (Mountakis, 1994). Zouxnia (2000) and Papaioannou et al. (1999) have highlighted the fact that the curriculum lacks the fostering of physical abilities development. A study made by Salvara (2001) on the given policy texts, suggested that the curriculum lacks the teaching methods for selecting and describing teaching. Activities are explained in detail, without a notice at pupil evaluation methods and instructional tools that could be employed. 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 objectives and targets allocated in generalized principles.

The National Core Curriculum (NCC) of Hungary is not a program with aims, targets, content, teaching methodology and evaluation, instead, it is a unified subscribing framework. Its main purpose is the development of physical condition. NCC is based on modern pedagogical thought of 'open' curricula that presuppose the active participation of PE teachers during instructional planning. Hamar (1998) stressed that within the National Core Curriculum of Hungary, physical education is appointed as the 10<sup>th</sup> cultural domain. As a result, this newly contextual viewpoint asserts physical education within the cultural significance of the country, "undertaking

the roles of creating a balance between healthy body and soul, educating healthy lifestyles, forming recreational and rehabilitative abilities" (Hamar, p. 70).

Comparing Greece's and Hungary's curricula (Salvara, 1997), many similarities in the development of both PE systems were revealed, such as that both countries were highly influenced from the German and Swedish systems (Golegou et al., 1997). However, the two programs are characterized by a different philosophy and a different know-how compilation. The questions arose were : Will teachers' personal teaching theory be differentiated? Will the differences in the curricula influence teachers' selection of teaching styles?

Therefore, one of our interests has been how these innovative contextual curricular changes have influenced teachers' instructional practices. The investigation of instruction is of paramount importance in order to construct pupils' achievement frameworks. In order to research current practices, with meaningful outcomes, we chose to collect data through direct observation. Consistently with Curtner-Smith et al., (2001) suggestions, the preferable method used in the present study was a systematic observation instrument, rather than questionnaires that could lead to misleading outcomes because "there are differences between what people say and what they do" (Lawson & Stroot, 1993, p. 445).

## Teaching Styles

In similar fashion to others (Goldberger, 1992; Byra & Marks, 1993; Ernst & Byra, 1997; Cai, 1998; Byra & Jenkins, 1998; Curtner-Smith et al., 2001), who have been interested in studying teaching styles, this study relied greatly on the work of Muska Mosston (1981). 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 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 decisions are made by the teacher (Curtner-Smith et al., 2001; Mosston & Ashworth, 2002). Mosston and his colleague (Mosston & Ashworth, 2002), have distinguished ten different teaching styles (see Curtner-Smith et al., for a review). Each of these styles is unique because

each has its own decision-making process where teacher and pupils operate under different sets of conditions. "Decisions always influence what happens to people, each style affects the developing learner in unique ways" (Mosston & Ashworth, 1994, p. 6).

Mosston and Ashworth (2002) have identified two clusters of landmark styles. The styles in the one cluster are known as reproductive, because within them pupils reproduce information demonstrated by the PE teacher and the aim in these styles is for the pupils to assimilate with the demonstrated pattern (Salvara, 2001). In contrast, the styles in the second cluster 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). In the present study, the spectrum of teaching styles was divided in three clusters, namely the discovery styles in between the two aforementioned clusters identified by Mosston and Ashworth (1994). In the discovery cluster "pupils are involved in problem solving, reasoning and inventing" (Mosston & Ashworth, 1994, p. 6). What follows is an explanation of the basic elements of each teaching cluster, before proceeding with the explanation of the clusters' categorization applied in the present study.

### *Reproduction of knowledge*

In this cluster, 'pupils perform exercises in a uniform and coordinated manner, individually, reciprocally, with self-check or with the selection of difficulty-level in a given task' (Mosston & Ashworth, 2002). The aim is at having pupils equate with the exercise pattern, reproducing organized movement phases. The approach in this style is mixed. Initially, dominant is the teacher-pupil relationship (command style), thereafter, 'the orientation leans towards learners, whereas inter-pupil relationship dominates (practise, reciprocal, self-check, inclusion styles). Teachers guide pupils directly with the logic of small steps, use direct feedback and reinforcement (Skinner, 1963). Alongside this cluster, teachers guide pupils on the basis of pattern assimilation and observation (Bandura, 1986). Pupils' mistakes are regarded as carelessness, identified and corrected with many similar exercise repetitions.

