

“Subjective theories and behaviours in physical education of Italian primary school teachers. Applying a superstructure model to study specialist-generalist teachers differences and the effects of a physical education professional development programme”

Dissertation

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Rita Casella
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1. Gutachterin: Prof. Dr. Katja Schmitt
2. Gutachter: Prof. Dr. Jurgен Schröder

Abstract

Relevance of the research

Important international organizations and educational authorities recognize the power of sport in contributing to healthy child development. Healthy lifestyles start from childhood, but the Italian school system gives insufficient support to motor development at the primary school age. We would like all pupils in primary school to receive quality physical education instruction through a well-designed curriculum taught by dedicated professional physical educators. We believe that helping in-service teachers to develop new understandings, beliefs, and perceptions (i.e. “in change” processes) can influence the operationalization of physical education curriculum in primary schools.

Research problem

The first aim of this study was (1) to explore the subjective theories and behaviours of specialist and non-specialist physical education teachers teaching in Italian primary schools. The questions were: What are the subjective theories of Italian primary school teachers? What are the differences/similarities between specialists and non-specialists in their respective beliefs about primary physical education? (*First study*). The second aim was (2) to assess the effects of a PD programme in physical education. The question was: Does the research process and teacher training cause any modification to the teacher’s initial personal practice theories (subjective theory)? (*Second study*).

Methods

Forty-three (43) in-service primary school teachers, thirty-six (36) without a specific qualification in physical education (non-specialist) and seven (7) with a specific qualification (specialist) were interviewed and videotaped during their regular physical education class. Data were collected using observations and interviews and based on the Research Programme Subjective Theories. Behaviour analysis was facilitated by the use of the SIMI – scout software package. Using both qualitative and quantitative methodologies, a variety of aspects dealing with teaching and learning were examined.

Main findings

In the first study, focusing on the comparison of subjective theories and behaviours of specialist and non-specialist primary school teachers, a description of how they implement physical education teaching was obtained. Few differences emerged between specialist and non-specialist teachers. They show that a specific qualification in teaching physical education helps teachers to use motor and methodological competencies better, such as giving feedback on skills verbally both to the class and individuals. In addition, experience has more relevance for teachers without a specific qualification in physical education, but it also has a moderate relevance for teachers with a qualification in physical education.

The second study, aimed at verifying the effects of a PD programme, focused on the question concerning what aspects of the subjective theories can be modified through in-service training. Results show improvements in teaching effectiveness both in the increase of time dedicated to student organization and observation and in the decrease of time dedicated to environmental organization.

Implications for future research

Understanding the subjective theories and behaviours of in-service primary physical education teachers may help university teachers who are responsible for teacher education to develop training programmes that are better targeted to the change process.

Abstract in German Language

Einleitung

Wichtige internationale Organisationen und Bildungsbehörden erkennen den wesentlichen Beitrag des Sports zur gesunden Kindesentwicklung. Obwohl ein gesunder Lebensstil seine Wurzeln in der Kindheit besitzt, ist das Italienische Schulsystem bezüglich der Förderung der Bewegungsentwicklung in der Primarstufe noch mangelhaft. Alle Primarschulkinder sollten einen Schulsportunterricht mit hohem Qualitätsniveau haben, der auf einem angemessenen Curriculum basierend von qualifizierten Sportlehrern geführt werden sollte. Wenn Primarschullehrern bei der Entwicklung neuer Kompetenzen, Einsichten und Wahrnehmungen geholfen würde, so könnte eine bessere Umsetzung des Schulsportcurriculums in die Unterrichtspraxis gewährleistet werden.

Problemstellung

Die erste Zielsetzung war es, subjektive Theorien und Verhalten von universitär ausgebildeten Sportlehrern und Sportlehrerinnen in Primarschulen im Vergleich zu nicht ausgebildeten KlassenlehrerInnen zu untersuchen. Deshalb konzentrierte sich die erste Studie auf die Frage, welche subjektiven auf Schulsport bezogenen Theorien italienische Primarschullehrer besitzen und ob sie sich von Lehrern, die im Sportunterricht spezialisiert bzw. nicht- spezialisiert sind, unterscheiden. Die zweite Zielsetzung was es, die Effekte einer gezielten Schulsportfortbildung auf die subjektiven Theorien und Unterrichtsverhalten von Primarschullehrern zu untersuchen. Die Frage war, ob der Erforschungsprozess und die Fortbildung eine Veränderung ihrer anfänglichen subjektiven Theorien verursacht.

Methode

Dreiundvierzig (43) Primarschullehrer, die im Sportunterricht spezialisiert oder nicht-spezialisiert (7 bzw. 36) waren, wurden interviewt und während einer ihrer normalen Sportunterrichtsstunden aufgenommen. Die Daten wurden durch aufs Forschungsprogramm Subjektiver Theorien basierende Interview- und Beobachtungsmethoden erhoben. Die Analyse von Verhaltensdaten wurde computerisiert mittels SIMI Scout Software Package durchgeführt. Sowohl qualitative als auch

quantitative Forschungsmethoden wurden zur Erforschung unterschiedlicher Aspekte des Lehr-Lernprozesses verwendet.

Hauptergebnisse

Die erste Studie, deren Ziel der Vergleich zwischen den subjektiven Theorien im Sportunterricht spezialisierter und nicht-spezialisierter Primarschullehrer war, ermöglichte eine Schilderung davon, wie die Primarschullehrer den Sportunterricht gestalteten. Geringe Unterschiede zeigten sich zwischen spezialisierten und nicht-spezialisierten Lehrern und wiesen darauf hin, dass eine spezifische Qualifizierung für den Schulsport bestimmte Lehrkompetenzen erhöht. Insbesondere sind spezialisierte Lehrer durch häufigere verbale Feedbackgabe bezüglich der Bewegungsfertigkeiten auf individueller und Klassenebene gekennzeichnet. Außerdem scheint eine langjährige Erfahrung im Lehrdienst insbesondere für die Unterrichtseffizienz nicht-spezialisierter Lehrer von Bedeutung sein.

Die zweite Studie, deren Ziel die Untersuchung der Effekte einer gezielten Schulsportfortbildung von Primarschullehrern war, ermöglichte herauszufinden, welche Aspekte ihrer subjektiven Theorien dank solcher Fortbildung verändert werden konnten. Die Ergebnisse zeigten, dass das Lehrverhalten durch eine Erhöhung der zur Studentenorganisation und –beobachtung verwendeten Zeit und eine Verminderung der zur Umgebungsorganisation verwendeten Zeit effektiver wurde.

Ausblick

Universitätsprofessoren, die für die Ausbildung von Schullehrern verantwortlich sind, können vom besseren Verständnis bezüglich subjektiver Theorien und Verhalten von Sportschullehrern in der Primärstufe profitieren, indem sie auf solche Kenntnisse basierend gezielte Aus- und Fortbildungsprogramme zur Förderung vom Veränderungsprozess gestalten.

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List of Abbreviations

ALT-PE = Academic Learning Time-Physical Education System

PCK = Pedagogical Content of Knowledge

PD = Professional Development

CPD = Continuing Professional Development

PE = Physical Education

RPST = Research Programme Subjective Theories

ST = Subjective Theory

SD = Semi-structured Dialogue

UNESCO = United Nations Educational, Scientific and Cultural Organization

Introduction

The United Nations Educational, Scientific and Cultural Organization (UNESCO) proclaimed 2005 International Year of Sport and Physical Education and invited governments to promote sport and physical education (PE) as a tool for health, education, social and cultural development at local and national levels. In the public health community, over the past decade it has become clear that physical activity and physical fitness play key roles in children's overall health and disease prevention.

The direct benefits of regular physical activity include physiological health (e.g. enhanced cardiovascular fitness) and psychological well-being (e.g. reduce stress), lower health care costs, and increased economic productivity (McCaughy, Martin, Kulinna & Cothran, 2006b). Daily quality physical activity is more important today than ever before. The dramatic increase in childhood obesity, school violence and early puberty are only some examples (Gallahue & Cleland-Donnelly, 2003, pp. 2-23). Teachers must remember that child development involves progressive change in their motor, emotional, cognitive and social domains and that to promote an active lifestyle from childhood has a fundamental role in developing a healthy lifestyle. Good habits start early: the important role of PE is demonstrated by the fact that children who exercise are more likely to stay physically active as adults. From the age of five to eleven, children develop a variety of fundamental and specialized movement skills (learning to move) and enhance their health through increased levels of physical activity (learning through movement).

PE teachers have an important role in enhancing these skills. Primary school teachers in Italy come from a variety of cultural backgrounds and training. Despite the recent university reform¹, we can find in-service teachers that do not have a degree, as they become qualified through the old system. Only in the last few years, primary school teachers' university training includes a specialization in PE. Only in minor cases do

¹ The Degree in Primary Education Science, in Italy, was a four-year university course and it has been updated to the new degree system ("3 years plus 2 system") recently. Before the University reform, people could teach at primary level with a specific Secondary School Diploma. Nowadays, primary school teachers can teach at this level only after obtaining a master degree in Primary Education Science.

teachers have a supplementary degree in PE. The Italian situation is not far from other European countries where elementary PE is taught by classroom teachers (Tsangaridou, 2005, pp.24-50) and PE is a marginalized subject (Siedentop, 2002a, pp. 368-377). Despite the need for a more efficient national policy, the Italian government has proposed numerous PE changes to teacher training qualifications in PE which have yet to contribute to an improvement in the quality of PE in schools. All pupils in primary school should receive quality PE instruction through a well-designed curriculum taught by dedicated professional physical educators. People become good PE teachers based on academic knowledge and teaching skills acquired through training programmes and also by developing personal professional experience. This experience is enriched when associated with reflective attitude and practice (Schön, 1983), but in Italy several differences can be observed between qualified and non-qualified in PE primary teachers.

The Italian situation is as follows: most in-service primary teachers became qualified through an old system which neither required a degree, nor any formal training in PE teaching, whereas only a minority of Italian primary school teachers has a supplementary degree in PE. One important area of inquiry, therefore, is to identify which factors contribute to improve the quality of primary PE teaching. A qualitative and quantitative analysis of in-service primary school teachers in PE is necessary. In addition, there is the need to immediately implement a development programme to support in-service teachers. Helping in-service teachers to develop new understandings, beliefs, and perceptions (i.e. “in change” processes) can influence the operative aspects of the PE curriculum in primary schools, both for qualified and non-qualified teachers. In line with the United Nations General Assembly Resolution (2003), the aim of this research is to promote quality PE, on the basis of locally assessed needs, and to strengthen cooperation and partnerships among three Universities².

This research remains committed to the notion that PE programmes and teachers should have expectations for student learning and should teach to enhance learning. It is clear that it is the explicit responsibility of the physical educator to help students learn and develop.

² This research is part of a broader qualitative study supported by the German Academic Exchange Service. It is part of a cooperation between the Rome University “Foro Italico” – ex IUSM (University Institute of Motor Science) and two German Universities, Georg August Universität Göttingen and Universität Koblenz Landau.

There is now, more than ever, support about how teaching can be performed more effectively due to research on teaching effectiveness and teacher training development.

1 Research on Teaching in Physical Education

Although the concept of the quality of teaching PE and sport has not been defined clearly or made operative, it has been a major and constant preoccupation of educators and teacher trainers. Several research paradigms have come to interesting conclusions (Pièron & Carreiro da Costa, 1996). The following paragraphs review the studies done in research on teaching PE with the intent to summarize or synthesize the important findings of this research correlated to the historical perspective and problems areas.

1.1 Historical Perspective on the Study of Teaching Physical Education

Considering the ambitious project of analysing the evolution of teaching PE, the major lines of research are discussed below. Ideas in education and the research that follows these ideas tend to be cyclical; researchers observed a frequent swing from a more constructive approach to one that is humanistic (Rink, 2006, pp. 41-70). Research on teaching PE is a fairly young research field, a quarter of a century old, but it has produced a substantial body of knowledge from descriptive and qualitative research (Siedentop & Tannehill, 2000, pp. 22-40).

Research on teaching began in the 1940s and the initial efforts were primarily linked to study the characteristics (e.g., age, gender) that teachers needed to teach effectively. Effective teachers were described using a rating scale, but the results were disappointing. During the latter part of the 1950s and well into the 1960s, research was dominated by *process-process studies* (Siedentop & Tannehill, 2000, pp. 22-40), research efforts were directed toward establishing relationships between process variables (e.g., clarity of presentation, teacher enthusiasm, and task orientation). Theory in teacher effectiveness research has tended to develop inductively (Siedentop, 2002a, pp. 386-377). Efforts to move deductively from psychological or sociological theories to relevant questions that guide teaching research have not proven to be as useful. Few efforts have proven to be successful and the Flanders Interaction Analysis (Siedentop, 2002b, pp. 427-440) model is an example of this. Later, researchers focused more specifically on student process variables. What most of these process-product studies of the 1960s and 1970s found was

that teachers who used direct instruction were more effective in producing student learning.

Much of the research that came out of the *process-product studies* of the 1970s had a positive influence on practice. Also, in the same period research started to identify how good teaching changed with different subjective matters, different students and different goals; the new line of research began to focus on *context*. With the advent of the 1970s, a major break-through came in the study of teaching behaviour and researchers began turning toward *context-specific variables* (e.g., academic learning time and direct instruction). Several *methodological changes* in the way research was conducted characterized the 1980s. In the late 1970s and early 1980s, a host of observation instruments was created for observing PE classes. Most of the early studies were descriptive, but not only. In the 1980s, research was conducted using the Academic Learning Time-Physical Education System (ALT-PE) (Siedentop & Tannehill, 2000, pp. 22-40).

Early descriptive and intervention research relied almost exclusively on *quantitative methods*, but in the 1980s, *qualitative methods* began to be used. By the end of the decade, the latter, had become the dominant form of research on teaching PE. Research in the 1980s focused primarily on understanding teaching from the perspective of teachers and learners. Researchers focused their attention on understanding what is happening in teaching and research abandoned the search for what effective teachers do that could be correlated with learning and started to seek teaching from the perspective of the participants. Research in the 1990s focused primarily on understanding the students' role in the *teaching-learning process*. This era of research used *qualitative research methods*. Interviews and extensive observations in field settings are the primary tools of the qualitative researcher. Qualitative research uses long-term narrative descriptions of what teachers and students do, especially trying to capture the perspectives of those in the learning environment. Qualitative research presents its findings and analyses in words and stories rather than with tables and graphs. A great deal of current research in education is qualitative. This research provides rich descriptions of teaching and learning that has helped us to understand the complex nature of teaching and learning in schools. Researchers have also returned to studying different approaches to teaching the content of

PE. These studies are far more difficult to conduct and interpret because it is so difficult to control the many variables involved.

More recently, researchers have utilized both *quantitative and qualitative methods* in the same study. The two approaches, when used together, can add to a growing understanding of teaching and learning in PE by utilizing the best features of each methodology. Another factor in relative effectiveness is teacher knowledge of content. The work of Shulman (1987) has brought the issue of *teacher knowledge* to a forefront. Teachers, of course, are reluctant to incorporate various kinds of knowledge to be successful (Shulman, 1987, pp. 1-22; Siedentop and Tannehill, 2000, pp. 22-40). They find difficulty implementing the various items of knowledge they have which may include:

- general and territorial knowledge of students,
- general pedagogical knowledge,
- knowledge of the content included in the curriculum, and the ability to transform their content of knowledge and deliver it to students in ways that help them learn. This last form of knowledge, called *pedagogical content knowledge* (PCK), is particularly relevant to effective teaching.

Research on teacher knowledge is still a young field, but some interesting points have been clarified. The ecology of teaching and learning PE is a relatively new paradigm (Siedentop, 2002b, pp. 427-440). An *ecological model* is an interrelated set of systems in which changes in one system affect other systems. Teaching/learning in PE can be viewed as ecology with three primary systems;

- managerial task system,
- instructional task system,
- the student-social system.

The interactive influence among these three systems forms the ecology of PE and research has revealed many features of PE ecologies (for extensive reviews of the topic see Siedentop, 2002b, pp. 427-440).

The research productively achieved during this quarter-century has been led by the evolution of the conceptual and methodological model and research on teaching in PE has established itself as a legitimate pursuit in the acquisition of knowledge (Rink, 2006, p. 41). This chapter identifies the major contribution to research knowledge on teaching PE and its implications. It is included because the significant findings of research on teaching has been used as a basis for this thesis and the questions researchers ask about teaching are not so different from the questions that teachers should be asking about what they do on a daily basis. Even if research on teaching in education has in general grown significantly, the Italian situation is very different from other countries (Gentile, 1999). Teaching is a complex profession and several nations (England, Australia, USA, Canada, Holland, Switzerland, Norway, Sweden and Israel) have developed university courses to prepare teachers (Gentile, 1999). In Italy, after an experience of 10 years where different faculties have organized courses to prepare infant and primary school teachers and two-year specialization schools to prepare secondary school teachers, new reform is being applied. The original idea behind this reform was to train teachers based on research developed to improve quality of teaching. However, insufficient research was published and the only papers available in the Italian context were rather obsolete (Pièron, 1989). Luzzatto (1998, p. 92) suggested improving the quality of initial formation and identified several critical teaching areas. Laporta (1994, pp. 112-113) suggested developing a continuing professional development (CPD) while teachers were in service.

1.2 The Evolution of Physical Education Pedagogy

In 2001 a chapter on Teaching in PE in the Handbook of Research on Teaching, Graber (2001, pp. 491-519) pointed out a map of how far research on teaching has come, where it is now, and where it must venture. She developed a conceptual model of areas of research on teaching, inventing a categories framework for organizing literature. The evolution of *pedagogical research on teaching PE*, in several decades, has passed through a huge amount of studies (Figure 1).

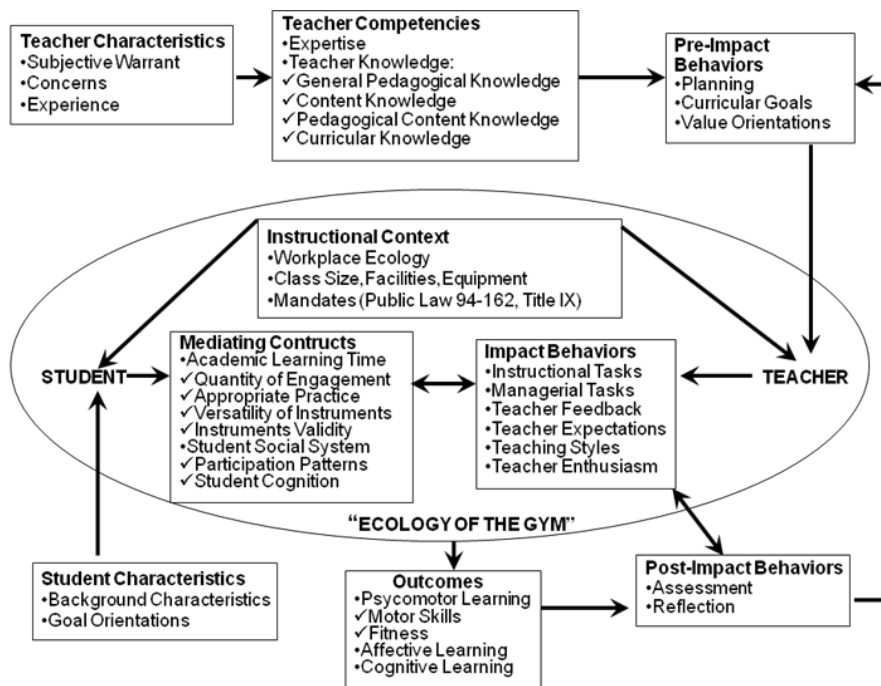


Figure 1: A conceptual model of areas of research on teaching (Graber, 2001, p. 492)

Although these categories are a good didactic distinction and a useful guide, research always moves from one area to another and the three general subdivisions in sub areas of *PE Pedagogy* or *Sport Pedagogy* by Silverman and Ennis (2003, pp. 27-40), help us to identify three major fields: Teacher Education, Curriculum and Teaching. Often, when doing research those areas are overlapping. Locke (1977, pp. 2-16), Silverman (2003, pp. 27-40) and Graber (2001, pp. 491-519), described Research on Teaching PE as a dismal science, but this field, sometimes called Sport Pedagogy in the international community, has made great strides over the past 30 years (Silverman & Ennis, 2003, pp. 27-40). The current use of terms like “Sport Science” or “Motor Science” is quite new. Universities traditionally have based their research on long established scientific disciplines. The social science approach, sport medicine, kinesiology or biomechanics represent relevant segments for a scientific approach to sport. Now we find terms or disciplines like “teacher education”, “curriculum”, “teaching and education”, that are elements of an increased specialization within Pedagogy of PE and we have seen, in the past two decades, a growing sophistication in research planning.

Also, interest is increasing in theoretically and methodologically driven research. The evolution of qualitative research as a valued paradigm is one of the significant areas of

inquiry (Graber, 2001, pp. 491-519). Another relevant aspect in the evolution of “PE Pedagogy” is the need for an interdisciplinary approach to the study of sport (Schmitt, 2001; Schmitt & Hanke, 2001; Schmitt & Hanke, 2003). One of the major challenges is to find ways to provide concrete evidence and useful guidance to practitioners (Graber, 2001, pp. 491-519). Qualitative research offers an interesting and valuable alternative approach to solving problems in physical activity (Thomas & Nelson, 1985, pp. 24-26), as this kind of research is more interested in the process than the product. Qualitative research is generally performed in its natural setting and data analysis is begun as soon as the data has been collected rather than at the end of the process as in quantitative research. The researcher sorts and categorizes the data, formulates hypothesis to explain the information and makes, for example, interpretive connections between narrative vignettes and other forms of description.

1.3 Changing Conceptions of Teaching and Learning

Chin and Benne (1985, pp. 108-117), described three types of planned change strategies in teachers and teaching: empirical-rational, normative-reeducative, and power-coercitive. The second strategy, normative-reeducative, is also part of a large movement toward the phenomenological and hermeneutic study of how individuals make sense of and contribute to the situations in which they live and work (Richardson & Placier, 2001, pp. 905-947). Within this normative-reeducative change approach, the assumption is made that change is enhanced through deep reflection on beliefs and practices (Chepyator-Thomson & Liu, 2003). Because the change process entails understanding one’s beliefs and knowledge and determining whether or not to change them, dialogue has been used as a critical element of this process. This dialogue could take place with other teachers or with trainers, research developers, teachers, administrators (Richardson & Placier, 2001, pp. 905-947).

As research literature was increasing during the 1980s, the focus broadened to include the mental process of teachers and students as well as their behaviour. Scholars in this tradition (Clark & Peterson, 1986, pp. 255-296; Lee, 2003, p. 15; Hanke, 1991), brought attention to the need for researchers to go beyond describing what teachers and students do in classes, relating how teachers react to student behaviour, and planning intervention programmes to

change the behaviour of teacher (Mueller & Skamp, 2003). Since this point, and particularly during the latter half of the 1980s, the proportion of cognitive studies in relation to behavioural studies has grown dramatically (Richardson & Placier, 2001, pp. 905-947). Using different forms of cognitive mapping techniques, researchers have been successful in showing the thinking and actions of experts and novices in knowledge about teaching (Ennis, Mueller & Zhu, 1991; Housner, Gomez & Griffey, 1993; Rink, French, Lee, Solmon & Lynn, 1994, Chen & Rovegno, 2000).

The teacher-thinking research in PE is based on the assumption that teachers base their decisions and actual behaviours on what they believe. Lee (2003), in S.J. Silverman and C.D. Ennis, "Student Learning in Physical Education" (pp. 9-25), have clearly shown that teachers' belief systems influence their decisions about selection of content, teaching strategies and tasks in PE (Ennis, Mueller & Hooper, 1990; Ennis, Ross, & Chen, 1992). A recent study by Kulinna, Silverman and Keating (2000, pp. 206-221), has shown that only a weak relationship exists between teachers' belief in physical activity, fitness and the corresponding PE programme used. Many questions are still unanswered, but the incorporation of teacher belief into studies with a multiple data source can contribute to the future understanding of how to improve education. The interest in teachers' thinking has led to several studies on teachers' reflection process and their decision making.

1.4 Reflection

The emphasis on cognition that affected education research has shown interesting results. Many of the cognitive constructs are examined to determine their effect on the process of change, and others are studied to determine if and how they are acquired as desirable outcomes of intervention. To understand the focus of this field and the cognitive concepts that are thought to affect the change process better see Richardson and Placier (2001, pp. 905-947) and Chapter 2.1 of the Thesis, *Teacher Change*. The two main concepts and subsequent research constructs that have dominated literature on change in teacher education and staff development over the past several years are reflective practice and beliefs. The growth in research on reflective practice has been advanced by the acceptance of Schön's (1983) conception of the reflective practitioner. Other contributions to develop research in this field arrived with Clift, Houston, and Pugach (1992), Grimmett and Erikson (1988), and in the most recent publications (Tsangaridou & O'Sullivan, 2003, pp. 132-152; Tsangaridou, 2005, pp. 24-50; El-Did, 2007, pp. 24-35, Hardin, 2005). The second construct is beliefs. Beliefs are generally viewed as different from knowledge and research in this field has emphasized that teachers' perceptions (Tjeerdsma, 1988) and beliefs are the most significant predictors of individual change (Nespor, 1987; Pajares, 1992; Richardson, 1996) and in the most recent publications by Wood & Bennett (2000, pp. 637-647).

1.5 Teacher Beliefs and Decision Making

According to the Clark and Peterson model (1986, pp. 255-296) and reported in Hanke (1991, pp. 9-14) and in Fang (1996, pp. 47-65), the process of teaching involves two major domains: teachers' thought process and teachers' actions and their observable effects (Figure 2).

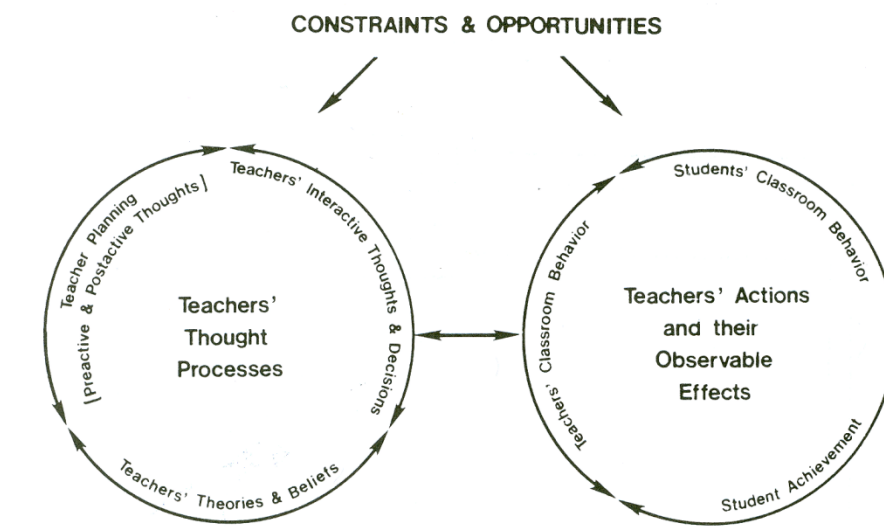


Figure 2: A model of teacher thought and action (Clark & Peterson, 1986, pp. 255-296)

Peterson and Clark (1978) put forward a model for the decision-making process that is compatible with classroom observations of teachers. According to this model, after having implemented a teaching procedure, teachers observe the student's responses to judge whether these fall within an acceptable limit. If they do, the teacher decides to continue the procedure already in use. When information indicates that the situation is evolving outside acceptable limits, the teachers must put into use different cognitive strategies. Teacher education research has generated, in the past decade, important findings on how to understand teacher beliefs and practice, generating also several methodological issues and different possible research directions. As Lee (2003, pp. 9-25), suggests in the Silverman and Ennis book (2003), in order to describe teachers' thought and decision-making process, it is useful to refer to an action-oriented position, and to the actual teaching process used. Their model has been used in several PE studies (Housner & Griffey, 1985; Housner, Gomez & Griffey, 1993) and the teachers' activity during the gym interactions is perceived more as process of continual supervision (a continual process of observation) than as an activity with strong decisional aspect (decision-making process), even if this decision-making activity does subsist.

The knowledge and decision making are components of an adaptive activity when confronted with the complexity of classroom and gym situations. Research results about

teachers' knowledge and decision making have led researchers to consider the appropriateness of classical cognitive models.

The limits of these models can be summarised as follow. Firstly, the models of the teacher as a decision maker cannot adequately describe how teachers think in typical classroom situations where no accidents occur and in this case the teachers can use a repertoire of routines. Secondly, the basic methodological problem is that there is an adulterated reconstruction of cognitive process during interactions in teaching situations. The interactive phase of teaching corresponds to the period of interaction with students. The phase before or after the interaction correspond to the world of the empty classroom. This involves the lesson planning (pre-active phase) and reflecting on the lesson (post-active phase).

Above and beyond elucidating the limits of the cognitive paradigm, the research results stimulate the development of certain approaches. These approaches take into consideration the adaptive character of teachers' actions when confronted with the complexity and specificity of certain professional situation. A model of totally rational thought is impossible in a complex task. The methodological limit of the an adulterated reconstruction of cognitive process during the teaching situations are met by the Research Programme on Subjective Theories (RPST) (Chapter 3.1, of the Thesis). The RPST results (Schmitt, 2001; Schmitt & Hanke, 2001; Schmitt & Hanke, 2003) stimulate the development of this approach to primary PE teaching. This model can be used to understand teachers' actions during the planning phase and interactive phase with students (teachers' STs).

2 Research on Teacher Education in Physical Education

Armour and Yelling (2004b), Bechtel and O'Sullivan (2006), mentioned the increased attention from around the world (from the education standards movement, from professional organizations and from research on teaching) for greater government interest in designing PD opportunities for practicing teachers. It is recognized that quality PE depends on well-qualified professionals and curriculum time even when other resources like equipment and facilities are in short supply (*ibidem*). Internationally, we can observe the increase in investment both in grants and in research for in-service professional training and for developing teacher educators and increasing opportunities for on-going PD for PE teachers.

In Italy, even if there is an increased level of interest within teaching, the situation is not uniform and at the same time worrying. In pre-service education, from 1998 to 2008, the tertiary Specialization School for Secondary Education was planned also to teach PE, replacing the old state examination for teachers. At the primary level, the Degree in Primary Education Science was a four-year university course and it has not yet been updated to the new degree system. Students qualify as primary school teachers when they have presented their dissertation and they can also become primary PE teachers if they please. In-service PD does not have a schedule of in-career PE training for teachers. From 2002 a new primary curriculum for PE was implemented (*Indicazioni Nazionali per i Piani Personalizzati delle Attività Educative nelle Scuole dell'Infanzia, Legge 28 marzo 2003 n. 53*) and the PD for primary PE teachers depends on voluntary initiative. An increasing number of interesting private initiatives and local projects for schools have sprung up and in 2004 an agreement protocol was signed between the Italian Education Minister and the University of Sport and Movement Sciences in Rome, to promote PE in primary schools. However, insufficient research supported these local projects and the only papers available in the Italian context were rather obsolete (Pièron, 1989; Laporta, 1994; Luzzatto, 1998).

Research on PD of PE teachers has been much slower to develop and little is known about what teachers learn during PD or the nature of the processes that facilitate learning (Bechtel & O'Sullivan, 2006). Quite recently in United States and more systematically in England interesting research (Armour & Yelling, 2004a; Bechtel & O'Sullivan, 2006; Deglau & O'Sullivan, 2006; O'Sullivan & Deglau, 2006; Guskey, 2002b) has highlighted

the difficult challenge in designing effective PD opportunities for teachers both in general education and PE. This is due to the fact that (1) there are several theoretical frameworks related to *teacher change* and the need to better understand teachers' PD and that (2) there are several *aspects of the PD process* in PE settings. While a rich source of research and interesting suggestions from more recent research (see *Journal of Teaching in PE*, vol. 25, no. 4, October, 2006) can help us to design effective PD programmes for PE, it is rare to find systematic research that examines what teachers have learned and how what they have learned can affect their practice (Bechtel & O'Sullivan, 2006).

2.1 Teacher Change

Richardson and Placier (2001, pp. 905-947), concluded their review chapter on “Teacher Change” in the Handbook of Research on Teaching stating that a normative-reeducative approach is required to change both individual-beliefs and organizational-cultural changes, therefore this approach is necessary if systematic change is to be successful. Also, despite considerable agreement on the process of change and the methodologies used to elucidate it, individual and organizational research approaches remained quite separate. Nowadays, many of the reforms require deep changes in content and pedagogical knowledge and in understandings about schooling, teaching and learning. In particular, the effects of teacher change on students over the course of the schooling process should be better understood (Wood & Bennett, 2000). Fullan and Hargreaves (1996) argued that teachers are indispensable agents of educational change, but in the era of radical reform, there are potential tensions between changes that are imposed externally through government policy and changes in professional knowledge and practice that are generated by teachers (Fullan, 1993a, pp. 19-41). Additionally, there is much literature to describe specific *theoretical models* for PD and teacher change (Table 1 of the Thesis, Teaching educational models):

- Fullan’s Theory of Teacher Change (Fullan, 1993a; Bechtel & O’Sullivan 2006 and Gentile, 1999);
- Shaw, Davis, Sidani-Tabbaa & McCarty’s Theory of Change Process (Shaw, Davis, Sidani-Tabbaa & McCarty, 1990; Bechtel & O’Sullivan, 2006);
- Guskey’s Model for Teacher Change (Guskey, 2002a);
- Hargreaves’s “Emotional Geographies” Theory of Teaching and Teacher Change (Hargreaves, 2000, 2001, 2005; McCaughtry, Martin, Kulinna & Cothran, 2006a, 2006b);
- Foucault’s “Technologies of Power and Self” Theory (Foucault 1983; Macdonald, Mitchell & Mayer, 2006);
- Research Program on Subjective Theories (Wagner, 2003; Haag & Mischo, 2003; Hanke, 1991).

<i>TEACHING EDUCATION MODELS</i>	<i>Authors of Theory</i>	<i>Authors of Articles</i>	<i>Main topics</i>
Shaw, Davis & McCarty's Theory of change process	Shaw, Davis, Sidani-Tabbaa & McCarty, 1990	Bechetel & O'Sullivan, 2006	Study of cognitive framework of teacher change
Fullan's Theory of Teacher Change	Fullan, 1993b	Bechetel & O'Sullivan, 2006	Teachers need to feel the ownership of change
Guskey's Model for teacher change	Guskey, 1986, 2002a	Bechetel & O'Sullivan, 2006	CPD (Continuing Professional Course) Learning Communities
		Bechetel & O'Sullivan, 2007	Enhancers and Inhibitors of Teacher Change
Model of Teacher Change	Guskey, 1986	Guskey, 2002a,b	PD and Teacher Change
	Guskey, 2002a; Hargreaves, 2001	Amour & Yelling, 2004	PE-CPD
Fenstermacher's Theory of Professional Learning	Fenstermacher, 1994 Fullan & Hargreaves, 1992	Wood & Bennett, 2000	Changing theories and changing practice
Hargreaves's Emotional geographies theory of teaching and teacher change	Hargreaves, 2000 Fullan & Hargreaves, 1992	McCaughtry, Martin, Kulinna & Cothran, 2006 a, 2006 b	Emotional dimensions and teacher change in PE Instructional resources on change in PE
Foucault's Theoretical Framework	Foucault, 1983	Macdonald, Mitchell & Mayer, 2006	PD in PE and levels of change
Action research, Reflection and Practice	Hargreaves, 2001	Sweeny, 2003	Gap between theory and practice
Reflection on and in Action	Shön, 1983	Tsangaridou, 2005	Classroom teachers' reflection on teaching PE
Research Programme on Subjective Theories	Groeben, Wahl, Schlee & Scheele, 1988	Wagner, 2003; Hanke, 1991 Haag & Mischo, 2003	Improving teaching by examination of Subjective Theory

Table 1: Teaching educational models

Every theoretical model (Table 1) points out different aspects related to teacher change and in this section, the most relevant ones are described. The widespread and diverse models of

professional standards for teaching raise questions with respect to the need to provide teachers with a pathway for continuing PD balanced with the public nature of surveillance and accountability that may accompany standards (Macdonald, Mitchell & Mayer, 2006).

Foucault's "Technologies of Power and Self-Theory" (Foucault, 1983; Dreyfus & Rabinow, 1989) in relation to standards for teaching gives other aspects about the PD (Macdonald, et al., 2006). The authors, that support this theoretical framework, gave a brief overview of the ways in which the emphasis has shifted from personal reflection as a professional responsibility (technology of self) to more public performance in line with provable standards and PD event (technology of power), for example codification for career progression, certification for PD imperative. It is not until the PD regimes, such as standards frameworks, are talked about within the discourses of power that research can understand patterns of acceptance and resistance by teachers to policies that seek to shape their performance. New language (understanding technologies of power in relation to standards for teaching) has added to widespread models of professional standards for teaching and new questions (about the standards agenda) in the PE profession have to be better understood.

McCaughy et al. (2006b) suggested that PD staff should be ready to anticipate and be receptive to *important emotional responses* that teachers may have to change. Educational change, in addition to being a cognitive process of understanding new content and new instructional procedures is a human affair where teachers and students feel change as well as think it. Failing to understand how teachers experience change we risk losing some of the best educational ideas, which might not be transformed into the meaning that teachers give to their work (McCaughy et al., 2006a). The authors suggest considering *emotional stance* to teacher change to better understand the workplace conditions of physical educators and how teaching and changes to teaching are contemplated by teachers.

Armour and Yelling (2004b) and Macdonald, et al. (2006) pointed out that there is an increased emphasis upon accountability in education in the UK, US and Australia, and a growing expectation that schools will become "*professional learning communities or learning organizations*" to support and enhance the development of both teachers and students in line with government expectations. The hypothesis to transform schools into learning communities can be helpful to resolve the problem of insufficient opportunities to

share ideas with colleagues. Teachers helping teachers is a key element of quality PD. In a recent study Bechtel and O'Sullivan (2007), suggested that support from *colleagues*, *headmasters* and *students* is influential for teachers to make and sustain change. An important conclusion is the need to incorporate meetings with teachers undergoing change as a key component of the PD of programs.

Haag and Mischo (2003), obtained good results in terms of improved teaching by the examination of other teachers' STs. The authors carried out an intervention study with teachers in order to improve teacher actions. The results support the assumption that studying other mapping structures of STs leads to a change in knowledge structures. Not only does the implementation of group work show a positive effect after teacher training, but it is particularly important for the study of subjective theory. This methodology can break knowledge structures and therefore may improve training at an action level (*ibidem*). The reconstruction of STs is not only a diagnosis of knowledge, but it can lead at least partially to an explication, specification and reflection, and therefore the development and modification of behaviour (Groeben & Scheele, 1977; Haag & Mischo, 2003).

The theoretical framework of RPST, as suggested in clinical research results (Wagner, 2003), showed that patients view their illness in a realistic way and have rationally guided coping behaviour and generally act according to their STs. The STs described, explained and predicted the patients' illness behaviour. Coping with an illness could, therefore, be reconstructed as conscious action, nevertheless the most interesting results were restricted to patients with chronic diseases (*ibidem*). The STs showed that the realistic assessment of patients is formed by information and experiences, which patients gained and interpreted in the course of their disease (Mitchell, Doolittle & Schwager, 2005). Whatever the approach, the desired result during psychotherapy is to obtain a change process. The constructivist point of view and RPST highlight that, since the STs of patients clearly influence their coping behaviour, research on the coping process should discover new ways of coping which can explain individual behaviour. In order to analyse these STs new concepts can also be revealed. In the study described in the third section of this thesis and conducted by the author on teachers' STs, for example, concepts of the superstructure inductively reconstructed, express different components (also emotional components) that influenced the course of behaviour during the PE lesson. The critical influence of the study was to

raise teachers' theories and practice to a conscious level of awareness and provide them with opportunities to observe in a separate manner the extent to which their intentions were achieved in practice. Focused reflection brought clarity to specific problems of which the teachers were previously unaware (Wood & Bennett, 2000).

Every approach has an interesting result on teaching research (Table 1), but the necessity is to clarify better which elements are indispensable to helping teachers to maintain the best appropriate teaching to school change. Some recent research (Bechtel & O'Sullivan, 2007) has clarified the aspects that affect the PE setting and teacher change.

2.2 Aspects of the Professional Development Process in Physical Education Settings

It is clear from different research on professional training for teachers that in order to achieve PD it is necessary to motivate and prepare teachers to change. For Gentile (1999), the term "teacher change" is a fundamental factor in reaching quality teaching and student learning and he defined it as an "on-going change process which is enriched by abilities and knowledge". To obtain quality education it is necessary to invest in the smallest unit of school: teachers. They are the actors that apply innovation and school reform in class. These views are common to a wide number of authors. The teacher is the key player in the reform of the educational system and increased student learning (National Commission on Teaching and America's Future, NCTAF, 1996).

Particularly, Bechtel & O'Sullivan (2007), have summarized the *factors* (norms of school culture, school context, micro politics of the school, the role of the school principal, importance of shared vision, workplace conditions, teacher dispositions and teacher belief) found in previous research, impacting the secondary PE teacher change process. The authors suggested gaining a better understanding of the factors that enhance or inhibit the change process for PE teachers, as this will lead to more effective PD programmes (Bechtel & O'Sullivan, 2007). The authors suggested that designers of an effective PD program will need to help teachers to examine their current belief pertaining to teach and /or PE as part of the PD process, as an enhancer to change.

Teachers' own beliefs will have an impact on the effectiveness of the PD offered and therefore these beliefs must be examined and addressed as part of a PD programme. To promote effective PD programmes we need to investigate and promote interest in such courses (Guskey, 2002a; Gentile, 1999). Only if teachers feel what they are doing is relevant will PD contents lead to PD. It is also important to consider the teacher's workplace and to obtain a change in teaching and learning processes at different levels (Richardson & Placier, 2001, pp. 905-947).

Elmore (1992) indicated that there is no evidence for a better teaching/learning process only with an organizational change. Individual changes are also required. Therefore, a balance between macro and micro level change is necessary (McLaughlin, 1990). Guskey (2002a) suggested creating partial goals inside a project, as the perception of the complexity of a target is not beneficial in obtaining change. Guskey (2002b) also claimed the importance of the promotion of collegiality and collaborative exchange. Reflecting on their work and practices and its effect on student learning, shared strategies and expertise is also of importance. Professional organizations or public education need to investigate and promote potentially effective PD opportunities, assessing real school needs, without forgetting factors that have influenced this process.

In the last decade, science teacher education has analyzed one of the most pervasive concepts to influence professional teaching practice: articulating the *relationships between theory and practice in science teaching* (Sweeney, 2003). Personal practice theories may be defined as being the systematic set of beliefs (theories) that guide the teacher and are based upon prior life experiences (personal) derived from non-teaching activities, and also from experiences that occur as a result of designing and implementing the curriculum through instruction (practice), (Cornett, Yoetis & Terwilliger, 1990). Every teacher develops personal practice theories and these influence professional teacher choices and behaviours with regard to classroom instruction (Ethell & McMeniman, 2000). Also, Tatto (1999) suggests that if teacher educators ask teachers to change their practice, they first need to understand the value and beliefs teachers bring to instructional decision-making, as well as how to alter such beliefs.

In a recent study Bechtel and O'Sullivan (2007), suggested that teachers' own beliefs will have an impact on the effectiveness of the PD offered and therefore these beliefs must be

examined and addressed as part of a PD programme. Furthermore, the authors suggested studying career stages and the impact they have on the teacher change process, as a new area of research. Two main suggestions, for future research, emerge from literature: we need to better understand the link between teacher beliefs and the individual's change process (Guskey, 2002a; Bechtel & O'Sullivan, 2007); we need to give major relevance to the role of emotional dimensions and change experience (McCaughtry, et al. 2006a).

In summary, to obtain effectiveness, it is important that when planning PD training the context be considered. It is also necessary to motivate teachers, to create the conviction that new knowledge can improve their work. Therefore it is extremely important to start from their beliefs, their STs. PD courses, even if they are temporary, have to incorporate teachers' problems and their demands. On the one hand, it is clear there is a need to introduce a continuing programme of development for teachers, while on the other hand it is difficult to introduce didactic and education innovation in school organizations in general, especially in Italy. Only few references provide teachers with valuable insight into the improvement of teaching. Several types of courses for teacher education training exist in Italy and as no specific research has ever been done to establish the effects of in-service training on PE teachers in primary schools (see above), the author, in this study, has found it necessary to undertake specific research to find ways of improving primary PE teaching effectiveness. What is learned by teachers and their students from PD experiences?

2.3 Developing an In-service Primary Physical Education Teacher Programme

Tsangaridou (2005, pp. 24-55), argued that, although several studies have been conducted in PE describing programmes or teaching behaviours of effective or ineffective teachers, only a small body of literature exists on how classroom teachers implement PE programmes or what teaching behaviour classroom teachers exhibit while teaching PE. Results from a descriptive analysis of non-specialist elementary PE teachers (Faucette, McKenzie & Patterson, 1990) indicated that students were usually involved in an organized group activity, sometimes in free play and they had few opportunities to engage in skill practice or gymnastics. Results also indicated that teachers who were more physically active provided more time for physical fitness in their classes and a higher

quality PE lesson (McKenzie, LaMaster, Sallis & Marshall, 1999). In a more recent study, Faucette, Nugent, Sallis & McKenzie (2002) concluded that an intensive two-year supportive PD programme for in-service classroom teachers could substantially improve the quality of teachers' classroom PE programmes. It is an old problem in many countries, but PE is still not acknowledged as having full academic status (Siedentop & Tannehill, 2000). Williams (1951; as cited in Siedentop, 2002b), asserted that physical experience is physical in its outward manifestation but also emotional, social and moral, in its relationships and meanings. The general requirement is to enhance primary school teachers' knowledge and abilities in teaching PE (Tsagaridou, 2005). To obtain empowerment, autonomy and good teaching, as stated by several authors (McDonald & Tinning, 2003; Calderhead, 1996; Tsangaridou & Siedentop, 1995; Tsangaridou & O'Sullivan, 1997), teachers should be able to reflect on their teaching. Schön (1983) differentiated between two types of reflection: reflection in action (taking place during the phase of instruction) and reflection on action (taking place after the instruction).