Communication is initially one-directional with absolute domination of teacher's verbal and non-verbal commands, while, special emphasis is given on the transmission of the message itself. When proceeding along this cluster, communication becomes

two-directional. This cluster also offers the initial development of emancipation with the shift of decisions from teacher to pupils. It formulates social behavioural abilities (Ernst & Byra, 1997). Pupils begin to act, while thinking; regulate their behaviour by selecting different task levels; self-evaluating; develop initiatives and personal achievement goals (Siedentop & Tannehill, 2000).

### *Discovery of knowledge*

In this cluster, 'pupils discover the how's and why's of tasks under the PE teacher's guidance or solve a task working individually' (Mosston and Ashworth, 2002). This style aims at having learners (a) 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 (b) 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 (c) perform the discovered movement for the verification of the given 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 et al (1999), this cluster is based on Socratic obstetrics with the main interest oriented towards the creation of a questioning, exploring, verifying climate through movement tasks. Based on Bruner (1960) pupils use two kinds of thinking : (a) intuition (forming hypotheses) and (b) analysis (control for movement verification). Pupils discover, under the guidance of the teacher a unique solution, while working on closed cognitive systems in a convergent learning process. 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 (Zeichner, 1992).

### *Production of knowledge*

In this cluster, 'pupils create multiple solutions working individually, in-groups, or planning individual exercise programs in cooperation with the teacher or by themselves' (Mosston & Ashworth, 2002). This cluster aims at having pupils (a) create multiple solutions on a given task using cognitive operations such as contrasting, comparing, categorizing, hypothesizing, drawing conclusions following

a divergent learning process; or (b) 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 or by themselves (Salvara, 2001).

The pupils basically introduce the approach of the productive cluster. Dominant here are 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, this cluster focuses on the search of alternative solutions with the use of divergent learning mechanisms (Mosston & Ashworth, 2002), such as decision making, while planning individual programs; and acquiring deep knowledge, while using search processes : cognitive apprehension, quest, discovery, verification (Mosston & 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 (Kelly, 1999). Communication between teacher and pupils is looped. Teacher and pupils' verbal and non-verbal interventions lean towards pupils. Additionally, in this cluster pupils develop initiatives (Mellor, 1992).

### *Clusters' categorization*

The categorization of the clusters in three models was based on perceptions for instructional conduct, cognitive structure, learning, communication, performance, evaluation, manipulation of mistakes and pupils' motivation orientations with which the clusters of reproduction, discovery and production are structured and become differentiated. Table 1 presents a diagrammatic depiction of the clusters.

In short, as presented in Table 1, teaching styles belonging to reproduction are organized mainly on the basis of behaviourism (Skinner, 1963; Kelly, 1999) and social-cognitive behaviourism (Bandura, 1986). 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.

Teaching styles included in the discovery cluster become organized around the information processing model, i.e. learning with guided discovery (Bruner, 1960; Gagne, 1964), 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).

*Table 1. Categorization of Teaching Styles in Three Clusters*

Perceptions	Teaching Clusters		
	Reproduction	Discovery	Production
Instructional Conduct	Logic of small steps with whole class, individual, reciprocal, or with selection of difficulty level	Intuitive and analytic thought (hows and whys of tasks)	Counterbalance(transformation and reconstruction of existed knowledge for the discovery of multiple solutions or programs)
Cognitive Structure	Motor tasks in small units displayed linearly; Continuous thought	Cognitive and motor tasks in units that present an entirety, displayed spirally; Convergent thought	Cognitive and motor tasks in units with structure, displayed loopy; Divergent thought
Learning	Observation and imitation of the pattern	Information processing	Transformation of knowledge from the old to the new
Communication	Message transmission from teacher to learners	Discovery with the participation of both teacher and pupils	Production of exercises by the learners
Performance	Emphasis on the outcome	Emphasis on the process	Emphasis on the production
Evaluation	Emphasis on demonstrating evaluation	Emphasis on processing evaluation	Emphasis on educational evaluation
Pupils Mistakes	Accounted as carelessness 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
Motivation	Ego/performance orientation	Task/mastery orientation	Task/mastery orientation

Finally, the teaching styles attributed to the production cluster are organized on the views of constructivism (Piaget, 1967; Rink, 2001, p. 123). 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).