Numerous results (Tsagaridou, 2005; Tsangaridou & O'Sullivan, 1994; Rovegno, 1992), revealed that teachers considered reflection a necessity in teaching. Teacher education and staff development programmes need to create opportunities for teachers not only to acquire new knowledge but also to clarify their own professional theories and learn from them. Through a reflective and empowering process, STs that are educationally sound should be reinforced while others that are inappropriate should be challenged and reconstructed (Tsangaridou & O'Sullivan, 2003). The interest was to understand the relationship between teachers beliefs and an individual's change process and where in the sequence of the teacher change process beliefs and behaviours have had a positive impact on PE programmes. Bechtel and O'Sullivan (2006) suggested some challenges that must be addressed during the planning and implementation of more-effective PD programmes, and highlighted how complex this quality process is, as there are many factors that need to be evaluated. In this study, the challenge was to start from the needs of teachers and the contexts of their teaching lives. The author wanted to work with them stimulating their thinking and reflecting on what and why they were taught PE as they were teaching. They were assisted to shift their thinking and their practices to ensure better quality PE teaching. Wood & Bennett (2000), in other studies, indicated the need for high quality PD courses which support the process of change in teachers' thinking and practice at different career

points, with a recognition that teaching is a difficult, complex and multi-faced process. Our course stimulated improvement in the quality of reflective consideration which is seen as a necessary condition for sustained change and development to take place (Wood & Bennett, 2000). Sweeney (2003) highlighted that some of the most promising examples in PDs are innovative structures that link schools and universities (Sweeney, 2003; Putnam & Borko, 2000; McLaughlin & Talbert, 1993). The importance of well-designed formal teacher preparation/PD programmes (for both pre-service and in-service classroom teachers) cannot be overrated. An analysis of the conceptual underpinnings of various teacher education programmes by Tatto (1999) suggests that in programmes where teaching was conceived, for the most part, as an externally regulated profession, teachers had few opportunities to understand, reflect on or align their practice in response to student learning needs. In a programme where teachers were seen as professional individuals capable of making informed instructional choices, teachers had more opportunities to acquire the knowledge and skills to adjust instruction to the learner's diverse needs.

Sweeney (2003) recognized that due to the professional nature of teaching it is necessary to include sound content knowledge, know how to effectively use appropriate pedagogical techniques and contemporary education theories. Following recommendations of an increasing number of recent educational research reports (Feldhusen, Ball, Wood, Dixon & Larkin, 1998; White, 1998; Ethell & McMeniman, 2000), it is also useful to analyze teacher behaviours videotaped in the gym. Videotaped lessons may be also used as a professional training method and included in teacher preparation courses to instigate teachers' reflections and for the analysis of their own personal practice theories.

The involvement of university based academics in PD is a good vehicle for contributing to sound scholarship on PD and on the interaction of theory and practice in professional classroom teaching (Sweeney, 2003). Focusing on the analysis of teachers' STs may help make considerable contributions to understanding what constitutes PD in the profession of teaching and what renders teachers more confident, conscious and reflective about the nature and importance of their profession. We cannot generalize and include nations with different political systems and cultures (Richardson & Placier, 2001, pp. 905-947) and we need more systematic studies. The influence of additional variables on STs like national curricula, geographical culture, the influence of teachers' beliefs and backgrounds, social

environment, the political context and career stages all need to be analyzed. Considering the hard challenge of the “agenda-setting dilemma” of PD between the content (subject matter of focus) and theoretical/philosophical focus (the personal development of the teacher), we proposed stimulating work that drives thinking and questions on what and why they teach and deliver PE as they do.

An intriguing research approach which might be fruitfully applied to perform research in and stimulate the development of quality primary PE teaching is the RPST (Schmitt, 2001; Schmitt & Hanke, 2001; Schmitt & Hanke, 2003). This model, described more extensively in Chapter 3.1, can be used to understand teachers’ actions during the planning phase, the interactive phase with students (teachers’ STs) and the reflective phase.

3 Research Methodology

3.1 The Research Programme “Subjective Theories”

The RPST has developed a rich source of research in Germany, both in clinical and university teaching research (Wagner, 2003; Haag & Mischio, 2003; Hermes, 1999). Also in Germany, these research approaches have found applications both in PE in schools (Treutlein, Janalik & Hanke, 1989a), and in sports training in sports clubs (Treutlein, Janalik & Hanke, 1989b; Hanke & Schmitt, 1999; Treutlein, Janalik & Hanke, 1992; Schmitt, 2001; Schmitt & Hanke, 2003). It is an innovative perspective for research and methodology, where the reflexive dimensions of the human being is central. The paradigm is based on an epistemological model that conceptualizes the human being as fundamentally capable of language, communication and action. He/she is an autonomous and potentially rational subject. Researchers assume a subject-object relationship that is in principle open; the person under study is just as capable of knowledge as the researcher. The basic assumption is that there is an analogy between the researcher’s theory and the individual’s theory (Groeben, Wahl, Schlee & Scheele, 1988; Hanke, 1991, p. 51).

RPST is an integrative theoretical framework for metacognitive research perspectives and it is in contrast to the behaviourist conceptualization of science and subject matter. Groeben and Scheele (1977) elaborated the RPST approach and within this approach, the construct of subjective theory is meant to indicate a specific part of the broad area of cognitive phenomena. The term “subjective theory” (ST) implies the assumption that the cognitive systems of understanding employed by the “naïve” individual possesses parallel structures and functions, or analogous to, those of scientific theories. Consequently, this approach implies a definitive demand upon scientists to develop and elaborate concepts of individuals which are equally applicable to themselves and the subjects of their research. This approach rejects and overcomes a contradictory asymmetry between scientists’ ways of conceptualizing themselves and their subjects of research, respectively. This implies that individuals as the subjects of research have the same qualities and abilities as the researcher. They both have verbal and communicational abilities, reflexivity, potential rationality, and the competence to act (Groeben, 1986; Hanke, 1991, p. 52). These

characteristics have been summarized by Groeben and Scheele (1977) as the “epistemological concept of the individual”.

According to Wagner (2003) and to Groeben and Scheele (1977) the construct of “ST” is meant to indicate a specific part of the broad area of cognitive phenomena. In brief this ST (Groeben, Wahl, Schlee & Scheele 1988; Scheele & Groeben, 1988; Wagner, 2003), can be outlined as:

- a) cognitions relating to oneself and the world,
- b) the reconstruction of a ST through a dialogue between the interviewee and scientist or interviewer,
- c) a complex network of linking topics,
- d) scientific theory,
- e) an explanation and prediction of behaviour,
- f) and the objective knowledge open to exploration.

The definition of STs ultimately requires both a dialogue-hermeneutic method for its description and a method based on observation (according to falsification criteria) in order to explain action (Groeben, 1990, p. 35; Wagner, 2003). This two-phase model of research achieves an integration of understanding (by description) and an explanation (by observation). If we consider STs as the most complex and most structured forms of the agent’s reflection upon his/her own acting and doing (or someone else’s reactions, including his/her behaviour), then the first phase of research on human action must consist in understanding the agent’s STs (Figure 3).

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RPST methodological approach also finds confirmation in the *Model of Action Research*. The most general definition of Action Research comes from John Elliot: “*It is the study of a social situation with a view to improving the quality of action within it*” (1991, pp. 69-90). Action research does not presuppose fixed research objects and this aspect express the difference from traditional research. In action research subjects take an active part in the research process and, during the course of it, individual change occurs. Action research is a form of self-reflexive enquiry undertaken by teachers in classrooms or in any social situation in order to improve the rationality and judgement of their own practices (Hermes, 1999, pp. 197-204). It is a process where participants can be led to increased self-awareness. An action research project aims, with the help of different sorts of data that are collected and analysed, at changing behaviour. In the context of school teaching it is also a PD through reflection, evaluation and improved practice.

The combination of different data sources, in this approach, is similar to the concept of “triangulation” (Patton, 2002, pp. 247-248), within the qualitative approach. Along with a move away from behaviourism, researchers turned to qualitative methodologies (Silverman, 2006, pp. 4-32) for inquiry into teacher education and staff development. Qualitative approaches allow researchers to move more deeply and hermeneutically into thinking processes and account more fully for context. This kind of research has allowed for in-depth examinations of process, context, content, and change, especially of trainee and in-service teachers. In research on teaching, the development of qualitative approaches appeared to be, in part, a reaction against process-product research (Doyle, 1977, pp. 3-16; Fenstermacher, 1979, pp. 157-185), however, qualitative approaches were soon recognized in their own right and in Germany the RPST has found a rich research field. Although qualitative research was often defined as ethnography (Thomas, Nelson & Silverman, 2005, pp. 345-366) the field opened up to include many different approaches to qualitative research. Mary Lee Smith’s (1987), treatment of the topic was particularly helpful in describing four approaches to qualitative research: interpretative, artistic, systematic, and theory-driven (for extensive reviews of the literature see Richardson & Placier, 2001).

The RPST has a strong theory base, developed by Groeben (1986). Currently, small sample and case studies dominate the research work in teacher education and staff development. In addition, Richardson and Placier (2001, pp. 905-947) argued that despite the existence of a

great deal of qualitative studies, only a small number of research projects use both qualitative and quantitative methodologies. Within the RPST, data analysis is not limited to the individual level and this method was applied to a whole sample (Wagner, 2003), identifying similarities between separate subjects. Consequently, it is possible to combine qualitative and quantitative methodologies applying an inductive and deductive (by statistical methods) mode of analysis (Thomas & Nelson, 1985).

According to Clarke (2003), using both qualitative and quantitative methodologies, a variety of aspects dealing with teaching can be examined. Areas of convergence increase confidence in findings and areas of divergence open windows to understand the multifaceted, complex nature of a phenomenon better. The combination of qualitative and quantitative research methods is similar to the concept of “triangulation” within the qualitative approach (Wagner, 2003). As Patton (2002, pp. 247) pointed out “*by triangulation with multiple data sources, observers, methods, and/or theories, researchers can make substantial strides in overcoming the scepticism that greets singular methods, lone analysts, and single-perspective interpretations*”. Triangulation of qualitative and quantitative data constitutes a form of comparative analysis and was used among several groups of teachers. The links between hypothesis and verbal/video data correspondence and the criteria used to interpret results are based on a different level of triangulation. Within the RPST (see Chapter 3.1 of the Thesis) approach, this combination of multiple data sources is recognized as an integrative two-phase model (Groeben, 1986; Hanke, 1991, pp. 50). Based on an image of the human being which is parallel in structure to the image of the researcher, this model of integration links external and internal perspectives by placing them in chronological order (before and after) and by ranking them according to importance (above and below). See Figure 3, Integrative model of methodological research structure. The final goal at the end of research is to obtain a clear result for every initial hypothesis, based on the congruence between the different sources of data, different instruments and different groups of teachers analyzed.

For the investigation of the Subjective Theory, on personal experience, the qualitative approach of “Subjective Theory” is well adapted, but the reconstruction of ST is not limited to the individual level. Within the STs research programme analysis of STs is

performed by means of a combination of several STs to one or more superstructures (Wagner, 2003).

The RPST can be applied in different teaching fields to gain a better understanding of the teachers subjective point of view. The subjective theory must be assessed in two successive phases of validation: a communicative and an explanatory validation. In the first phase of communicative validation, every teacher describes his/her individual concept of teaching. In the second phase of explanatory validation, concerning the external observation which characterizes the teaching methodology, the researcher has to determine whether the teacher's reasons can be considered valid from the prospective of external observation. So, the subjective theory coming from every teacher has to be compared with empirical data and facts. In contrast to most qualitative research on teaching, based on single cases or very small sample sizes, a large sample size allows also quantitative inference to be made. Also, the ST qualitative model, when applied to a wide number of subjects, allows to compile all ST into a single superstructure. To interpret superstructures, the qualitative-systematic aggregation method by Stössel and Scheele (1992, pp. 333-385) is a useful tool. This method attempts to identify similarities and discrepancies between separate individual STs in order to form main concepts or relationships which can be transformed into a graphical representation of the ST superstructure.

3.2 Semi-Structured Dialogue

In research on teaching, the cognitive constructs of interest may be derived from a specific action model by using the dialogue-hermeneutic method of the STs research programme (Schmitt, 2001). This method, based on a special form of interviewing called Semi-structured Dialogue (SD), allows to describe and reconstruct the subjective theory of teacher. The SD is a method that consents the reduction of memory and consciousness problems and the confusion of pre-active, interactive and post-active cognitions. Moreover, the above cognitions were explained by Clark and Peterson (1986, pp. 255-296), studying planning and retrospection as a cyclical process under the heading of "teaching planning" (see Figure 2 of the Thesis). The resulting SDs and procedures make it possible to diagnose the individual deficits in teachers' actions and to validate this data in a dialogue consensus with the teacher educator or researcher. This phase relies on the communicative abilities of

the person involved. In a dialogue with the researcher STs are reconstructed. At the end of this phase (communicative validation) the teachers reported that it was very helpful for them to talk at length about how they cope with their teaching theories. One of the advantages of this structured approach is to obtain comparable data by using multiple dialogues. This agreed reconstruction guarantees that the resulting structure accurately represents the subjective theory of the teacher. Moreover, this procedure prevents the researcher from reconstructing his/her own subjective theory on the teachers' subjective theory. It is essential that the researcher creates an atmosphere that will allow the teacher to express ideas openly and freely. These objectives of ideal conversational conditions, together with the questions to provide clarification, are meant to exclude biases, such as social desirability. In summary, the researcher's questions, in this phase of explanatory validation, concern the empirical verification of the reconstructed STs and show satisfactory levels of validity (Wagner, 2003). These qualitative interview techniques were also based on a qualitative theoretical framework (Patton, 2002), where the respondents can express their own understanding in their own terms.

3.3 Systematic Observation Methods

Systematic observation and analysis of the teaching-learning process is a procedure that allows researchers to collect objective information on the teaching-learning process and analyze this information in a significant way. Information is usually collected by a "live observer" or by using audiotapes or videotapes in the form of data on the instructional process. Systematic observation is a process usually described in the following four steps (Rink, 2006, pp. 333-349):

- (1) Deciding what to look for;
- (2) Choosing an observational method or tool to collect data;
- (3) Collecting data;
- (4) Analyzing and interpreting the meaning of data.

On the steps listed, the most difficult one to do is the first one, because events often have many alternative explanations (1). The selection of what to look at in teaching begins with

defining the main categories and seeking possible descriptions. At the beginning the list of categories is not complete, but it should help researchers begin the analytic process. Many different observational tools have been developed to look at teaching (Rink, 2006, p. 363). The tool constructed for this research is organized in four levels of observation and it was designed for research purposes: to look at the way teachers develop the content of their lessons relating to their STs.

Different types of observational techniques and methods will give the observer different types of information (2). An observational technique or other method of collecting data on teaching is like a lens or filter on a camera. Researchers or observers can decide to look for a specific characteristic or set of behaviours and either count the number of times a behavior occurs or merely record that a behavior did occur. They can use a stopwatch to record how long a particular instructional characteristic occurred. Observers can also categorize behaviour (e.g., types of feedback), relate one type of behaviour to another, or use a time-sampling technique to record only at particular intervals or times. There is not one best method of recording observational data, but the event recording is one of the most-used observational methods in teaching (Rink, 2006, pp. 350-377). Usually the frequency of that event is determined by continuing the number of times the behavior occurs in a lesson. Event recording is used when the occurrence or lack of occurrence of a type of behavior is important to know or when knowledge of frequency of a specific type of behavior is important. Usually, several types of behaviour or different dimensions of the same behavior are recorded at one time. The difficulty of obtaining reliable data increases with the number of different behaviours observed at any one time and the amount of observer interference required to make a judgment. The reliability of event recording can be increased with careful definitions and much practice in discriminating when the behavior occurs and when it does not. Events may be coded according to a decision making system involving a tree-structure of behavioural categories and subcategories. Decisions may be made with a variable time interval length between observations: The choice of the interval length should match the average duration of teachers' behaviours (Van der Mars, 1989).

One aspect that facilitates observer reliability is proper and prolonged training in the use of the observation system. The guidelines for observer training and data collection should be based on the technical descriptions and directions for observers, indicated by Van der Mars

(1989, pp. 20-52). The independent observers should practice observations and code some “reliability videos” with an experienced observer so that the trainees may compare their data with that of an experienced observer. This process helps establish good observer accuracy for data coding to begin when the percentage of agreement of one observer with himself/herself achieves at least 70 percent (Rink, 2006, pp. 333-349). Agreement of one observer with himself or herself is usually called intra-observer agreement and it is a formula to compute simple percentage of agreement (Figure 4).

$$\text{Percentage of Agreement} = \frac{\text{Agreements}}{\text{Agreements} + \text{Disagreements}} \times 100$$

Figure 4: Equation of the percentage of agreement between two observers

However, this equation indicates only the level of agreement on how many trials each observer detected and recorded. Researchers do not have information on their seeing the same behaviour in the same way at the same time. An inter-rater reliability analysis using Cohen’s Kappa statistics³ may be additionally performed to determine consistency between raters/observers. This statistical procedure may be used to estimate both inter- and intra-observer agreement and is the most psychometrically sound statistic for assessing observer agreement due to its ability to take change into account (Watkins & Pecheco, 2000).

³ Cohen's Kappa measures the agreement between two raters who each classify N items into C mutually exclusive categories. The equation for κ is: $\text{Pr}(a) - \text{Pr}(e) / 1 - \text{Pr}(e)$ where $\text{Pr}(a)$ is the relative observed agreement among raters, and $\text{Pr}(e)$ is the probability that agreement is due to chance. If the raters are in complete agreement then $\kappa = 1$. If there is no agreement among the raters (other than what would be expected by chance) then $\kappa \leq 0$.

The third (3) step of the systematic observation is to collect information on teaching. Several alternatives exist (e.g., audiotape, video, ask colleagues or students). The video and microphone are extremely useful and video equipment was used in this research. The fourth (4) step, that is interpreting the meaning of the data obtained through observation and deciding on the appropriateness of the behaviour described, challenges the analytic skills of even the most competent researcher.

3.3.1 Teacher Behaviour

The second phase of the RPST (explanatory validation) is based upon the falsification/truth criterion concerning external observation which characterizes the methodology of today's qualitative analysis. We have to determine whether the teachers' reasons can be considered valid (from the perspective of the external observer) or effective reasons. "Which teacher behaviour gives us indications of the teacher's STs? Which teacher behaviour will give us the most valid information regarding our goals? "

In this research the teachers' STs were reconstructed on the basis of verbal data from dialogues and the corresponding meanings in behavioural data were studied. The open-end questions of SD were used to develop an observational inductive categorical system illustrated in Figure 4. To this aim, categories were defined a priori and, after viewing the videotaped lessons, they were revised to obtain an objective matching between category definition and observable behaviour. These tools must be selected with care and to define accurate, criteria must be established.

The systematic observation of teachers' teaching has revolutionized teaching research and has led to important discoveries about the nature of effective teaching and behavioural definitions are extremely important (Siedentop & Tannehill, 2000). The researcher has to make important decisions in developing an observation system. To create the behavioural categories researcher inducted categories from the dialogue and deduced categories from observed teachers' behaviours in videotapes (see Table 1 of the Appendix, Comparison of different data). In an interactive process a decision had to be made which teacher behaviour would provide the most valid information to study teachers' ST.

3.3.2 The Simi-Scout Programme

Behaviour analysis and the interpretation of data (coding procedure) can be facilitated by the use of the SIMI – Scout software package (2008). Simi Scout is multifunctional game analysis software that can be used in various applications. It can be used for tactical as well as for communication and behaviour analysis. It is easy to use and the user defines a list of attributes (teachers behavioural categories in our case).

The teacher behavioural categories selected for this research (video categories) are divided into different levels (4 levels in this project), which can be combined freely. The user can view and analyse the video directly on the computer. Action can be stopped by clicking mouse. The observer can identify the behaviour observed through an interactive window every five seconds for example. It is a simple event recording to classify teachers behaviours. All acquired data is stored in a database and from different teachers can be compared data. The software output lets us study the frequency and percentage (relative frequencies is based on the total recoded events in one lesson) of every category and subcategory directly. See Figure 5.

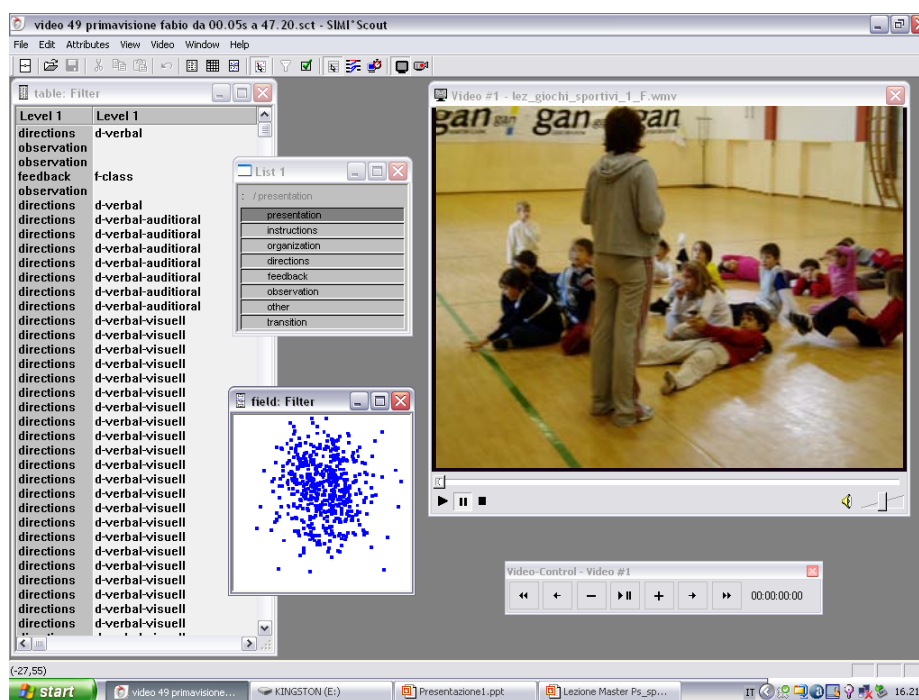


Figure 5: SIMI – Scout software package

4 Instruments and Research Design

There is universal agreement that teaching is a complex activity occurring in a complex environment (Tsangaridou, 2005). The complexity of teaching and the variety of the work context helps to justify the view of the teacher as a thinking, decision-making, reflective and autonomous professional. Because teaching is complex and contexts vary, teachers themselves need to make decisions and reflect on their situations and teaching in order to act appropriately in their classroom (Richardson & Placier, 2001, pp. 905-947). Every teacher has attitudes, beliefs and expectations. Commonly, teachers seem to translate their teaching knowledge into practice on a personal basis. They draw on their own experiences and subjective perceptions of practical situations. We need research that considers many aspects at once and not only trains but also develops a way of thinking and exposes teachers to many different strategies. This study focused on describing the subject theory as a process that accompanies teaching practice. The focus on videotaping PE lessons and semi-structured interview analysis, reflected the field's growing interest in not only what teachers know but in how that knowledge is represented.

Although the RPST is a qualitative approach, a wide range of quantitative analyses, from simple frequency tables to multivariate statistical techniques (the regression analysis) were used. Thomas and Nelsons (1985, p. 332) declared that qualitative research does not exclude quantitative analysis. Quantitative and qualitative methodologies were chosen in order to understand aspects that are difficult to convey using quantitative or qualitative methods separately (Patton, 2002, pp. 248-257). The two approaches, qualitative and quantitative methods, when used together, can add to our growing understanding of teaching and learning in PE by utilizing the best features of each methodology. Open-ended interviews were conducted with all the 58 teachers. The size of the sample allowed quantitative inference to be made. In addition, teachers were observed instructing the class for one session. It can be argued that the observation of one class is insufficient to provide enough data on gym practice. In addition, the criticism is also made that teachers will be at their best or their worst because of the presence of observers in the gyms. Due to the large sample it was impossible to observe more than one class. In response to the latter point, it can be argued that irrespective of whether the teacher is at her best or worst, because instruction is culturally constructed, it will be embedded practice that will be displayed in

the gym. In other words, the range of best and worst will be confined to embedded practice.

Based on these considerations, the *first aim* of the present project was to analyze the difference in subjective teaching theories and teaching practice between in-service Italian specialist and non-specialist primary PE teachers and explaining their didactic perspectives. The distinguishing factors between PE specialists and non-specialist are quite easy. The title of *specialist* refers to teachers who have completed a bachelor's degree in PE. Conversely, the term *non-specialist* has come to refer to classroom primary teachers who are teaching PE but who do not have any significant training in the field.