The lack of research on the teachers' employment of teaching styles establishes the need for further analysis. In this vein, the purposes of this study were as follows :

1. To demonstrate the teaching styles employed by the teachers in Athens and Budapest as coded with the Instrument for Identifying Teaching and Learning Behaviours (I ITLB, Salvara, 2001).

2. 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.

3. To reveal, whether the teaching styles employed, can satisfy pupils' overall personality development, involving psychomotor, cognitive, social and emotional perspectives.

Predictions about the kind of results this study 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 that teachers would employ predominantly reproductive teaching styles, given the logical speculations accounted from published studies (Goldberger, 1992; Curtner-Smith et al., 2001). Based on a recent study (Salvara, 2002b), concerned with the two countries physical education curricula, the analysis 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 (NCC, 1995). On the other hand, based on previous research (Salvara, 1997), that revealed a tendency for the Hungarian teachers towards a constructivist approach to instruction (Salvara et al., 2002c), it was then assumed that Hungarian teachers might favour to employ more productive teaching styles along with reproductive ones.

## Method

### Participants and Setting

Eighty four PE teachers employed in the cities of Budapest and Athens

consented to participate in the study. They all taught mixed gender elementary school classes. The schools were located almost from all municipalities across Athens and Budapest. Table 2 displays the teacher samples of the present study based on the criteria of teachers' gender, teaching experience in years, postgraduate studies and school grade as well as pupils' socioeconomic status\*\*\* that teachers taught.

**Table 2.** *Sample Description*

	Gender		Years of Teaching Experience				Postgraduate Studies		School Grade			Pupils Socioeconomic Status			
	M	F	0-5	6-15	16-25	26-35	With	Without	4	5	6	H	Hm	Lm	L
Athens	22	20	5	12	16	9	12	30	4	19	19	6	14	14	8
Budapest	23	19	4	11	16	11	13	29	5	19	18	7	12	15	8
Total	45	39	9	23	32	20	25	59	9	38	37	13	26	29	16

**Note** M denotes males, F denotes females; H denotes high class, Hm denotes high-medium, while Lm denotes low-medium and L low.

This research was based on anonymity of the subjects who participated and a cover letter explaining the procedures and purposes of this research was distributed to each teacher respectively. For the investigation that conducted in Budapest, permission was granted by the dean\*\* of the faculty of the Semmelweis University, while for the research conducted in Athens, it was granted by the Hellenic Pedagogical Institute.

One lesson of each teacher's choice in which they taught any activity to pupils was videotaped during a half-year period in both cities. The mean length of these lessons was 43.24 minutes and the mean class size was 23.73 pupils. A total of 11.902 minutes were observed in Athens and Budapest. Activities chosen by the teachers were athletics (high-jump, long-jump, hurdles, races, etc), gymnastics (uneven bars, balance beam, floor exercises, etc), basketball, volleyball, conditioning and elementary school-games.

### Instrument for Identifying Teaching and Learning Behaviours (I ITLB)

Lessons were coded with the Instrument for Identifying Teaching and Learning Behaviours (I ITLB) (Salvara, 2001, 2002a), which is based thoroughly on Mosston's

framework (Mosston, 1981; Mosston & Ashworth, 1990, 1994, 2002) as well as on the systemic theory (Piaget, 1969). I ITLB is an interval recording instrument developed to record the amount of time in which teachers and learners use each of the teaching and learning behaviours (Salvara, 2001, 2002a).

I ITLB includes seventeen categories of teaching behaviours (what the PE teacher does and says) and learning behaviours (what the pupil does and says), that recur constantly during instruction. Table 3 in its left column includes the I ITLB categories. 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 1 represents an example of A1 (pupils' thinking orientation) I ITLB category\*.