The *second target* of the present project was to define and create professional training programmes that specifically enhance the teaching effectiveness of in-service teachers of primary schools in the PE domain. The innovation in our research, therefore, is not only the integration of qualitative and quantitative research methods, but also the combination of different contents (teaching area and teacher education area). In the Appendix a table of comparisons among different data (Table 2 of the Appendix) is presented. This table shows the different instruments and their association used during the research (verbal data before lessons; questions asked in SD; verbal data deduced from interviews; video data induced from observed behaviours; categories deduced from literature and clusters of categories). All the data and information was helpful to reconstruct the STs of teachers. To sum up, two research questions guided this project:

1. What are the STs of our teachers? How are they translated into instructional practice? What are the differences/similarities between specialists and non-specialists in their respective beliefs about primary PE? (*First study, Chapter 5.1*).
2. Does the research process and teacher training cause any modification to the teacher's initial personal practice theories (subjective theory)? (*Second study, Chapter 5.2*).

The research schedule is presented below, in Table 2.

	T1	T2	3 months	T3
<i>Participants</i>	<i>Pre-training</i>	<i>Training</i>	<i>Participants</i>	<i>Post-training</i>
N = 43		3 months	n = 15	
n = 36 (non-specialist PE teachers)	verbal data		(15 Pre- and post-trained teachers)	verbal data
n = 7 (specialist PE teachers)	and video data			and video data
<hr/>			<hr/>	
<i>first study</i>			<i>second study</i>	
(36 vs. 7)			(15 before and after)	

Table 2: The research schedule

4.1 Developing a Semi-structured Dialogue for Primary School Teachers

In the present study with primary teachers in PE, the teachers' subjective theory was assessed in a first phase of communicative validation throughout a special interviewing method, the SD. For this purpose, teachers were interviewed individually for obtaining a description of his/her individual concept of PE.

For the development of the SD, we selected different aspects, each of them being closely connected to the process of planning PE lessons and of course to the teaching process (see Table 1 of the Appendix, SD in its integral version). The SD included topics such as: Curricula in PE; PE Goals; the most important Individual Objectives (Outcomes) of PE Didactics; General Contents of PE Teaching; Teaching Methodologies in General and in PE; how teachers use Instructions, Demonstrations and Feedback; the potential use of any Didactic Support Equipment during the PE lesson; Student Management; Teaching Styles; Assessment Strategies (evaluation of learning-outcomes). The contents of this dialogue and the level of introspection and reflection may be closely aligned to qualitative instruments used by research into physical educators' concerns (Tsangaridou, 2005; Behets & Meek, 1999). See the contents of the SD in Table 3.

The SD was conducted directly after the collection of behavioural data needed for the second validation phase (explanatory validation) (see the following Chapter 4.2).

PE GOALS and CURRICULA	<p>Questions about PE goals in primary school curriculum such as: “Can you describe why PE exists in the school curriculum?” and “May you tell me reasons why PE is taught in primary schools?”</p> <p>Main answer classes: a) Children’s favourite subject; b) Compensation of non-motor subjects; c) Curriculum-based prescription; d) Healthy lifestyle; e) General educational function; f) Education for, in, and/or through sport (to do sport, to learn motor ability, to learn life skills); g) General, social goals and specific motor/fitness goals.</p>
EXPECTED OUTCOMES	<p>Questions about the most important individual objectives (outcomes) of PE didactics. Answer classes: objectives focused on social, emotional, cognitive and motor dimensions and their subcategories. Question to provide clarification concerning the eventual hierarchical structure of objectives and time spent pursuing them with reference to a one year programme.</p>
CONTENTS	<p>Questions concerning the general contents of PE teaching. Answer classes: a) motor activities, b) motor expressive activities, c) team sports, games. Question to provide clarification concerning how the teacher combines objectives and contents to pursue them.</p>
TEACHING METHODOLOGIES in GENERAL	<p>Questions about general teaching methodologies in non-motor subjects. Answer classes: a) deductive/inductive, b) prescriptive/heuristic, c) analytic/global, d) others...</p>
TEACHING METHODOLOGIES in PE	<p>Questions about specific teaching methodologies in PE. Answer classes: a) deductive/inductive, b) prescriptive/heuristic, c) analytic/global, d) others...</p>
TEACHERS’ INSTRUCTIONAL BEHAVIOUR	<p>Questions concerning instruction, demonstration and feedback:</p> <ul style="list-style-type: none"> - Modality-specificity of encoding: Verbal, verbal-visual, verbal-tactile, verbal-auditory, audiovisual. - Feedback organization: a) to all the class, b) to small groups, c) to individuals, d) or based on the situation.
USE of DIDACTIC EQUIPMENT	<p>Questions about the usage of didactic support equipment during PE, different from the PE apparatus, such as posters, blackboards, cards, films, handouts from students, cds, internet.</p>
STUDENT and ENVIRONMENT MANAGEMENT	<p>Questions concerning how the teacher manages the unique environmental and social interaction conditions in PE (i.e., spatial and temporal conditions that are extremely different from those of the classroom).</p> <p>Answer classes concerning the management of students’ social interaction: a) Work in groups, b) Work in couples, c) Individual work, d) Other</p> <p>Answer classes concerning the environmental organization: a) Rules, b) Rituals, c) Signs, d) Other</p>
TEACHING STYLES	<p>Questions about teacher’s awareness of the teaching styles utilized in PE. Answer classes: a) Command, b) Practice, c) Reciprocal d) Self-check, e) Inclusion, f) Guided Discovery, g) Convergent, h) Divergent, i) Self-teaching</p>
ASSESSMENT STRATEGIES	<p>Questions about evaluation priorities and methods to assess children’s performance.</p> <p>Answer classes: tests, measures, flow-charts or other for evaluating: a) basic motor skills, b) technical learning outcomes, c) social skills.</p>

Table 3: The contents of the Semi-structured Dialogue

4.2 Category System for Observing Physical Education Teachers

For the second validation phase (explanatory validation), aimed at estimating the congruency between verbal and behavioural data, the behaviour of each teacher was videotaped during a freely chosen PE lesson. Behavioural categories for data coding were built through an iterative process. The final video categories used in this project are reported below in a flow chart with four separate levels (Figure 6).

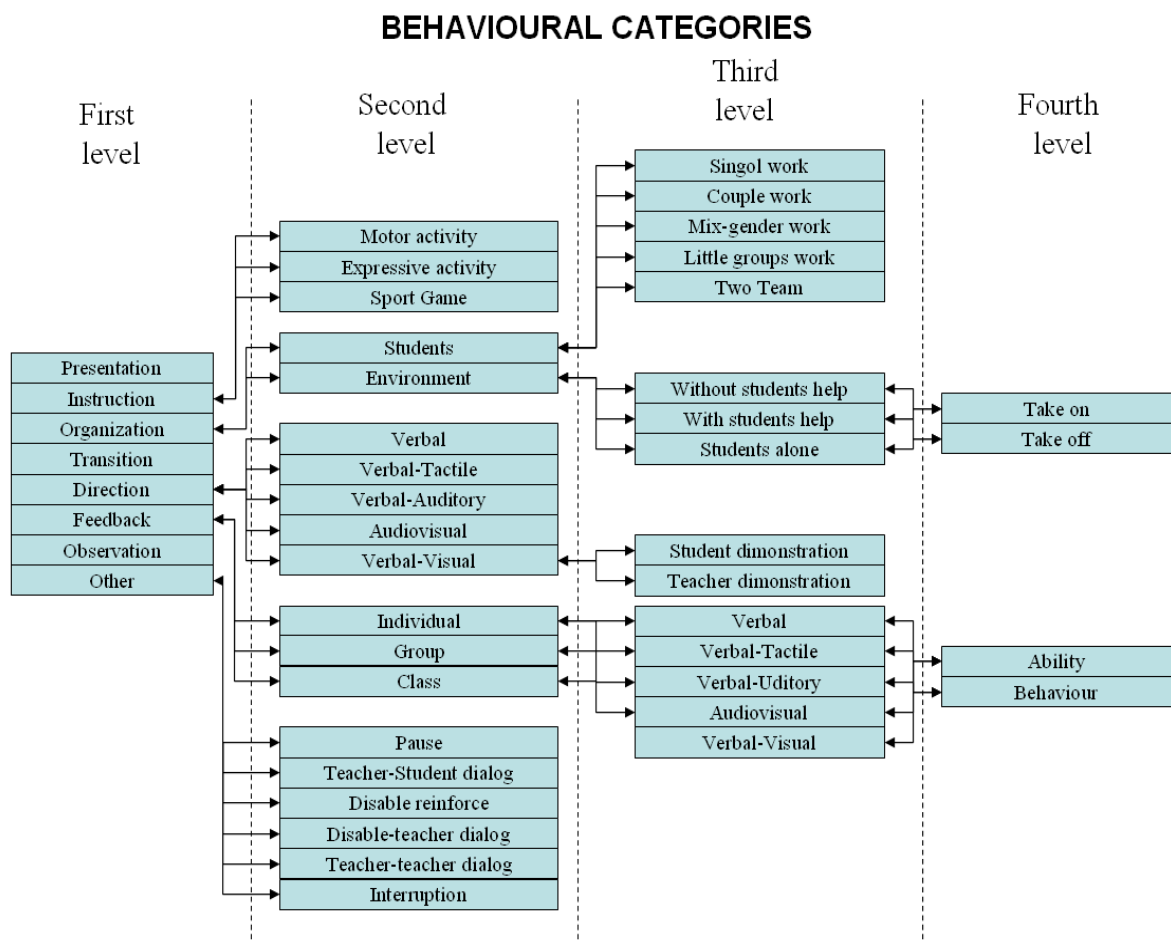


Figure 6: Video categories in four levels

The definitions of *video categories* of teacher behaviours in PE lessons are reported below and in Table 3 of the Appendix:

1. **PRESENTATION of the LESSON:** the way in which the lesson is arranged, general verbal information about lesson activities (the essay of the day). E.g. what are we doing today?

2. **INSTRUCTIONS on ACTIVITIES** (explanation or presentation of activities): verbal communication, the use of media materials are the most common forms of task communication. E.g. what are we doing now? Why are we doing it? And the teacher informs the students about the skills they need to complete the task and tells them what they have to do. This is usually the first step in a sequence of steps.
During the lesson teachers can change the kind of activity (e.g. warm-up, a game...). As a second level of decision the observer decided “which kind of activity?” **MOTOR ACTIVITIES** or **EXPRESSIVE MOTOR ACTIVITIES** or **TEAM SPORT, GAMES**.

3. **ORGANIZATION:** it is a term reserved for almost everything the teacher does that is directly related to the content to be taught.
As a second level, the observer decided the **STUDENTS ORGANIZATION**. This event starts with the teacher asking or ordering and ends when teacher starts to explain or students start to play. And as a third level he/she decided among these categories: **SINGLE WORK** (facing the students); or **COUPLE WORK**; or **MIXED GENDER COUPLE**; or **GROUPS** (3, 4 or more groups, or all student interaction); or **TWO TEAMS**.
As a second level the observer could also decide the **ENVIRONMENTAL ORGANIZATION**. This event starts with the teacher asking students to take equipment and stops when equipment is taken off. As a third level the observer decided **WITHOUT STUDENTS HELP**; or **WITH STUDENTS HELP**; or **STUDENTS ALONE**. As a fourth level the observer decided if teacher or students **TAKE AND PLACING EQUIPMENT** or **TAKE OFF EQUIPMENT**.

4. **TRANSITION:** teacher gives directions, commands or orders to change from one activity or exercise to another (e.g. “stop”...in single file, or in line, or sit down). Also it is not directly related to the content to be taught.

5. **DIRECTION:** teacher is involved in same activity or game or task or skill. Refining, extending, repeating task...As a second level the observer decided “which kind of channel does the teacher use? **VERBAL**; or **VERBAL TACTILE (TO TOUCH)**; or **VERBAL AUDITORY** (she/ he uses a small drum or whistle); and/or **AUDIO-VISUAL** (she/he uses a video); or **VERBAL VISUAL**. As a third level of observation the observer decided between the **STUDENT DEMONSTRATION** or the **TEACHER DEMONSTRATION**.

6. **FEEDBACK:** teachers can help students utilize feedback on knowledge of results and performance inherent in a skill and can use teacher feedback to maintain student focus and motivation to continue practice. As a second level the observer decided the organization of the feedback. **INDIVIDUAL:** feedback directed one to one; **GROUP:** feedback directed to two or more students; **CLASS:** feedback directed to all students.
 As a third level, the observer decided the encoding feedback, which kind of channel does the teacher use? **VERBAL** or **VERBAL TACTILE (TO TOUCH)** or **VERBAL AUDITORY**, **AUDIO-VISUAL** or **VERBAL VISUAL**. As a fourth level the observer decided on type of feedback. **SKILL FEEDBACK:** feedback is related to the skill; **BEHAVIOUR FEEDBACK:** feedback is related to management (also punitive action or when she/he threatens action).

7. **OBSERVATION:** teachers observe, students move

8. **OTHER:** inside this last category the observer found different subcategories. **PAUSE:** when the teacher is not in the videotape and we don't know what he/she is doing; **TEACHER-STUDENTS DIALOGUE**; **REINFORCE DISABLED STUDENT WORK**; **DISABLED STUDENT-TEACHER INTERACTION**; **TEACHER-ADULT (TEACHER, PARENT) DIALOGUE**; **INTERRUPTION**, teacher interrupts lesson or stops some activities while students are talking or doing

something, by saying or doing something that she/he believes necessary (to talk to students like a father or mother), to rebuke (to speak angrily to someone because they have done something wrong).

4.3 Method for Compiling Subjective Theories and Superstructures

The identification of the elements of the ST at individual level may encourage individual reflection on action for teaching improvement and optimization. On the other side, the identification of group differences in ST as a function of factors such qualification or experiences may offer useful information for decision makers to orient PD policies. In order to answer the research question regarding possible similarities between the different personal STs (with a specific qualification vs. without a specific qualification; pre-intervention vs. post-intervention), an attempt has been made to identify correspondence between individual ST - separately for specialist and non-specialist teachers, pre- and post-intervention - and to represent them as inter-personally shared 'superstructures'.

The methodology for compiling 'Superstructures' is based on the agreement of elements that emerged from the singular ST and on the accordance between elements emerging from the combination of different STs (the Superstructures, Figures 12, 13, 14, 15, pp. 134, 135, 180, 181). The reconstruction of STs is generally extremely complicated and a personal approach has been commonly adopted. However, the analysis of ST may be strengthened by performing a combination of several ST to one or more superstructures. For this purpose, the empirical data from several observation levels was aggregated to the corresponding parts of the verbal data. The explanatory validation of the teachers' ST was performed at the superstructure level by identifying: (1) Data, where the various levels of observation were consistent with the teachers' statement and (2) Cases, that revealed a discrepancy between the teachers' STs and their actual coping-strategies.

The qualitative-systematic aggregation method (Stössel & Scheele, 1992, pp. 333-385) was used to interpret the superstructure. This method attempts to identify similarities between separate individual ST in order to form main concepts and relationships. In other terms, each main concept/relationship is representative of those separate individual concepts or relationships, respectively, which have been identified as corresponding to each other. In

this study, the creation of Superstructures have been primarily guided by the questions in SD. The superstructures are compiled assessing the answers' frequency of SDs' categories and video categories. The researcher utilizes the highest frequencies and percentages of teachers' answers for verbal data, while, for the video data, he/she utilizes the average time (expressed in percentage of every categories and sub-categories and based on the total recorded events in one lesson) of the correspondent behaviour categories.

Two major *criteria* were used for deciding concepts relevance. According to the first criterion, categories and linked concepts with the highest frequency of teachers' choice were used to identify differences between teachers with and without a specific qualification (first study); and between pre- and post-intervention (second study). The second criterion was to consider only the verbal answers (verbal categories) that had correspondence with observed behaviour (video categories) that also had the highest frequency.

For the interpretation of results, two tables (see Tables 25 and 29, first and second study respectively, pp. 126, 177) were compiled. These tables, called corroboration tables, allowed to identify positive, negative or void corroborations between the hypothesis and what emerged from the instruments (verbal and video data). The interpretation of the analysis of data is confirmed through triangulation, which means cross-checking through other sources of data, other methodologies, other researchers, and other theories (Fielding & Fielding, 1986).

The Superstructures of ST can be shown in a flow chart (Wagner, 2003) explaining the main teacher concepts in PE teaching. As an example, Figure 7 contains part of the diagram, shown in Figure 14, related to the ST Superstructure of pre-training teachers. In this example, empirical data from questions of the SDs and from observations of teaching behaviours are combined to highlight the some relevant elements of ST. The higher-level concepts are placed on the left, while boxes in the middle and on the right represent their sub-categories. In this way, the instructional process in PE may be represented to identify those elements which are relevant for successful teaching. The researcher designs box after box respecting the relationships between categories and sub-categories.

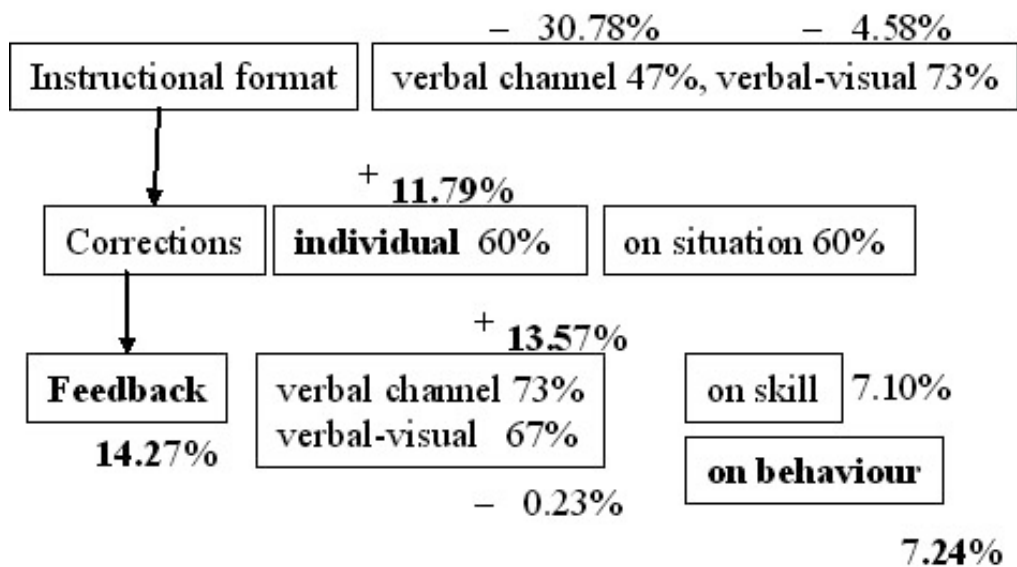


Figure 7: Part of the diagram in Figure 14 related to the ST Superstructure of pre-training teachers in PE

This example follows the formation rules of the structure-formation technique by Wagner (2003). Verbal data are reported as percentage values inside the boxes indicating the rate of choices for each category. Video data are the percentages close to the boxes indicating the percentage of time spent for a given category of teaching behaviour. The “-“ sign represents the absence of consistency between verbal and video data sources, while a “+” sign would represent the presence of consistency. The “+” sign connotes the highest frequency in choices for both verbal and video categories, while the “-“ sign indicates that the two categories (verbal and video) are not in correspondence, there is not the agreement between the highest frequencies of verbal and behaviour data. The absence of sign indicates that the verbal-video consistency could not be evaluated because a given category could be extracted only from verbal or video data. Differences of interest are highlighted in bold font and the reader confronts the two superstructures (e.g., ST Superstructures of the pre- and post-trained teachers) to understand the change of percentages.

4.4 An Integrated Research Approach to Teaching and Teacher Training in Physical Education for Primary School Children

This research is innovative not only because of its integration of qualitative and quantitative research methods, but also because it combines research on teaching effectiveness and teacher training development. Comparisons between the teachers' verbalized subjective theory and the scientific observed theory lead the researcher to identify which training materials must have been developed to modify problem areas. SDs and lesson observations helped us to diagnose specific problem areas in teachers' actions and to prepare training materials for the modification of these areas. Haag & Mischo (2003), in order to improve teachers' actions and teaching, it is recommended that we reduce the discrepancy between knowledge and professional actions. The subjective theory research approach has been applied in different areas and results of some interventional studies (Haag & Mischo, 2003), in which the ST of participants was recorded and modified, have shown the effectiveness of training programmes based on this approach. Professional training was undertaken during the first interview between the teacher and the researcher. The SD with the teacher, after her/his PE lesson, was carried out using a reflective process, focusing on his/her perception of the PE lesson. Working with this approach (ST) means finding personal variables of teachers' theories and actions. The process of reconstructing ST is not only a diagnosis of knowledge, but leads the teacher to reflect on his/her theory and develop new behaviour in the gym. Also, it is important that teacher educators (expert researchers in didactics) acknowledge the value of authentic experiences in teacher learning. Thus, it is necessary that teachers be given opportunities to reflect on actual pedagogical issues and or problems with the person that has just observed their behaviour. In addition, teachers need opportunities to share, analyze, assess and justify their professional theories and actions with the educator. By providing teachers with time to observe and discuss teaching experiences that have occurred naturally within the classroom or gym context, teacher educators can help teachers bring to light the theories that guide their actions so that these theories and actions can be refined, adjusted, or restructured as appropriate. We implemented several strategies to facilitate trustworthiness in the findings. First, we conducted computer based observations to support our interview findings. Second, multiple researchers collected data, analyzed it, and worked together to

interpret the findings. To summarize, we conducted numerous interviews and classroom observations in order to analyze the teacher STs superstructure before and after PD work.

4.4.1 Developing in-Service Teacher Training

Solas (1992) suggested that teachers have particular educational theories which guide their practices but these are often implicit theories. Through a reflective and empowering process, professional theories that are educationally sound should be reinforced while others that are inappropriate should be challenged and reconstructed. It is important, therefore, for in-service programmes, but also for future pre-service programmes (Moore, 2003), not only to expect teachers to articulate their theories of teaching but also to provide opportunities for them to develop, refine and reflect on their theories. This research wanted to provide greater knowledge and get an insight into the relationship between teachers' educational theories and practice. The teacher education staff developed programmes that considered the opportunities for teachers not only to learn new concepts but also to clarify their own professional theories and learn from them. The first study on teacher beliefs helped the researchers to recognize which were the real needs and the real opportunities for a change. Results (see Chapter 6.2 of the Thesis) indicated that teachers spent more of their time using direct styles of teaching and using mainly students' group organization during the lesson (the frontal lesson). The content of the course was selected on the basis of these results. During the training course the staff worked especially on different teaching methods and styles that teachers would be able to use in the gym. The researcher proposed stimulating work that drives thinking and questions on what and why teachers teach and deliver PE as they do and lessons that included new subject matter e.g. motor expressive activities, and motor creative activity (see Table 4 of the Thesis).

4.4.2 The Structure of the Teacher Training Course

During research, our teachers participated in a methodology and practice course in teaching primary PE. The content of the course was presented to the teachers using approaches that facilitated prospective teachers' analytical and reflective thinking

(Tsangaridou & O'Sullivan, 1994; Hanke, 1991). First of all the SD was designed in a way that the prospective teachers would have opportunities to think and reflect on several aspects of PE in general and in specific on the PE lesson just taught. Second, a copy of each videotape was returned to teachers with the explicit indication to watch it. In addition the focus of the course was both on the pedagogical content knowledge of PE and on new contents of primary PE programmes, taking aspects into account that emerged during the SDs and after first observations (first examination of the data). Our specialized staff in primary PE teaching met the teachers 10 for 3 hour lessons. The course lasted about 3 months. Teachers received substantial PD through workshops, temporary peer learning activities and school site visits by expertise primary PE mentors during the 3 month in-service primary PE teacher programme (see Table 4, The in-service primary PE teacher training programme). The lessons included three areas: 1) *Class management and teaching strategies for physical educators* (2 lessons); the task was achieved by means of strategies aimed at anticipating class events, reducing the mental workload associated with class management and supervising students' work and deferring contradictions inherent in this task. This area also included topics such as: physical activity and children's growth and development; the role of movement for primary school children and the meaning of developing an active lifestyle. The aim of the course was to offer practical suggestions on how PE should be conducted to facilitate student learning; 2) *Motor expressive activity* (4 lessons), the aim was to develop open or free movement in children, finding a personal approach and encouraging physical and mental well-being. This experience offered practical help and gave theoretical suggestions for PE lessons. 3) *Motor creative activity and creative thinking* (4 lessons); the creative abilities that contribute to the explanation of learning and enhancing self-esteem and interpersonal relationships. This experience offered practical help and gave theoretical suggestions for PE lessons.