<b>Learners thinking orientation</b>
<p>We announce to pupils the subject matter, which will become the subject for observation and imitation and will be given to pupils for individual work. We agree on the decisions that pupils will make, such as exercise sequence, number of repetitions, duration of practise, and state that we are at their disposal for personal feedback.</p>

*Figure 1. 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 (Goldberger, 1992; Salvara, 2001, 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 the limits of each category, 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); i.e. they possess independency. 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. 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 centralising tendency among themselves around the 'mother-concepts : ' reproduction, discovery and production (Mosston & Ashworth 1994, 2002; Salvara 2001, pp. 131-133).

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 teacher and pupils. Depending on who is making the decisions in the different stages of the teaching act, different teaching styles emerge evolving Mosston's landmark clusters. 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.

## Coding, Observer Training and Internal Consistency

During observations, the seventeen categories of teaching and learning behaviours were recorded 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 six 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 89.2%.

## Data Analysis

Descriptive statistics were computed on all eighty-four lessons. Comparisons were made between the teaching styles used by Greek and Hungarian teachers. A bivariate correlation analysis was employed to determine multicollinearity between the I ITLB categories. Multivariate analysis of variance (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 and pupils' socioeconomic status.

Follow-up univariate analyses of variance (ANOVAs) were performed for the main effects revealed. Consequently, exploratory data analysis was performed. For pairwise comparisons, the post-hoc Bonferroni procedure was the preferable follow-up test, as it ensures a good control over Type I error rate (Field, 2000). Data analyses were performed, solely with the statistical package for social sciences (Norusis, 1999).

## Results

### Descriptive Statistics

The descriptive data in Table 3 present the percentages of intervals in which teachers in Athens and Budapest employed each of the teaching and learning behavioural categories of the I ITLB instrument.

An examination of the data in Table 3 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 direct behaviours than indirect ones.

**Table 3.** 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)	%
Introduction 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
Continuation 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 teachers 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
Reconstruction 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 discoverys 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
Output Pupils evaluation(D17)	3.90	1.25	164	9.8	4.48	1.02	188	11.2
	Total		1681				1672	

Table 4 shows the mean values and percentages of intervals in which teachers in Athens and Budapest employed each of the ten teaching styles. Examination of Table 4 indicates that although teachers in both countries spent the larger proportion of their time in reproductive styles, it is evident that Hungarian teachers attributed

more of their time to discovery and productive styles, compared to the time spent by the Greek teachers in the same clusters.

**Table 4.** Mean Values and Percentages for Each Teaching Style Employment by Teachers in Athens and Budapest

Teaching Styles & I ITLB cat.	Athens			Budapest		
	M	Total(min)	%	M	Total(min)	%
Reproductive styles Command (1) A1+B3+C8+D17	21	875	14	19	796	14
Practice (2) A1+B3+C9+D17	23	978	16	20	827	14
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
Discovery styles 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
Productive styles 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
Total	144	6,051		141	5,851	

Figure 2, 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.

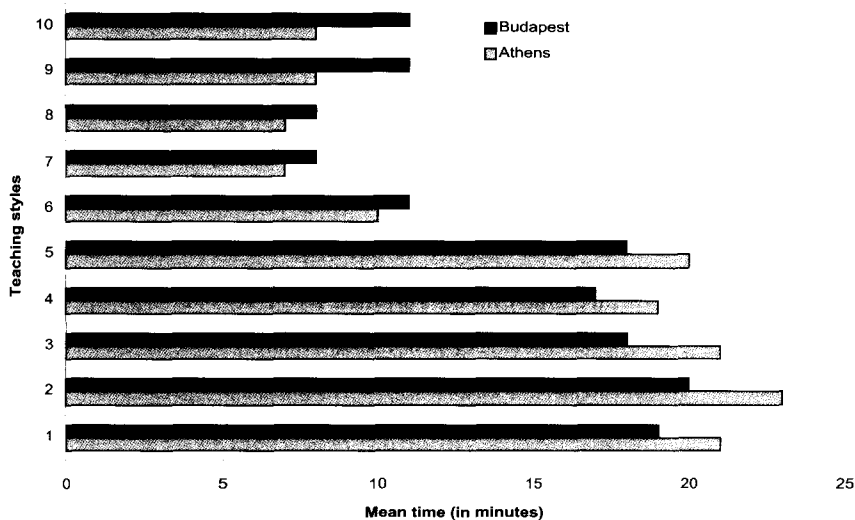


Figure 2. Teaching Styles Employment by Teachers in Athens and Budapest

Table 5. Bivariate Correlations between All I ITLB Categories

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

A bivariate correlation analysis was employed to determine multicollinearity between the I ITLB categories. In Table 5, the results indicate 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).