Level of School			Contents of university professional training programmes	Goals of university professional training programs	Teacher educators	Planning	Place
			Motor creative activity and creative thinking. The creative abilities contribute to the explanation of learning and enhancing self-esteem and interpersonal relationships	This experienced can offer practical help and theoretical suggestions in PE lessons	Dott. Tocci and Scibinetti	4 lessons with teachers	Inside University, Department of Science of Education for PE and Sport
Primary School			Motor expressive activity. The aim is developing open or free movements in children, finding a personal approach and encouraging physical and mental well-being	This experienced can offer practical help and theoretical suggestions in PE lessons	Dott. Mezzetti	2 lessons with teachers + lessons with students and teachers	Inside University, Department of Science of Education for PE and Sport, and in the school
			Class management, student instruction and teaching strategies for physical educators	The task is achieved by means of strategies aimed at anticipating class events, reducing the mental workload associated with class management and supervising students' work and deferring contradictions inherent in this task	Dott. Casella	2 lessons with teachers	Inside University, Department of Science of Education for PE and Sport

Table 4: The in-service primary PE teacher training programme

5 Data Analysis

5.1 First study: Specialist vs. non-specialist Teachers

5.1.1 Participants

In 2005, nine (Table 5, Location of schools) primary schools, each from a different district of Rome, were formally informed about of the purpose and methodology of the study, as well as the nature and extent of their possible participation.

	Schools	Address
1	Sanzio	Via del Casaleto
2	Girolami	L.go Manessi
3	Alfieri	L.go S.PioV
4	Istituto Comprensivo "Tiberio Gulloni"	Località Colonna
5	Merelli	Via Zandonai
6	Merelli	Via Mengotti
7	Ferrante Aporti	Via Serra
8	Maffi/Maglione	Via Pietro Maffi
9	Pistelli	Via Monte Zebio

Table 5: Location of schools

Forty-three in-service classroom teachers voluntarily agreed to participate in the study. The participants were divided into two groups, *specialists* (n = 7, 16.27%) and *non-specialists* (n = 36, 83.72%). Of the participants in the specialist group, 5 (11.66%) were females and 2 (4.65%) were males. In the non-specialists group, there were 33 (76.37%) females and 3 (6.97%) males. See Table 6, Primary school teachers, first sample.

	Female		Male		Tot	%
Specialists in PE	5	11.66%	2	4.65%	7	16.27%
Not Specialists	33	76.74%	3	6.97%	36	83.72%
Tot	38	88.37%	5	11.62%	43	

Table 6: Primary school teachers, first sample

Table 4 of the Appendix (Demographic information on teachers – specialists vs. non-specialists) presents teachers’ demographic data, educational background, and experience in teaching. Numbers for each teacher are used throughout this thesis and in Table 4 of the Appendix to protect the privacy of all participants. They were informed that anonymity procedures would be established in the study and that all data and reports would be given to them. Seven teachers had a degree in Motor Science; thirty-six had no specific qualification in PE. Their average age was 41. Their teaching experience ranged from 2 years to 37 years. Their teaching experience in PE was 8.5 years on average. The education levels of both specialists and non-specialists varied from a Secondary School Diploma to the completion of a degree in PE, in Psychology, or Primary Education Science⁴.

⁴ Before the University reform (“3 years plus 2 degree system”), teachers could teach at primary level with a specific Secondary School Diploma. From 2001 primary school teachers can teach at this level only after obtaining a BA degree, in Primary Education Science. In the samples there are teachers that have a second degree in PE or

5.1.2 Instruments

Data collection included interviews (before and after PE lessons), and PE lesson videotapes. During the first appointment, prior to the PE lesson, we used teacher questionnaires to gather demographic data and some information about the lesson (goals and contents of lesson, teaching methods, apparatus and if necessary critical events). During the second appointment, immediately after the lesson, a semi-structured interview was carried out with the teacher, focusing on his/her perception of their lesson. The interview included open questions, questions guided by hypotheses, and questions to provide clarification. The function of the latter was to confront the teacher with alternative explanations and to question his/her statements in order to gain a clear picture of his/her ideas and viewpoints. A data collector collected data using teachers' questionnaires before PE lessons, lessons observations and SDs after lessons. The data collector was training to conduct semi-structured interviews and nonparticipant observations. Every lesson was videotaped. In collaboration with German researchers (two experts in ST research method), the Italian lead researcher was responsible for data analysis and general oversight of this study. Lucidi, Alivernini and Pedon (2008) admit that, even if there is no clear standardization, for analysing and interpreting qualitative data it is necessary to use triangulation. To collect and corroborate different data it was useful to place them into a table (see an example in Table 7, below). The tools of data collection are observation, interviews and researcher-designed instruments (Thomas & Nelson, 1985, p.25). The corroboration table can be compiled for a single case or for more than one case that has been studied.

e.g. in Psychology, who have and in addition to this the basic teaching qualification for teaching in primary education (a Secondary School Diploma or a Degree in primary Education Science).

		<i>1° Instrument</i>	<i>2° Instrument</i>	<i>3° Instrument</i>
First Hp	Teacher n. 1	+	-		
	Teacher n. 2		+	+	
	Teacher n. 3	-			
	Teacher n. 4		-	+	
				

Table 7: Structure of a corroboration table. As an example, congruence/incongruence signs for three instruments and four teachers are displayed

Notes: “+” = instruments corroborate the hypothesis; “-“ = instruments do not corroborate the hypothesis; empty cells mean that the instruments were not applied.

The final goals for every hypothesis are to construct clear conclusions based on the correspondence among different instruments and among different cases because more than one instrument and case was analyzed. The next Table 8 shows the specific research instruments used for the triangulation in the first study.

Data sources	Methods of Data Collection	Methods of Data Analyses
First Instrument	<i>Teacher's Questionnaires before Lessons</i>	Semi-structured Dialogue, first part
Second Instrument	<i>Lesson Observations and Videotapes</i>	Intuitive method of observation
Third Instrument	<i>Teacher's Semi-structured Dialogues after Lessons</i>	Semi-structured Dialogue, second part
Fourth Instrument	<i>Systematic Observation Instrument (analysis of videotapes)</i>	Frequency Analysis of Categories
Fifth Instrument	<i>Supplementary Statistic Analysis</i>	Regression Analysis
Sixth Instrument	<i>Compilation of Superstructure</i>	Assessment of ST hypothesis

Table 8: Research instruments used for triangulation in the first study

Consequently the used instruments for the triangulation are illustrated.

First Instrument: *Teachers' questionnaires before lessons* (Table 2 of the Appendix, SD). To secure demographic information about these teachers, three sections of questions (developed by Katja Schmitt, 2001 and adapted to this research) were used. The first section required information concerning the formation of the teachers' classes (e.g. grade level, class size, student with special needs, see Table 5 of the Appendix, Information concerning the formation of the teachers' classes). The second part gathered information concerning the teachers' educational and sports background (see Table 4 of the Appendix). The third concerned aspects of the lesson (e.g. contents, objectives, critical events). See Table 6 of the Appendix, Interview before lesson and Chapter 3.2 of the Thesis.

Second Instrument: *Lesson Observations and Videotapes* (see Chapter 3.3). Teachers were allowed to choose which lesson from year 6, 7, 8, 9, or 10 and one lesson of each was videotaped. The camera was set up in the corner of the gymnasium, and was mounted on a tripod to focus on the teacher during all phases of the lesson. Teachers wore a wireless

microphone, allowing all instructions to be recorded. Mean class size was 18.53 students (SD = 6.38) and mean lesson length was 44.07 minutes (SD = 11.08). See Table 5, of the Appendix, Information concerning the formation of the teachers' classes.

Third Instrument: *Teachers semi-structured dialogue after lesson* (Patton, 2002). Nine open-ended questions formed the basis for the formal interview (SD, see Table 1 of the Appendix). All interview sessions lasted between 20 and 25 minutes. It was conducted after PE lessons and information deriving from this discussion was recorded using SD, with "if-then" statements. These questions were created in accordance with ST Research Programme (Hanke, 1991). The SD included topics such as: Curricula in PE; PE Goals; the most important Individual Objectives (Outcomes) of PE Didactics; General Contents of PE Teaching; Teaching Methodologies in General and in PE; how teachers use Instructions, Demonstrations and Feedback; the potential use of any Didactic Support Equipment during PE lesson; Student Management; Teaching Styles; Assessment Strategies (evaluation of learning-outcomes). See Table 2 of the Appendix, The Content of SD.

Fourth Instrument: *Systematic observation instrument* (the instrument developed for these researches, not published, see Table 3 of the Appendix, Definition of Video Categories of teachers' behaviours in PE classes). Open-ended questions inside the SD were used to develop an observational inductive categorical system and it was designed to collect verbal data and basic organizational information from primary school PE classes. During its development, the videotaped lessons were viewed by researchers and subsequent revision of categories was made. On completing the observation instrument, lessons were coded and data was reduced by grouping concepts into categories using SIMI-SCOUT software for analysis. The use of the SIMI-Scout programme facilitated the organization of the categories and the creation of a data base (Figure 5). It is an interval recording instrument designed to estimate how much time and how many behavioural characteristics teachers use every five seconds. Definitions of video categories, together with examples are provided in Table 3 of the Appendix and Figure 6 of the Thesis.

Fifth Instrument: *Supplementary Statistical Analysis*. The presence of a relatively large sample allowed for additional multivariate statistical analyses to provide a more comprehensive view on the pattern of differences in ST not only between specialist and non-specialist teachers, but also as a function of the length of their past teaching

experience. To this aim, multiple regression analysis models were applied to both verbal and video data. See Chapter 5.1.6 of the Thesis for a more detailed explanation of the employed regression models.

Sixth Instrument (Assessment of hypothesis): *Compilation of ST superstructure* (Wagner, 2003). Figures 7 and 8 demonstrate the basic superstructure, in which main concepts and their graphic relationships were identified. To interpret the superstructure, the qualitative-systematic aggregation method by Stössel and Sheele (1992, pp. 333-385) was chosen and an example of the main Subjective Theory's elements of PE teachers is shown below (Figure 8).

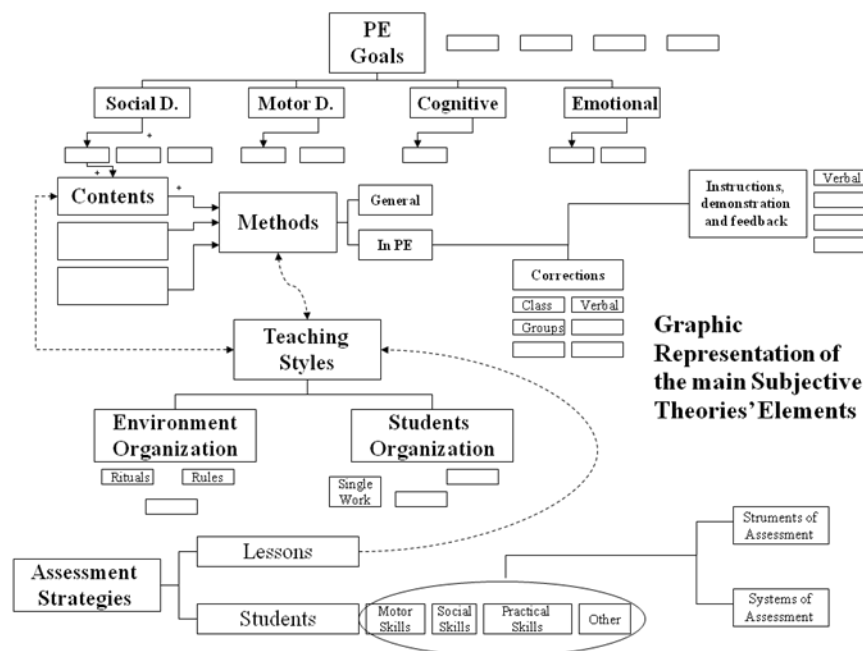


Figure 8: Example of inter-individual superstructure of Subjective Theories' elements

Notes: The arrows represent relationships between boxes. Dotted-line arrows indicate a flexible relationship. Rectangles aligned close to another represent subordinations.

In the above example, the main elements of STs are presented as follows: empirical data from several questions of the SDs and from observations was applied to the corresponding parts of the ST. The arrows with “+” represent a relationship between boxes.

Subordinations are designed by smaller rectangles. The most important concepts are placed on the left. The arrows with a dotted line show a flexible relationship. The hypothetical “red line” of ST represents the *instructional process* in PE and identifies the theoretical and practical elements needed to operate successfully within teaching. The interpretations of the analysis of data are confirmed through triangulation, which means cross-checking through others sources of data, other methodologies, other researchers and other theories (Fielding & Fielding, 1986).

Explanation of the main elements of ST. The goal of teaching is student learning. The teacher has the primary responsibility of directing the teaching-learning process. Teachers need to design and redesign experiences for their students based on their pedagogical goals and their knowledge of the learner, the lesson content, and the teaching-learning process. It is important for teachers to choose an instructional process appropriate to their goals. Instruction is guided by a long-term plan to reach specific student outcomes called the curriculum (Rink, 2006, pp. 3-21). Goals (broad outcomes) and objectives (more specific outcomes) are designed in *four learning domains*: motor, cognitive, emotional and social. Teacher has responsibility for all domains of learning and she/he writes major goals for PE and the most important individual objectives (outcomes) of PE didactics that he/she teaches. Selecting realistic goals for a programme is difficult in PE and the interviewer helps teachers asking a hierarchical structure of these objectives (hierarchical structure of the outcomes inside every domain) and how they spend time pursuing them (the percentage indication with reference to a one year programme). Two types of events occur in the gym: content behaviours and management behaviours. Content behaviours are those directly related to *lesson content*. Teachers describe what the general contents of PE teaching are and the interviewer suggests three main categories: the motor activities, the motor expressive activities and the team sport, games. Teacher provides clarification through a description of how he/she combines these three big categories inside the development of four dimensions (motor, cognitive, emotional, social domains). The instructional functions of the teacher’s performance are the following: developing content, identifying methods and styles of teaching, presenting task and evaluating. Teacher describes his/her preferable teaching methodologies in other subjects and in PE, how she/he gives instructions, demonstrations and guidelines, which channels of communication she/he prefers to use (verbal, verbal-visual, verbal-tactile, verbal-auditory,

audiovisual), how she/he normally corrects students (she/he makes corrections to all the class, to small groups, to individuals or based on the situation) and which channels of communication she prefers to use (verbal, verbal-visual, verbal-tactile, verbal-auditory). The teacher describes if she/he uses any didactic support equipment during PE lessons (for example posters, a blackboard, cards, films, handouts from students, CDs, or internet) and if she/he uses didactic support equipment depend on lesson content, method, on objectives or kinds of social interaction. Management behaviours arrange and maintain the learning environment, in particular the *student* and *environment organization*. PE lessons take place in spatial and temporal conditions that are extremely different from those of the traditional classroom. Teacher describes how she/he manages these specific tasks, using rules, rituals, signs, or other. The PE lesson has specific social interaction characteristics unique to its teaching and teacher copes with these specific aspects. She/he organizes students in groups, or in couples, or in a single work, or in small groups. Teacher describes how she/he assess your PE lesson and how she/he assess a child's skills (e.g. practical skill, motor skill, social skill or other) and what system she/he uses to assess the child's performance.

The elements of the ST provide the structure necessary for successful learning and within this structure the teachers are free to use behaviours that satisfy personal concerns, e.g. preference for a particular approach to learning.

5.1.3 Verbal Data Analyses: Results of the Phase of Communicative Validation - Descriptive Statistics and Exploratory Models

Semi-structured dialogue after lesson transcripts were summarized into categories (e.g. PE goals and curricula, expected outcomes, contents, etc., see Table 3 of the Thesis). Nine open-ended questions were organized in tables where we could read frequencies and percentages (see Verbal Categories' frequency in Figures from 6.2-1 to 6.2-33 in Chapter 6.2.1 of the Thesis and Tables from 6.2-1 to 6.2-29 of the Appendix) regarding answers by specialist teachers (n =7) versus non specialists (n = 36). Comparisons of specialist and non-specialist ST characteristics were made by employing descriptive summaries and narratives. In order to answer the first research question regarding possible similarities between the different individual STs, two subjective theory superstructures were compiled.

5.1.4 Video data analyses: Results of the Phase of Explanatory Validation - Descriptive Statistics and exploratory models

Observation data from the observers' perspective described in Table 3 (Definition of Video Categories of teachers' behaviours in PE classes, the instrument developed for this research) was taken into account for the empirical testing of the ST in the explanatory phase of this first study. Descriptive statistics were computed to determine mean and standard deviation for the four levels of observation categories (e.g. Presentation of the lessons, Instructions on activities, Organization etc.). See Figures from 6.2-34 to 6.2-44 of the Thesis, Table 8 of the Appendix, Average time of main behaviour categories dedicated in PE lessons by specialists and non-specialists teachers. An independent t-test examined the differences/similarities between specialist and non-specialist samples. A level of significance of .05 was used to determine whether to accept or reject the similarities/differences between groups. Each ST superstructure (specialists versus non-specialists) was tested with respect to its validity. For this purpose, the empirical data from several observation levels was applied to the corresponding parts of the ST superstructures. See Chapter 6.2.2 of the Thesis.

5.1.5 Joint Verbal-video Data Analyses: Description of ST - Contextualising the Stage of the Analysis

The size of the sample allowed quantitative inference to be made and data was analyzed inductively (Patton, 2002, pp. 453-456; Clarke 2003). Data from all sources was read carefully to identify links between verbal and video data (e.g. PE goals, Individual objectives in PE, Time spent to pursue the objectives etc.). Also, we implemented another strategy to facilitate trustworthiness in the findings: expert German researchers served as *peer debriefers* to evaluate the data related to lesson events pertinent to the nature and function of teachers' STs. Their role was to question the themes and issues. The researchers extracted or overlooked from interviews and observations. Taken as a whole, these diverse sources of information and data presented a complete picture of the teachers' ST superstructure (see Table 25 of corroboration, p. 126 and Figures 12 and 13, pp. 134, 135 and data description of ST superstructure in Chapter 6.2.4).

5.1.6 Regression Analyses

Quantitative analyses were performed additionally to qualitative analysis despite the unbalanced number of specialists and non-specialists teachers which reflects the different frequency in the Italian primary school teachers population. However, it is to consider that the low n of the specialist teachers group does not invalidate the multiple regression, but merely weakens the power of the statistical tests, thus reducing the chance of finding significant relationships and increasing the risk of Type II errors.

Eight regression analyses (four for verbal data and four for video data, respectively) were performed to evaluate the relationship linking verbal and behavioural categories of ST to the following variables:

1. Non-specific qualification in teaching PE (teachers' academic level),
2. Specific qualification in teaching PE,
3. Years of primary school teaching in general,
4. Years of PE primary school teaching.

Evaluating differences in teaching theories between those teachers in possession of a further degree and those with only the basic teaching qualification for primary education. was aimed at understanding if PE teaching was supported and influenced by theoretical competencies. Evaluating differences between teachers with and without a specific qualification in PE aimed at understanding at what extent PE quality is influenced by specific competencies. Evaluating the influence of the years of teaching in general was aimed at testing the hypothesis that didactic experience may have an influence on PE teaching theories. Evaluating the influence of years of teaching in PE aimed at verifying the hypothesis was that specific experience in teaching PE may influence PE teaching theories.

Verbal and behavioural categories of ST were entered into analysis as *predictors*, whereas the presence/absence of specific or non-specific qualification in PE and the past experience in general teaching or PE teaching were entered as *dependent variables* (Tables 9a,b). Since verbal data were not hierarchically ordered, all independent variables (i.e., interview categories) were entered simultaneously (Table 9, panel a). In contrast, the method of hierarchical regressions was chosen for video data according to the hierarchical structure of

behavioural categories, with first-level categories belonging to the first block, second-level categories to the second block and so on (Table 9, panel b). The order of entry was selected to evaluate the predictive value of behavioural categories belonging to the last levels (e.g., feedback on skill) only after controlling statistically for the prediction accrued, in order, by categories of antecedent levels (e.g., feedback in general, feedback modality, feedback channel). Both for verbal and video data analyses, *logistic regression* was used in the case of dichotomous dependent variables (i.e., teachers' academic level and specific qualification in PE), while *linear regression* was used for interval scale variables (i.e., years of primary school teaching in general and years of PE primary school teaching).

Panel a

<i>Dependent Variables (DV)</i>	<i>Levels of the DV</i>	<i>Independent variables (IV) or Predictors</i>
Teachers' academic level	Degree/no degree	PE goals and curricula Expected outcomes Contents ...
Specific qualification qualification in PE	Presence/absence	PE goals and curricula Expected outcomes Contents ...
Primary teaching experience in general	Years	PE goals and curricula Expected outcomes Contents ...
Primary PE teaching experience	Years	PE goals and curricula Expected outcomes Contents ...

Panel b

<i>Dependent Categories</i>	<i>Levels of the DV</i>	<i>Independent variables (IV) or Predictors</i>			
		First Block	Second Block	Third Block	Fourth Block
Teachers' academic level	Degree/no degree	Feedback ...	Individual groups class	Verbal audio-visual ...	On skills on behaviour ...
Specific qualification in PE	Presence/absence	Feedback ...	Individual groups class	Verbal audio-visual ...	On skills on behaviour ...
Primary teaching experience in general	Years	Feedback ...	Individual groups class	Verbal audio-visual ...	On skills on behaviour ...
Primary PE teaching experience	Years	Feedback ...	Individual groups class	Verbal audio-visual ...	On skills on behaviour ...

Table 9: Dependent and independent variables used for the four regression analyses performed on verbal data (panel a) and on video data (panel b)

5.2 Second study: Pre- vs. post-trained Teachers

5.2.1 Participants

During 2005 and 2006, teachers who participated in the first study, took a methodology and practice course in teaching primary PE (see Chapter 4.4). In 2006, all primary schools (Table 5, of the Thesis), which participated in the first phase of our research, were formally contacted again and informed about the purpose and methodology of the second study, as well as the nature and extent of their possible participation. See Table 10, below.

	Female		Male	
Specialists	3	25%	0	0%
Non Specialists	12	75%	0	0%
<i>Total</i>	15			

Table 10: Second sample of primary school teachers

Fifteen in-service classroom teachers, who had already met the previous year during our first study, voluntarily agreed to participate in the second study. Table 11 of the Appendix (Demographic Information on 15 Teachers) presents teachers' demographic data, educational background, and experience in teaching. Numbers for each teacher are used throughout this thesis to protect the privacy of all participants. They were informed that anonymity procedures would be established in the second study and that all data and reports would be given to them. Three teachers had a degree in motor science; twelve had no specific qualification in PE. Their average age was 40. Their teaching experience ranged from 2 to 37 years. Their teaching experience in PE was 8 years on average. The education levels of 15 teachers could vary from a Secondary School Diploma to a completion of a BA, BSc degree either in PE, Psychology, or Primary Education Science. This variability is due to the fact that before the University reform ("3 plus 2 years degree

system”), people could teach at primary level with a specific Secondary School Diploma. Nowadays, primary school teachers can teach at this level only after obtaining a BA degree, in Primary Education Science.

5.2.2 Instruments

The same procedure used one year earlier to collect and analyse data (see paragraph 3.1.2) was repeated. See Table 10 of the Appendix, the Interview before lesson on 15 teachers and Table 7 of the Appendix, Information concerning the formation of the teachers’ classes. In the next Table 11 the specific research instruments used for the triangulation are shown. The instruments are the same used in the first study, excluding the regression analysis, because we could not apply it to longitudinal studies.

Data Source	Method of Data Collection	Method of Data Analyses
First Instrument	<i>Teacher’s Questionnaires before Lessons</i>	Semi-structured Dialogue
Second Instrument	<i>Lesson Observations and Videotapes</i>	Intuitive method of observation
Third Instrument	<i>Teacher’s Semi-Structured Dialogues after Lessons</i>	Semi-structured Dialogue
Fourth Instrument	<i>Systematic Observation Instrument (analysis of videotapes)</i>	Frequency Analysis of Categories
Fifth Instrument	<i>Compilation of Superstructure</i>	Assessment of ST hypothesis

Table 11: Research instruments used for triangulation in the second study

5.2.3 Verbal Data Analyses: Results of the Phase of Communicative Validation – Descriptive Statistics and Exploratory Models

Semi-structured dialogues after lesson transcripts were summarized into categories. Nine open-ended questions were organized in tables where we could read frequencies and percentages (see Verbal Categories' frequency in Figures 6.3-1 to 6.3-34 of the Thesis and Tables from 6.3-1 to 6.3-29 of the Appendix) regarding answers by pre training teachers (15) versus post training teachers (15). Descriptive statistics were computed for the pre-training and post-training groups. Comparisons of ST characteristics were made by employing descriptive summaries and narratives. In order to answer the second research question regarding possible modifications to the teacher's initially personal practice theories (subjective theory) we started to compile two superstructures, pre-training teachers ST versus post training teachers ST.

5.2.4 Video Data Analyses: for the Phase of Explanatory Validation - Descriptive Statistics and Exploratory Models

The observation data from the observers' perspective described in Table 3 (Definition of Video Categories of teachers' behaviours in PE classes, the instrument developed for this research) was taken into account for the empirical testing of the ST in the second phase of this second study. Descriptive statistics were computed to determine mean and standard deviation for the four levels of observation categories (see Figures from 6.3-34 to 6.3-45 of the Thesis and Table 9 of the Appendix, Average time of main behaviour categories dedicated in PE lessons by pre-training and post-training teachers). A paired (dependent) t-test examined the differences/similarities between pre-training and post-training teachers. A level of significance of .05 was used to determine whether to accept or reject similarities/differences between groups. Each ST superstructure (pre-training versus post-training teachers) was tested with respect to its validity. For this purpose, the empirical data from several observation levels was compared with the corresponding parts of the ST.

5.2.5 Joint Verbal-video Data Analyses: Description of ST - Contextualising Stage of the Analysis

Similarly to what performed in the first study, verbal and video data were analyzed jointly also in the present study of differences in ST prior to and after a PD intervention. The same procedures were applied to build inter-individual superstructures using these diverse sources of information. See Table 29 of corroboration p. 177 and Figures 14 and 15, pp. 180, 181.

6 Results and Discussions

6.1 Preliminary Analysis: Calculating the Reliability of Observation Data

The reliability, when used in conjunction with observational tools, can have several meanings. First, it refers to whether the tool can be used to observe in a consistent way. To observe accurately, the observer must code or record a behaviour, such as positive feedback, each time it appears and not when it does not appear. Reliability is usually determined by comparing the observations of one observer with those of other observer considered to be an expert. When no expertise is available, reliability is usually determined by agreement between more than one observer on the same event. Agreement between observers is usually called inter-observer agreement. Reliability also depends on the observer's ability to be consistent (i.e. to code the same behaviour in the same way more than once). Agreement of one observer with himself is usually called inter-observer agreement. Reliability is a function of an observational measure and researchers use varying criteria for reliability, depending on the sophistication of the tools. The reliability coefficients were computed as preliminary analysis.

Methods for observing and recording behaviour have been used extensively in many areas of research dealing with human behaviour (Van der Mars, 1989, pp. 20-52). Because they have been used extensively in PE, their reliability is well demonstrated (Siedentop & Tannehill, 2000, pp. 318-351). A total of 58 lessons (36 lessons were conducted by teachers without a specific qualification in PE, 7 by teachers with a specific qualification, and 15 lessons were videotaped after teachers' training) were videotaped and observed using the SIMI-SCOUT programme and our observation categories (see Chapter 3.3.2). The content, grade level and specific classes to be observed were not controlled by researchers so as to provide a representative sample of teachers' behaviours. In the coding system the categories of teachers' behaviour (Presentation of lesson, Instructions, Organization of students and the environment, Transition, Direction, Feedback, Observation) and subcategories were coded simultaneously. This system consists of four levels of decision making. Decisions were made at the end of each 5 second interval. The interval length of 5 seconds matches the average duration of teachers' behaviours.

The reliability coefficients were computed as preliminary analysis.

Three random lessons (3 different teachers) were observed twice (a total of 6 times), with the observations occurring on different days, not less than one week apart, by four observers, separately (3 videos x 2 times x 4 observers) (See intra-observer agreements in Tables 12, Observers A, B, C and D). Reliability also depends on the observer's ability to code the same behaviour in the same way more than once. The basic equation was also applied in this step (Figure 4 of the Thesis, Chapter 3.3) to calculate the percentage of agreement between two observers on 5 videos and the inter-observer agreement between the first and the second coders and the third and fourth coders, respectively, was on average 80% in the first level of observation categories (see Tables 13 and 14, Inter-observer A-B; C-D). The first and second coders observed 22 videos by randomly selecting classes, the third and fourth coders observed the other 21 videos by randomly selecting classes. The regular inter-observer agreement (Figure 4, Chapter 3.3 of the Thesis) would be an aspect of the total observation for which both saw the same behaviour and recorded it as such; also the absence of behaviour is considered an agreement. Disagreement occurs when the two observers differ on a particular aspect of the observation and one codes an episode, whereas the other records it differently. In the coding system the absence of behaviour is not mentioned, observers have to code every 5 seconds, and repeat categories when behaviour of the same category is longer than 5 seconds. Within intervals in which two or more events happen, they created a sequence. One event or parallel behaviour is coded as a second event or second form of behaviour (rules for the coder).

To complete observer reliability (backup procedure) the Cohen's Kappa ($k = > 0.60\%$) coefficient of reliability was calculated on 10 videos, selected interval part of the videotaped lessons, used SPSS (Statistical Package for social Sciences). In accordance with Gelfand and Hartmann (1969) and with Warkins & Pecheco (2000) their recommendation was respected and the correlation coefficients for reliability, that take into account change agreements, should be higher than 60%. See Table 15 of the Thesis, the Cohen's Kappa measures.

**INTRA-OBSERVER
AGREEMENT
OBSERVER A**

Video 35

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	5	5	5	0	5	100
	Organization	25	23	23	2	25	92
	Transition	3	1	1	2	3	33.33333333
	Direction	112	117	112	5	117	95.72649573
	Feedback	5	5	5	0	5	100
	Observation	131	128	128	3	131	97.70992366
	Other	23	25	23	2	25	92
	Totals	304	304			<i>average</i>	<i>76.3462191</i>

Video 39

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	2	2	2	0	2	100
	Organization	70	65	65	5	70	92.85714286
	Transition	9	9	9	0	9	100
	Direction	177	159	159	18	177	89.83050847
	Feedback	58	57	57	1	58	98.27586207
	Observation	94	84	84	10	94	89.36170213
	Other	28	25	25	3	28	89.28571429
	Totals	488	401			<i>average</i>	<i>82.4513662</i>

Video 7

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	1	1	1	0	1	100
	Organization	80	110	80	30	110	72.72727273
	Transition	1	5	1	4	5	20
	Direction	128	128	128	0	128	100
	Feedback	43	58	43	15	58	74.13793103
	Observation	41	27	27	14	41	65.85365854
	Other	102	106	102	4	106	96.22641509
	Totals	396	435			<i>average</i>	<i>66.1181597</i>

**Average
Intraobserver
Agreement** **74.971915**

**INTRA-OBSERVER
AGREEMENT
OBSERVER B**

Video 17

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	1	1	1	0	1	100
	Instructions	14	15	14	1	15	93.33333333
	Organization	57	56	56	1	57	98.24561404
	Transition	1	1	1	0	1	100
	Direction	251	248	248	3	251	98.80478088
	Feedback	114	117	114	3	117	97.43589744
	Observation	141	144	141	3	144	97.91666667
	Other	52	44	44	8	52	84.61538462
	Totals	631	626			<i>average</i>	96.29395962

Video 37

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	9	6	6	3	9	66.66666667
	Organization	36	36	36	0	36	100
	Transition	4	2	2	2	4	50
	Direction	181	230	181	49	230	78.69565217
	Feedback	100	112	100	12	112	89.28571429
	Observation	110	176	110	66	176	62.5
	Other	48	29	29	19	48	60.41666667
	Totals	488	591			<i>average</i>	63.44558747

Video 3

FREQUENCY

		First ob.	Second ob.	agr.	disag.	agr. + disag.	% agreement
LEVEL 1	Presentation	0	3	0	3	3	0
	Instructions	17	27	17	10	27	62.96296296
	Organization	55	60	55	5	60	91.66666667
	Transition	4	6	4	2	6	66.66666667
	Direction	189	232	189	43	232	81.46551724
	Feedback	110	58	58	52	110	52.72727273
	Observation	36	62	36	26	62	58.06451613
	Other	8	8	8	0	8	100
	Totals	419	456			<i>average</i>	64.1942003

**Average
Intraobserver
Agreement** **74.64458246**

**INTRA-OBSERVER
AGREEMENT
OBSERVER C**

Video 6

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	2	3	2	1	3	66.66666667
	Organization	43	43	43	0	43	100
	Transition	0	3	0	3	3	0
	Direction	208	178	178	30	208	85.57692308
	Feedback	44	31	31	13	44	70.45454545
	Observation	199	192	192	7	199	96.48241206
	Other	164	207	164	43	207	79.22705314
	Totals	660	657			<i>average</i>	62.30095005

Video 16

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	1	0	1	1	0
	Instructions	4	5	4	1	5	80
	Organization	71	79	71	8	79	89.87341772
	Transition	7	6	6	1	7	85.71428571
	Direction	264	254	254	10	264	96.21212121
	Feedback	120	127	120	7	127	94.48818898
	Observation	100	103	100	3	103	97.08737864
	Other	86	77	77	9	86	89.53488372
	Totals	488	652			<i>average</i>	79.1137845

Video 3

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	1	0	1	1	0
	Instructions	4	5	4	1	5	80
	Organization	71	79	71	8	79	89.87341772
	Transition	7	6	6	1	7	85.71428571
	Direction	264	254	254	10	264	96.21212121
	Feedback	120	127	120	7	127	94.48818898
	Observation	100	103	100	3	103	97.08737864
	Other	86	77	77	9	86	89.53488372
	Totals	652	652			<i>average</i>	79.1137845

**Average
Intraobserver
Agreement** **73.50950635**

**INTRA-OBSERVER
AGREEMENT
OBSERVER D**

Video 18

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	9	8	8	1	9	88.88888889
	Organization	71	80	71	9	80	88.75
	Transition	3	7	3	4	7	42.85714286
	Direction	487	375	375	112	487	77.00205339
	Feedback	33	64	33	31	64	51.5625
	Observation	49	64	49	15	64	76.5625
	Other	29	84	29	55	84	34.52380952
	Totals	681	682			<i>average</i>	<i>57.51836183</i>

Video 2

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	1	1	1	0	1	100
	Organization	57	56	56	1	57	98.24561404
	Transition	1	1	1	0	1	100
	Direction	188	186	186	2	188	98.93617021
	Feedback	81	85	81	4	85	95.29411765
	Observation	107	108	107	1	108	99.07407407
	Other	91	86	86	5	91	94.50549451
	Totals	526	523			<i>average</i>	<i>85.75693381</i>

Video 10

		FREQUENCY					%
		First ob.	Second ob.	agr.	disag.	agr. + disag.	agreement
LEVEL 1	Presentation	0	0	0	0	0	0
	Instructions	1	1	1	0	1	100
	Organization	57	56	56	1	57	98.24561404
	Transition	1	1	1	0	1	100
	Direction	188	186	186	2	188	98.93617021
	Feedback	81	85	81	4	85	95.29411765
	Observation	107	108	107	1	108	99.07407407
	Other	91	86	86	5	91	94.50549451
	Totals	526	523			<i>average</i>	<i>85.75693381</i>

**Average
Intraobserver
Agreement** **76.34407648**

Table 12: Intra-observer agreement

**INTER-OBSERVER
AGREEMENT
OBSERVERS A-B**

Video 1

		FREQUENCY					
		Observer A	Observer B	agrem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	4	4	4	0	4	100
	Organization	31	43	31	12	43	72.09302326
	Transition	2	2	2	0	2	100
	Direction	209	208	208	1	209	99.5215311
	Feedback	103	98	98	5	103	95.14563107
	Observation	63	48	48	15	63	76.19047619
	Other	40	42	40	2	42	95.23809524
	Totals	452	445				79.77359461

Video 21

		FREQUENCY					
		Observer A	Observer B	agrem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	0	0	0	0	0	0
	Organization	47	47	47	0	47	100
	Transition	4	4	4	0	4	100
	Direction	236	231	231	5	236	97.88135593
	Feedback	85	84	84	1	85	98.82352941
	Observation	58	58	58	0	58	100
	Other	48	47	47	1	48	97.91666667
	Totals	478	471				74.327694

Video 19

		FREQUENCY					
		Observer A	Observer B	agrem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	5	5	5	0	5	100
	Organization	67	65	65	2	67	97.01492537
	Transition	4	4	4	0	4	100
	Direction	204	201	201	3	204	98.52941176
	Feedback	74	74	74	0	74	100
	Observation	59	58	58	1	59	98.30508475
	Other	72	71	71	1	72	98.61111111
	Totals	485	478				86.55756662

**INTER-OBSERVER
AGREEMENT
OBSERVERS A-B**

**Video
27**

		FREQUENCY					
LEVEL		Observer A	Observer B	agrem.	disag.	agr. + disag.	% agreement
1	Presentation	0	0	0	0	0	0
	Instructions	1	1	1	0	1	100
	Organization	90	85	85	5	90	94.44444444
	Transition	1	1	1	0	1	100
	Direction	167	164	164	3	167	98.20359281
	Feedback	68	68	68	0	68	100
	Observation	100	102	100	2	102	98.03921569
	Other	58	57	57	1	58	98.27586207
	Totals	485	478				86.12038938

video 7

		FREQUENCY					
LEVEL		Observer A	Observer B	agrem.	disag.	agr. + disag.	% agreement
1	Presentation	0	0	0	0	0	0
	Instructions	1	1	1	0	1	100
	Organization	80	110	80	30	110	72.72727273
	Transition	3	5	3	2	5	60
	Direction	128	128	128	0	128	100
	Feedback	43	58	43	15	58	74.13793103
	Observation	41	32	32	9	41	78.04878049
	Other	102	106	102	4	106	96.22641509
	Totals	396	440				72.64254992

**Average
Inter-
Observer
Agreement** **79.88435891**

Table 13: Inter-observer agreement between A-B observers

**INTER-OBSERVER
AGREEMENT
OBSERVERS C-D**

Video 2

		FREQUENCY					
		Observer C	Observer D	agem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	2	2	2	0	2	100
	Organization	57	57	57	0	57	100
	Transition	1	1	1	0	1	100
	Direction	197	188	188	9	197	95.43147208
	Feedback	86	81	81	5	86	94.18604651
	Observation	112	107	107	5	112	95.53571429
	Other	89	91	89	2	91	97.8021978
	Totals	544	527				85.36942884

Video 6

		FREQUENCY					
		Observer C	Observer D	agem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	2	2	2	0	2	100
	Organization	50	50	50	0	50	100
	Transition	0	0	0	0	0	0
	Direction	225	223	223	2	225	99.11111111
	Feedback	40	43	40	3	43	93.02325581
	Observation	233	235	233	2	235	99.14893617
	Other	159	163	159	4	163	97.54601227
	Totals	709	716				73.60366442

Video 16

		FREQUENCY					
		Observer C	Observer D	agem.	disag.	agr. + disag.	% agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	5	6	5	1	6	83.33333333
	Organization	71	76	71	5	76	93.42105263
	Transition	7	6	6	1	7	85.71428571
	Direction	264	259	259	5	264	98.10606061
	Feedback	120	120	120	0	120	100
	Observation	100	91	91	9	100	91
	Other	86	88	86	2	88	97.72727273
	Totals	653	646				81.16275063

**INTER-OBSERVER
AGREEMENT
OBSERVERS C-D**

**Video
12**

		FREQUENCY					%
		Observer C	Observer D	agem.	disag.	agr. + disag.	agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	9	8	8	1	9	88.88888889
	Organization	71	80	71	9	80	88.75
	Transition	3	4	3	1	4	75
	Direction	401	375	375	26	401	93.51620948
	Feedback	48	64	60	16	76	78.94736842
	Observation	53	64	53	11	64	82.8125
	Other	35	40	35	5	40	87.5
	Totals	620	635				74.42687085

video 8

		FREQUENCY					%
		Observer C	Observer D	agem.	disag.	agr. + disag.	agreement
LEVEL							
1	Presentation	0	0	0	0	0	0
	Instructions	2	2	2	0	2	100
	Organization	66	62	62	4	66	93.93939394
	Transition	1	1	1	0	1	100
	Direction	388	381	381	7	388	98.19587629
	Feedback	95	82	82	13	95	86.31578947
	Observation	70	75	70	5	75	93.33333333
	Other	54	40	40	14	54	74.07407407
	Totals	676	643				80.73230839

**Average
Inter-
Observer
Agreement** **79.05900462**

Table 14: Inter-observer agreement between C-D observers

	Measure of Agreement Kappa	Number of valid Cases
Video 30	-.642	590
Video 27	.806	581
Video 29	.676	669
Video 15	.786	605
Video 31	.593	366
Video 35	.604	263
Video 36	.659	482
Video 37	.734	589
Video 27	.806	581
Video 2	.758	681

Table 15: Cohen's Kappa measures

6.2 First Study – ‘Qualified Teaching’ Question: Specialists vs. Non-specialist Teachers

6.2.1 Verbal Data

The analysis of verbal data was targeted to the communicative validation of the ST (Groeben, 1986; Hanke, 1991). The first research question: (1) “What are the differences/similarities between specialists and non-specialists teachers regarding STs?” was evaluated using Mann-Whitney U-test on verbal data. The analysis of this nonparametric test indicated that there was no significant ($p < .05$) difference between specialist and non-specialist teachers for any verbal category. In Table 16 were reported the results of the mean rank of each group, the U value and its significance level only for variables where a tendency to a difference was observed.

<i>Categories</i>		M rank	U	Exact Sig.[2*(1-tailed Sig.)]
Global Method	Specialists	29.71	72*	.087
	Non-specialists	20.50		
Global Method in PE	Specialists	29.71	72*	.078
	Non-specialists	20.50		
Verbal Instruction	Specialists	13.64	67.5*	.053
	Non-specialists	23.62		

* $p < .05$

Table 16: Results of Mann-Whitney U-test on verbal data, first study

$N = 43$. specialists $n = 7$, non-specialists $n = 36$.

The results of the descriptive statistic are presented in the following pages. In these figures, percentages refer to verbal data and indicate the rate of choices for each verbal category (see Figure 6 and Table 3 of the Thesis). The frequencies were converted to percentage values to make comparative statements. Given the possibility of giving multiple answers, the sum of all percentage values may be higher than 100%.

Although only a part of the results presented in this chapter reached statistical significance when submitted to inferential analysis, descriptive statistics and graphic representations are reported for all results. The reason of this extensive description is that the present study lies at the intersection point between qualitative and quantitative data analysis. Limiting the presentation of the results to those statistically significant would cause a loss of qualitative information inherent to this data set. However, the discussion is primarily focused on those results which resulted to be significant at the group level.

Both specialists and non-specialists from the analysis of verbal data identified that the major PE goal was the *educational function*. They did not recognize the possible differences in the meaning of doing sport, learning motor ability and learning through sport, but both groups accurately rated the importance of PE in education and in the complete development of children. Moreover, specialists identified the development of the *motor goal* with specific attention to *body formative function* as a second PE goal, together with the development of *general goals*, e.g. motor or social goals. Non-specialists identified the development of general *motor or social goals* as a second PE goal. The results for both groups are in Figures 6.2-1 and -2 (see Tables 6.2-1 and -2 of the Appendix).

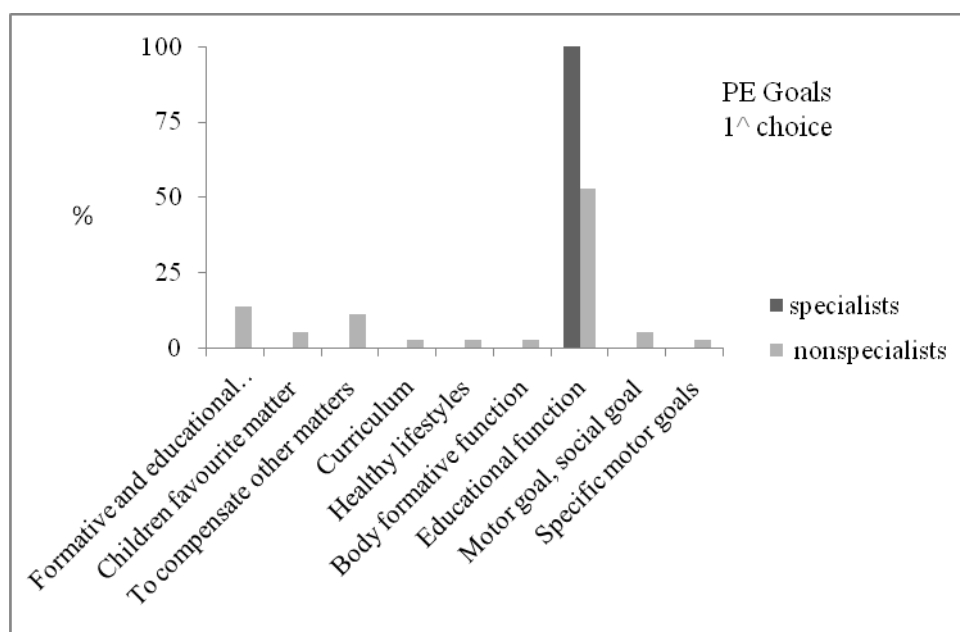


Figure 6.2-1 Verbal Data - First Study - PE Goals-first choice

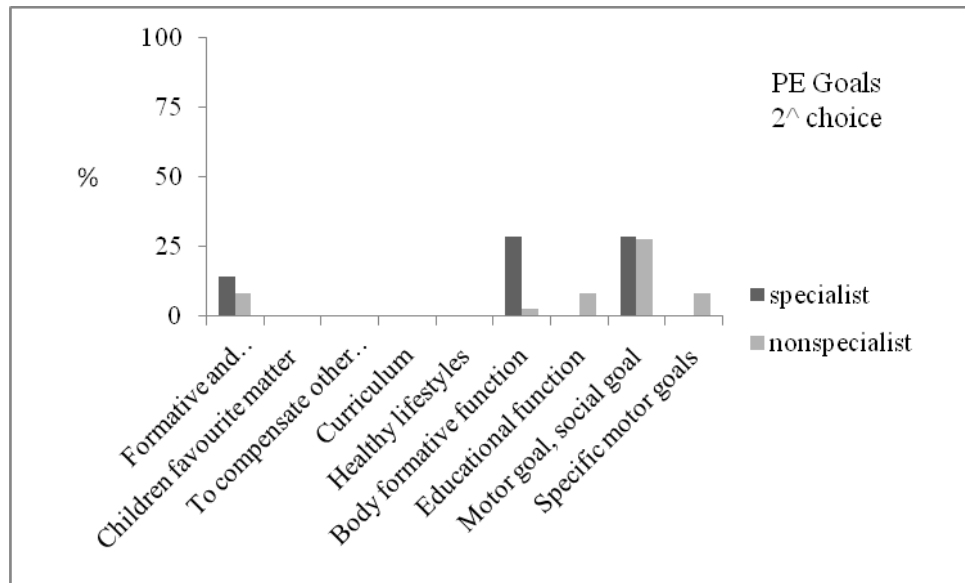


Figure 6.2-2 Verbal Data - First Study - PE Goals-second choice

The second SD question was: “What are the most important outcomes of a PE lesson that you teach?” Teacher described what she/he saw as being the most important *Individual objectives* (outcomes) of the PE didactics taught. Despite National Indications, published by the Italian Ministry of Education which identify the major goals for PE, every teacher had his own personal ideas about what effects the lesson should have on his/her students. Both groups rated *social dimension* (Figures 6.2-3 and -4, Tables 6.2-2 and -3 of the Appendix) and indicated that the average time spent in pursuing these objective was congruent with their choice (Figures 6.2-5 and -6).