## Teacher Differences

A one-way multivariate analysis of variance (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 general linear model (GLM) multivariate procedure, the dependent variables were the main effects of I ITLB, while the variable of city, teachers' postgraduate studies, and years of teaching experience as well as pupils' socioeconomic status and teachers' gender were the factors (independent variables).

Significant multivariate main effects emerged for the factors of city, Wilks lambda= 0.634,  $F(4, 57) = 1.93$ ,  $p=0.033$ ; for PE teachers' postgraduate studies, Wilks lambda= 4.81,  $F(4, 57) = 3.61$ ,  $p= 0.001$ ; for pupils' socioeconomic status, Wilks lambda=.266,  $F(4, 170) = 1.87$ ,  $p=0.002$ . A tendency was observed for the factor concerned with PE teachers' gender, Wilks lambda= 0.65,  $F(4, 57) = 1.87$ ,  $p=0.054$ . Non-significant main effect was found for PE teachers' years of teaching experience.

Follow-up univariate analyses (ANOVAs) indicated that teachers in Athens differed significantly in the time spent on B3 (observation and imitation of the exercise pattern),  $F(1, 73) = 8.18$ ,  $p=0.005$  and on D17 (pupils' evaluation),  $F(1, 73) = 5.98$ ,  $p=0.017$ , compared to their colleagues in Budapest.

Teachers with postgraduate study were found to be significantly different for their time spent on A1 (orientation of pupils' thought),  $F(1, 73)=8.97$ ,  $p=0.004$ ; on A2 (questioning situation),  $F(1, 73)=9.36$ ,  $p=0.003$ ; on B3 (observation and imitation of the exercise pattern),  $F(1, 73)=21.47$ ,  $p=0.001$ ; on B5 (discovery with pupils' effort),  $F(1, 73)=6.02$ ,  $p=0.017$ ; on C11 (selection of difficulty level),  $F(1, 73)=5.64$ ,  $p=0.020$ ; and on C14 (checking solution's reliability),  $F(1, 73)=9.34$ ,  $p=0.003$ , compared to their colleagues without postgraduate studies.

Pupils' socioeconomic status was factor significant for the time spent on A1 (orientation of pupils' thought),  $F(3, 73) = 5.06$ ,  $p=0.003$ ; on A2 (questioning situation),  $F(3, 73)=6.43$ ,  $p=0.001$ ; on B3 (observation and imitation of the exercise

pattern),  $F(3, 73)=3.17$ ; on C8 (work with the whole class),  $F(3, 73)=5.37$ ,  $p=0.002$ ; and on C15 (checking multiple solution's reliability),  $F(3, 73)=3.12$ ,  $p=0.031$ .

Although a non significant main effect was found for the teachers' years of teaching experience, only one I ITLB category was found significantly different; C8 (work with whole class),  $F(3, 73)=6.40$ ,  $p=0.001$ .

The post-hoc Bonferroni, test revealed significant differences for the pupils' socioeconomic status variable. Teachers teaching pupils belonging to low and medium socioeconomic classes tend to use more indirect teaching styles, while teachers teaching pupils belonging to high-medium and high socioeconomic classes tended to apply more direct teaching styles. All I ITLB categories were found significantly different ( $p<0.05$ ).

PE teachers having zero to five and sixteen to twenty-five years of teaching experience differed significantly ( $p=0.001$ ) on the time spent on C8 (work with the whole class) that predominate in direct teaching styles as compared to the teachers having six to fifteen and twenty-six to thirty-five years. It is evident that novice teachers tended to use direct teaching styles as compared to the more experienced teachers of this sample. On the contrary, this cannot be said for the ranges of sixteen to twenty-five years and six to fifteen years, where the opposite was observed.