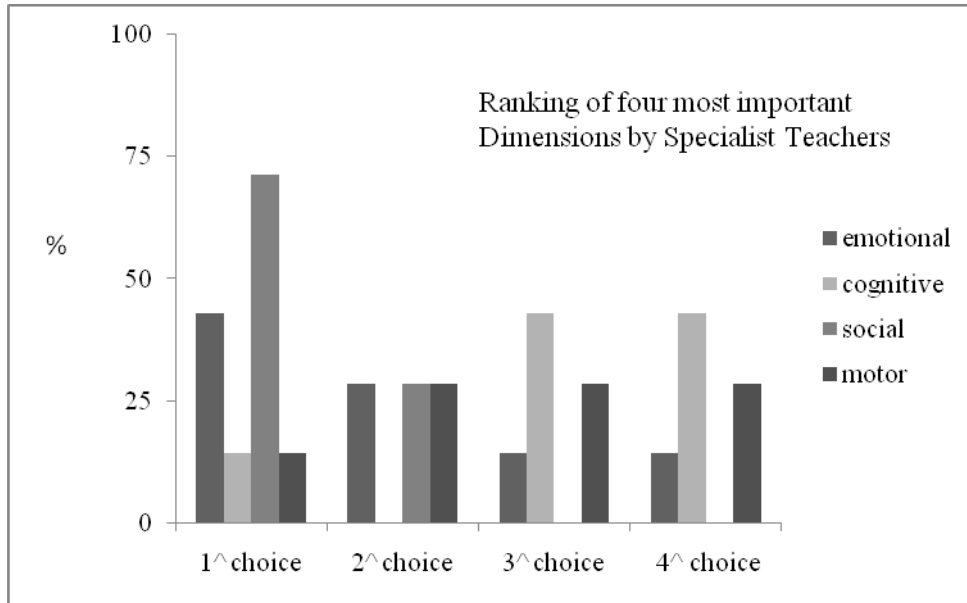


Figure 6.2-3 Verbal Data - First Study - Ranking of Four Most Important Dimensions in PE Didactics by Specialists

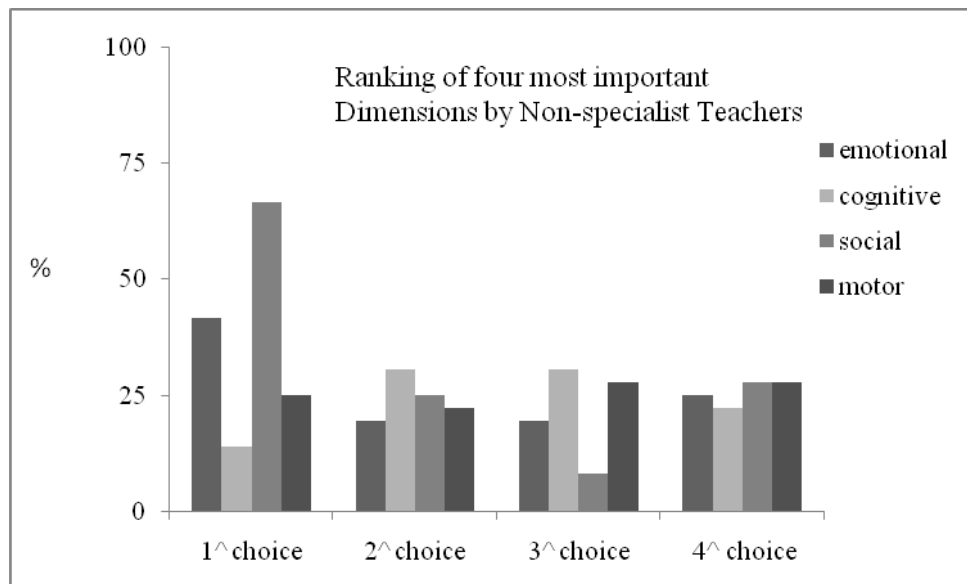


Figure 6.2-4 Verbal Data - First Study - Ranking of Four Most Important Dimensions in PE Didactics by Non-specialist Teachers

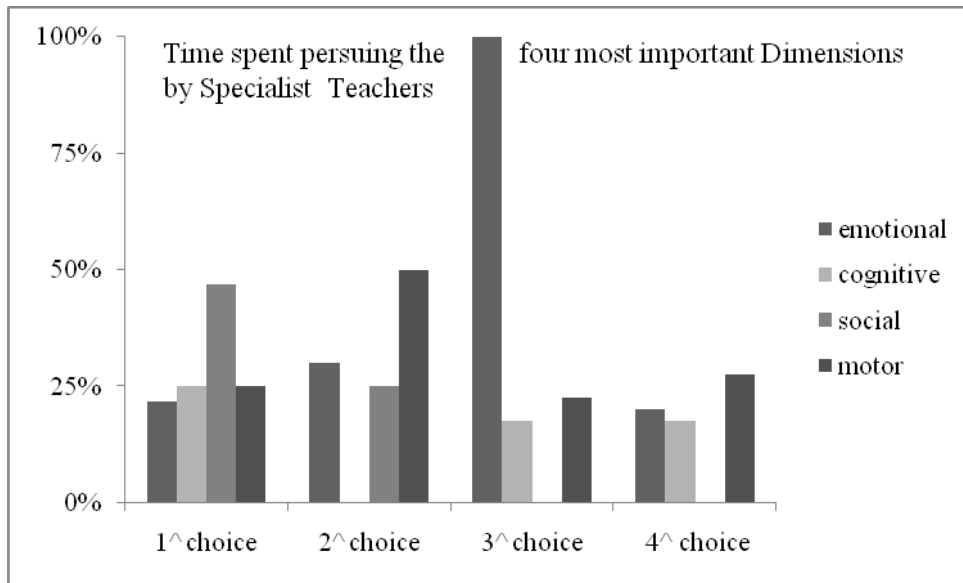


Figure 6.2-5 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics by Specialist Teachers

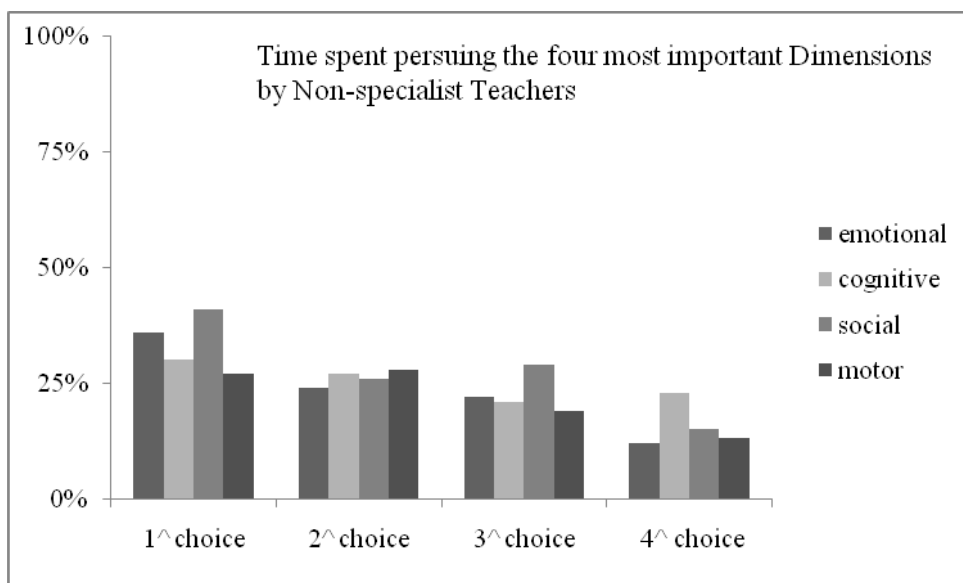


Figure 6.2-6 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics by Non-specialist Teachers

The ranking of the four most important dimensions in PE Didactics by both groups are different. Specialists rated the *emotional*, *social* and *motor* dimensions as second choice,

while non-specialists rated only the *cognitive dimensions* as second choice. *Motor development* was identified by non-specialists as the fourth option. The average percentage of time declared pursuing the four most important dimensions in PE didactics by specialist vs. non-specialist teachers is not congruent with their previous responses (Figures 6.2-3 and -4, -5, -6, and Tables 6.2-2 and -3 of the Appendix). Percentages of time spent pursuing *social* and *motor dimensions* were high for specialist teachers as second choice, while non-specialists declared distributing their time in equal measure for all dimensions. Specialists declared dedicating a high percentage of time to pursuing *emotional dimensions* as their third choice.

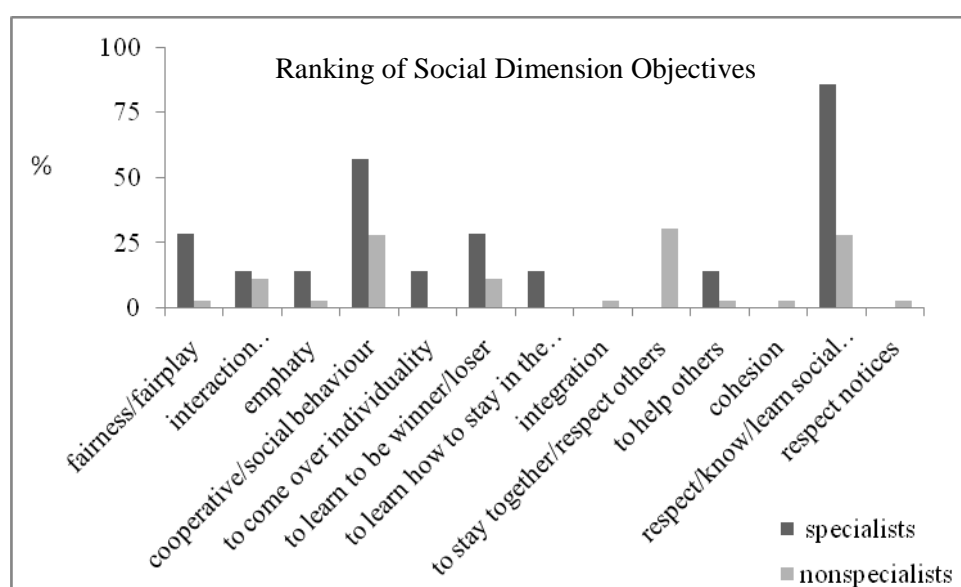


Figure 6.2-7 Verbal Data - First Study - Ranking of Social Dimension Objectives of PE Didactics by Specialist versus Non-specialist Teachers

Within the description of these social dimensions there were more differences than similarities among specialists and non-specialist. Specialist teachers identified the most important objective inside social dimension as *to respect, know, and learn social rules*. Whereas non-specialist teachers mentioned the category: “*to be together, to respect others*” most frequently. The last answer was congruent with the declared average time spent by non-specialist pursuing these objectives. Specialist teachers used their time to pursue *cooperative and social behaviour* (Figures 6.2-7 and -8, Tables 6.2-4 and -5 of the

Appendix).

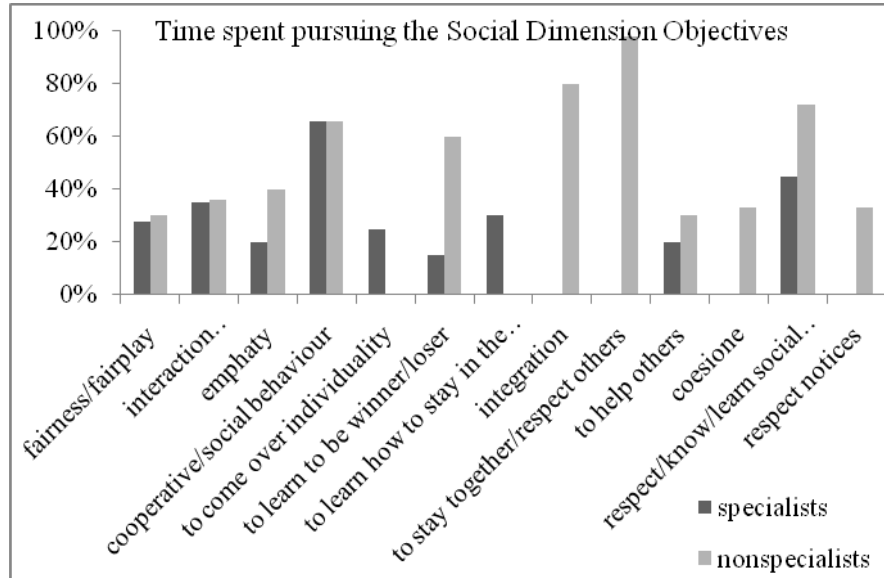


Figure 6.2-8 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Social Dimension Objectives in PE Didactics by Specialist versus Non-specialist Teachers

Within the description of these *emotional dimensions* there were more differences than similarities among specialists and non-specialist. Specialist teachers stated that the most important objective inside the emotional dimension is *to love/appreciate motor activities*. Whereas for non-specialist teachers the category: “*to develop self-esteem*” was mentioned most frequently (Figures 6.2-9 and -10, and Tables 6.2-6 and -7 of the Appendix).

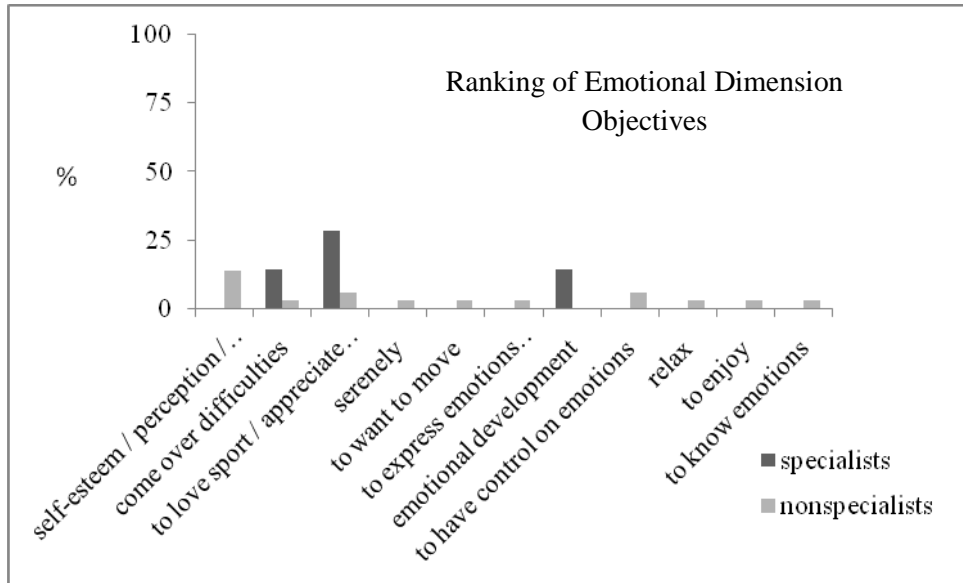


Figure 6.2-9 Verbal Data - First Study - Ranking of Emotional Dimension Objectives of PE Didactics by Specialist versus Non-specialist Teachers

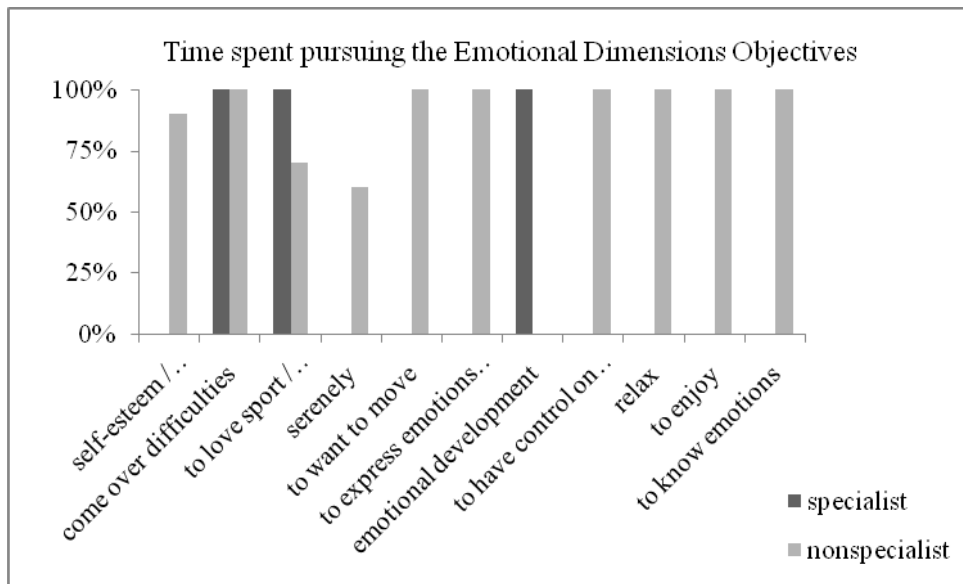


Figure 6.2-10 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Emotional Dimension Objectives in PE Didactics by Specialist versus Non-specialist Teachers

Within the description of these *cognitive dimensions* specialists and non-specialist stated

that the most important objective is to *learn rules, tactics* (Figures 6.2-11 and -12, and Tables 6.2-8 and -9 of the Appendix).

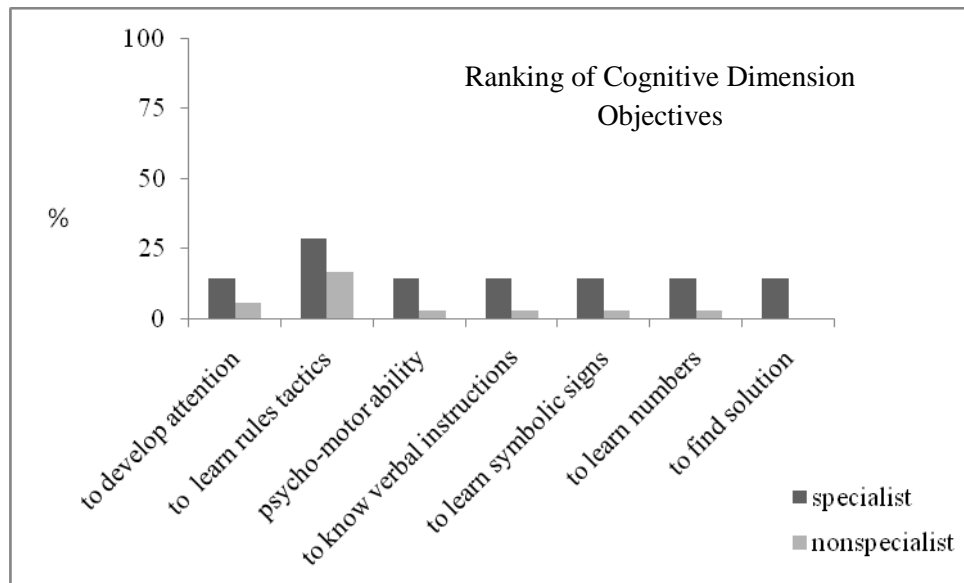


Figure 6.2-11 Verbal Data - First Study - Ranking of Cognitive Dimension Objectives of PE Didactics by Specialist versus Non-specialist Teachers

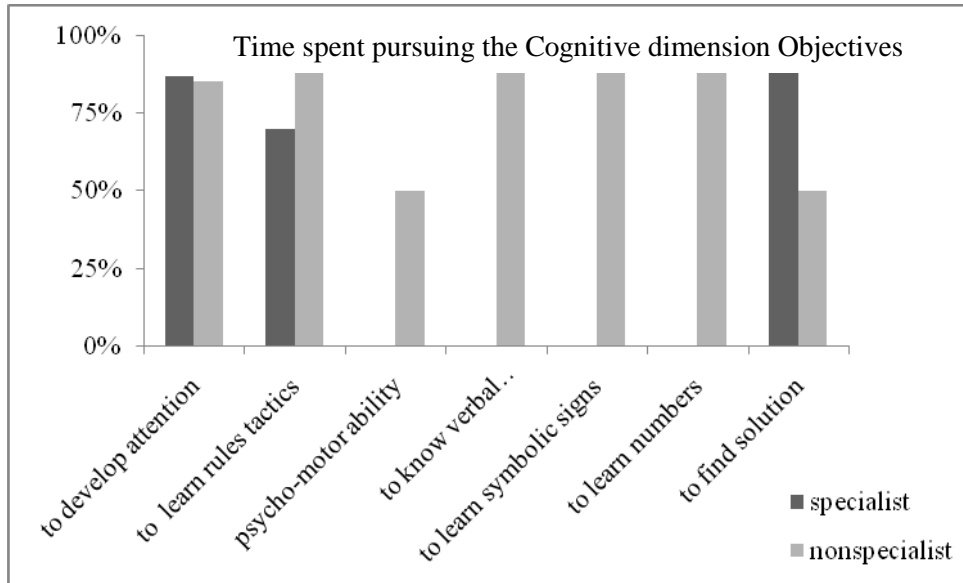


Figure 6.2-12 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Cognitive Dimension Objectives in PE Didactics by Specialist versus Non-specialist Teachers

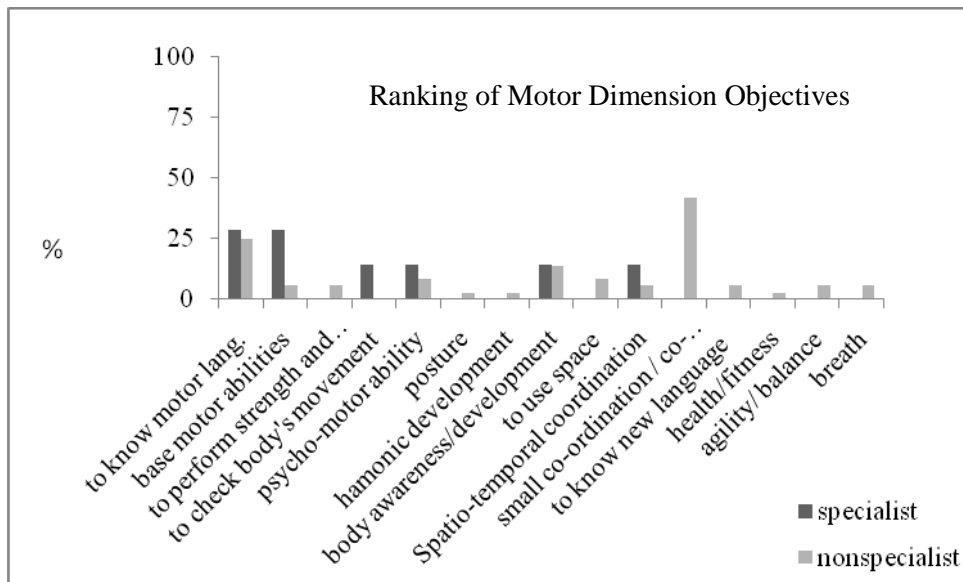


Figure 6.2-13 Verbal Data - First Study - Ranking of Motor Dimension Objectives of PE Didactics by Specialist versus Non-specialist Teachers

Within the description of these *motor dimensions* specialist teachers identified that the most important objective is *to know motor language and basic motor abilities*. In contrast, the non-specialist teachers identified the category: *to develop small co-ordination and to know motor language* with major frequency (Figures 6.2-13 and -14, and Tables 6.2-10 and -11 of the Appendix).