## Discussion

The main strength of this study was that it produced detailed data on Greek and Hungarian teachers' practices within the ten examined teaching styles using the I ITLB instrument. This study indicated that both Greek and Hungarian teachers spent most of their time using reproductive teaching styles. Even though, Hungarian teachers used productive teaching styles, still direct teaching styles seemed to predominate in instruction (see Table 4). The teaching styles falling into discovery and production clusters that require learners to go beyond what they already know (Goldberger 1992), were virtually absent from the teaching repertoire, even though especially Hungarian teachers showed an increased frequency of application. Teaching styles falling into the discovery and production clusters have been characterized as "virgin territory" (Goldberger 1992, p. 44) in theory and research.

The teaching style used for the vast majority of time by both teacher samples within the present study 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 observed. 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 of urban and rural teachers. Curtner-Smith et al (2001, pp. 184-185) speculated that the reasons direct styles predominate might have been environmental including the influence of other colleagues, political implying the focus on the later NCC and IPEPTH policy texts (1995), or as a result of occupational socialization. According to Alberti (1980) direct approaches in instruction might be due to neo-behaviourist views on the instructional organization.

In this study, it was assumed that postgraduate studies, pupils' socioeconomic status and years of teaching experience may also comprise some of additional reasons. However, it would be premature to determine which the primary reason for such teaching styles employment was. All aforementioned factors, according to the authors of this paper, seem 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 samples. It appears that, well-educated teachers applied more pupil-centred approaches; they included greater high order questioning and critical thinking on pupils. It was found for the present samples, that the styles belonging to the discovery cluster were their preferred practices.

Years of teaching experience were not a main factor in influencing teaching styles selection. However, a difference was found only for the application of 'observation and pattern imitation,' which is mainly included in the reproductive teaching styles (Mosston & Ashworth 2002). Novice teachers seemed to employ in a greater extent teaching styles that belong to the reproductive cluster. In their study, Housner et al (1993, p. 291) 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." Interestingly, it was found that both teacher samples teaching pupils belonging to low and medium socioeconomic classes tended to apply more indirect teaching styles, embodied to the production cluster. On the contrary, teachers teaching pupils belonging to high-medium and high socioeconomic classes tended to employ more direct teaching styles, accounted for the reproduction cluster. No accurate assumption

could be made concerning this finding. There is no empirical research to support such a trend and furthermore an oversimplification should be avoided. Further research is required to determine the principal reasons for such finding.

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, PE programs focus on psychomotor learning, emphasizing subject-matter orientations. Greek teachers had not expanded their instructional variability in such extent. This might be due, as alluded in the introduction section, to the emphasized subject-matter centred curriculum (IPEPTH, 1995). On the contrary Hungarian PE programs target at physical condition, in 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.

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 take into consideration the form with which the teaching products were presented in both countries. Interestingly, all ten teaching styles examined were used by the teachers in both countries, in contrast to the findings reported by Curtner-Smith et al. (2001), where some productive styles were completely absent.

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

The limitations of this study should be acknowledged. Given the limited data base of the present study, there is a need for continued research to further examine the reasons that teachers select among the different teaching styles. One area of particular importance is the way teachers' education promotes the use of productive styles in physical education teacher education (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.

The findings in this study extend previous work in this area and further underscore the importance of the variety of teaching styles employment during instruction. This study marks the first attempt to explore teaching styles application in Greece and Hungary further provides valuable information about the factors influencing instructional employment. In addition, this study provides with baseline data for possible future research on teaching styles in a comparative aspect between countries. Additional research is certainly needed in the search for the factors influencing teaching styles selection. The teaching styles and behaviours we choose, as teachers, can have a significant impact during the long-term process (Mosston & Ashworth 1994, 2002). Considering Mosston's and Ashworth's (1994, p. 7) words that "every style has a place in the multiple realities of teaching and learning," we, teachers, should be more careful with our teaching style selections.

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, teachers' selection of teaching styles and questioning strategies employed. Even though the findings of this study are limited and additional investigation is warranted, it is our hope that both local and governmental curriculum developers would promote indirect teaching methods in their works.

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