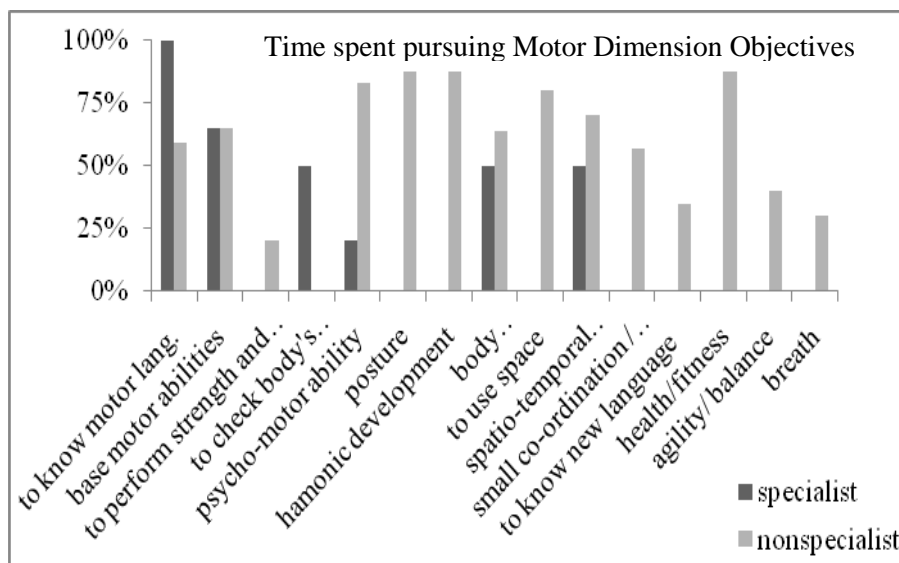


Figure 6.2-14 Verbal Data - First Study - Average Percentage of Time Spent Pursuing the Motor Dimensions Objectives in PE Didactics by Specialist versus Non-specialist Teachers

Frequency of lesson contents linked to social dimensions used during PE lessons by specialist versus non-specialist teachers focused for both groups on *team sport*. Also, both groups used congruent examples. The results are provided in Figure 6.2-15 and Table 6.2-12.

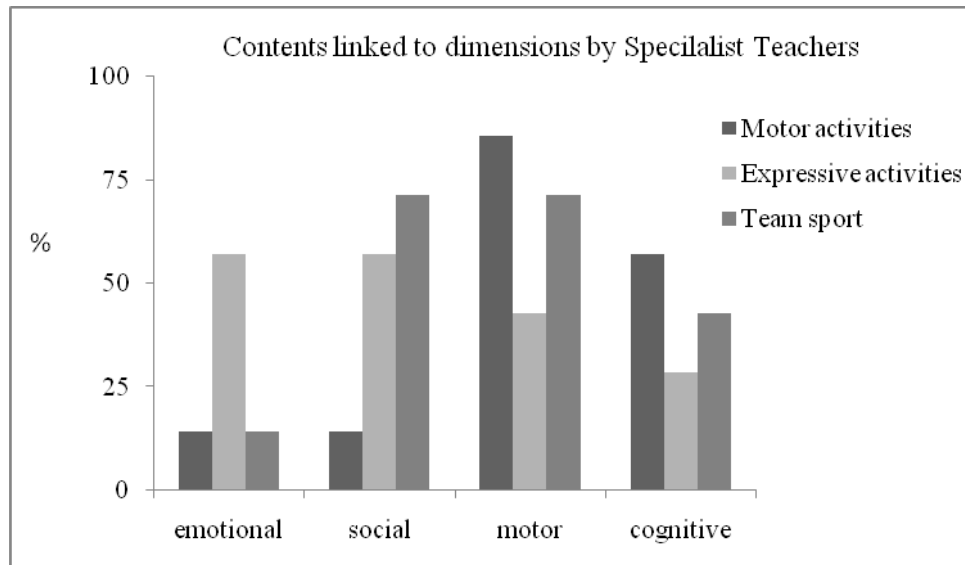


Figure 6.2-15 Verbal Data - First Study - Percentage of Lessons Contents Linked to Emotional, Social, Motor, Cognitive Dimensions by Specialist Teachers

Non-specialist teachers showed lower knowledge about teaching methodologies both in other subjects and in PE, but both groups preferred to use a *prescriptive method* in PE. The results for both groups are in Figures 6.2-16 and -17 and Table 6.2-13 of the Appendix.

At the beginning of this Chapter the results of a Mann-Whitney U-test were reported. A tendency to a significant level of difference between the two groups in the declared use of global method in general and in PE was observed. The use of this method was higher for specialist teachers both in general and in PE in respect to non-specialist teachers.

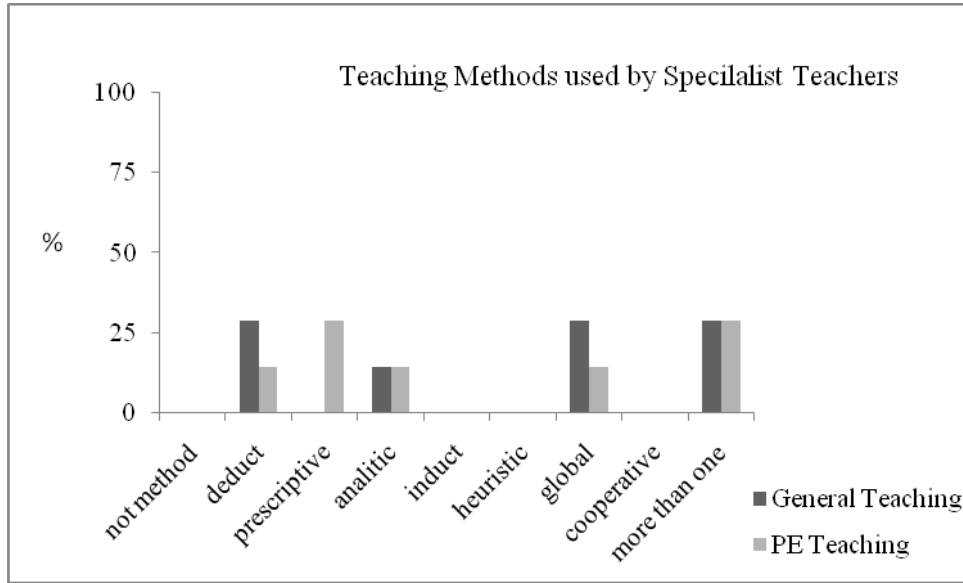


Figure 6.2-16 Verbal Data - First Study - Percentage of Teaching Methods used in General and in PE Lessons by Specialist Teachers

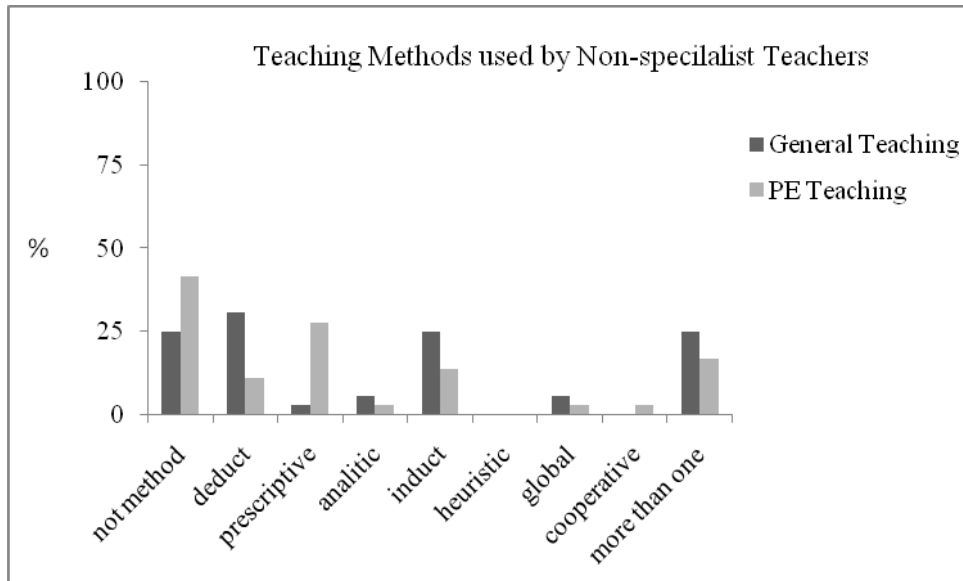


Figure 6.2-17 Verbal Data - First Study - Percentage of Teaching Methods used in General and in PE Lessons by Non-specialist Teachers

Regarding instructions, demonstrations and feedback the teachers were asked: “Which channels of communication do you prefer to use (verbal, verbal-visual, verbal-tactile, verbal-auditory, and audiovisual)?” and “How do you normally correct your students? Do

you make corrections to all the class, to small groups, to individuals or based on the situation? Which channels of communication do you prefer to use when you make corrections (verbal, verbal-visual, verbal-tactile, verbal-auditory)?”

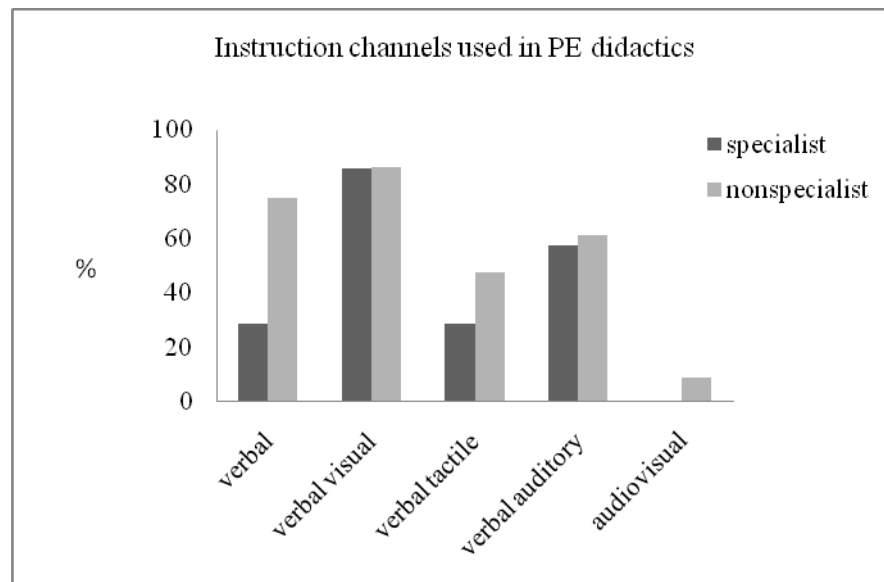


Figure 6.2-18 Verbal Data - First Study - Percentage of Instruction Channels Used in PE Didactics by Specialist versus Non-specialist Teachers

Specialist teachers preferred to give instructions by *verbal-visual channel*, non-specialist declared to use both the *verbal* and *verbal-visual channels* (Figure 6.2-18 and Table 6.2-14). The use of the *verbal channel* to give instructions showed a tendency to a significant result of the Mann-Whitney U-test. A difference in the declared use of a verbal channel when giving instructions was observed between the two groups. Non-specialist teachers preferred to use this method to give instructions, more often than specialist teachers.

The *verbal-visual feedback channel* rated by specialists was significantly higher than that of other channels, while non-specialist teachers preferred to use the *verbal feedback channel* (Figure 6.2-19 and Table 6.2-15).

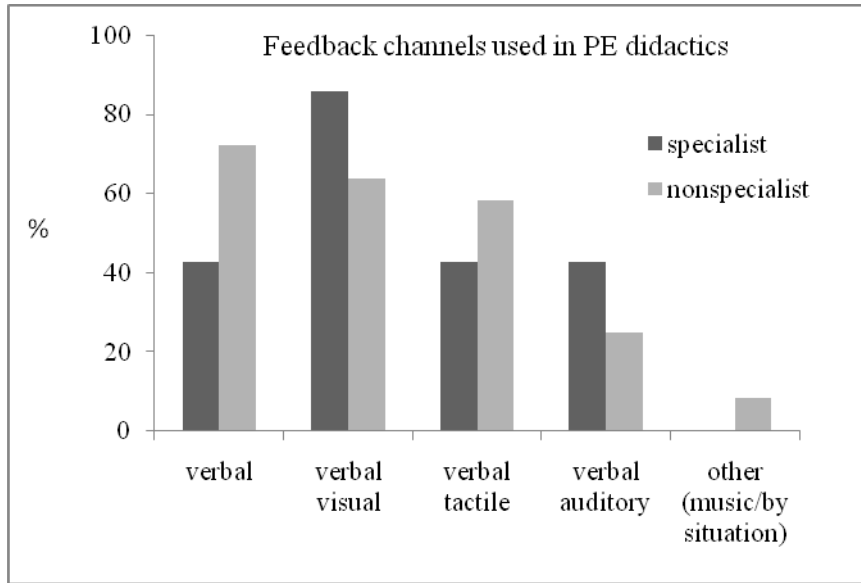


Figure 6.2-19 Verbal Data - First Study - Percentage of Feedback Channels Used in PE Didactics by Specialist versus Non-specialist Teachers

The percentages of *correction groups* (on all students, small groups, single, or based on the situation) used in PE didactics by specialists versus non-specialist teachers were similar (Figure 6.2-20 and Table 6.2-16).

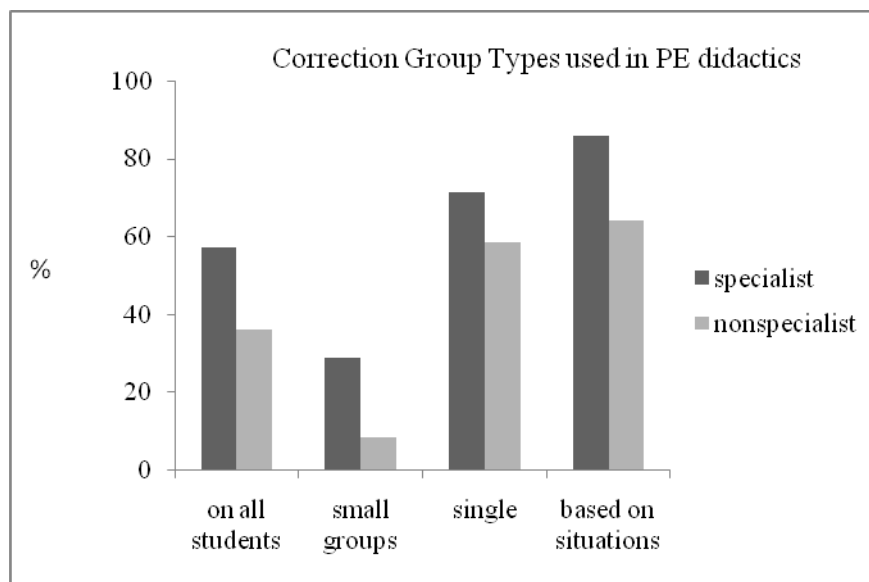


Figure 6.2-20 Verbal Data - First Study - Percentage of Correction Group Types Used in PE Didactics by Specialist versus Non-specialist Teachers

Both groups based their corrections *on the situation* and *on a single student*. Both groups did not normally use *didactic equipment* in PE Lessons (Figure 6.2-21 and Table 6.2-17 of the Appendix).

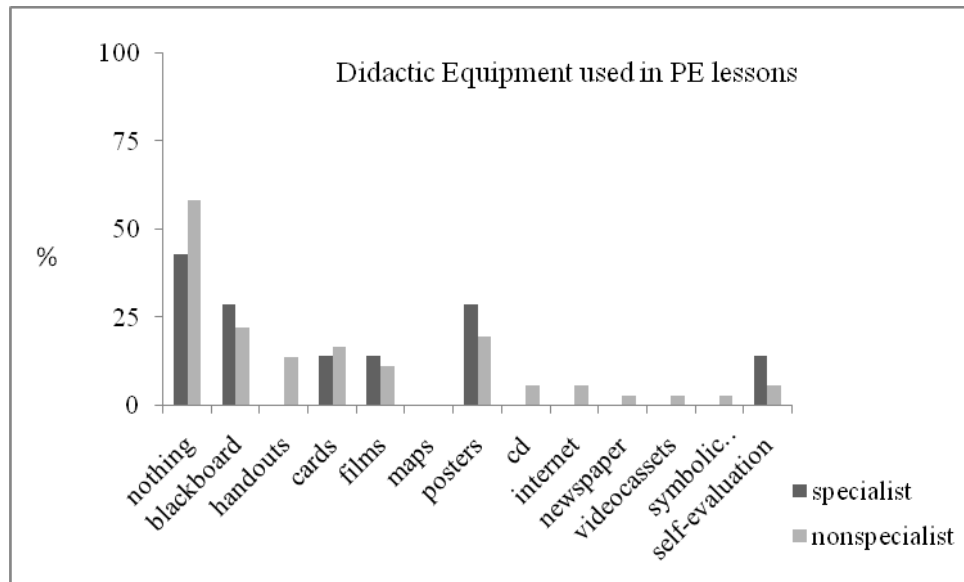


Figure 6.2-21 Verbal Data - First Study - Percentage of Didactic Equipment Used in PE Lessons by Specialist versus Non-specialist Teachers

When teachers described motivation factors related to the use of didactic support equipment, specialists depended on the *method*, while non-specialists depended on *lesson content* (Figure 6.2-22 and Table 6.2-18).

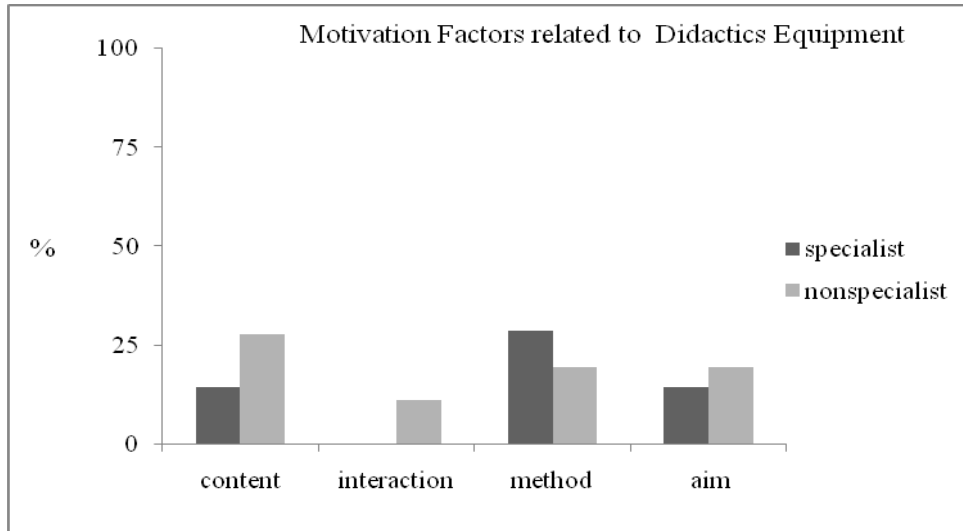


Figure 6.2-22 Verbal Data - First Study - Percentage of Motivation Factors Related to Didactics Equipment Used in PE by Specialist versus Non-specialist Teachers

During PE lessons teachers had to manage specific tasks linked to the spatial and temporal conditions of the gym. Specialist teachers used more *rules* than non-specialists and for both groups *other systems* represented a good strategy to manage student organization (Figure 6.2-24 and Table 6.2-20 of the Appendix).

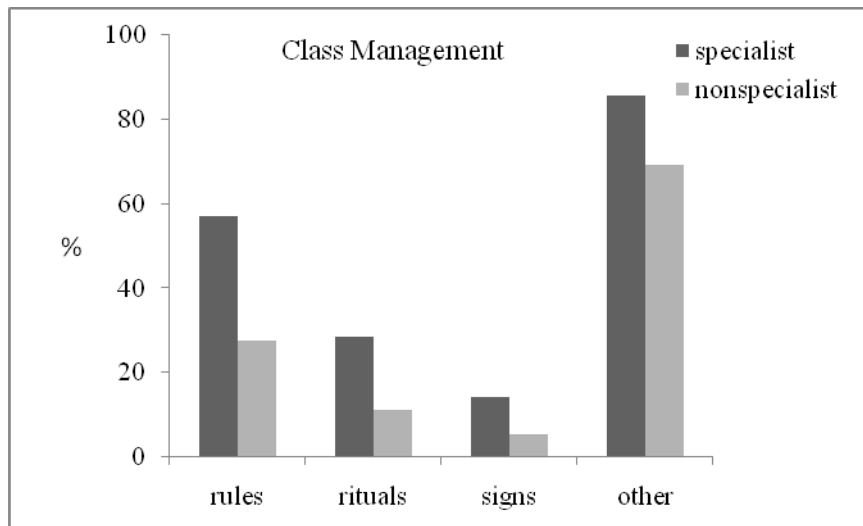


Figure 6.2-24 Verbal Data - First Study - Percentage of Class Management Used in PE Didactics by Specialist versus Non-specialist Teachers

Inside *other strategies* specialist teachers managed students using good environment organization, eye contact, proposing interesting work, not stopping during lessons; while non-specialist teachers managed students using a whistle, working in small groups and by threatening them (Figure 6.2-25 and Table 6.2-21).

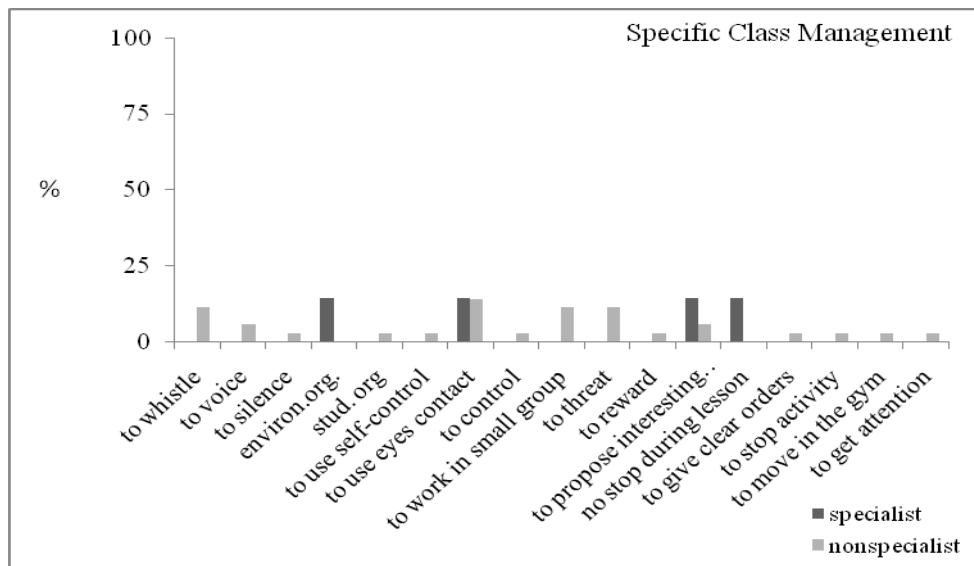


Figure 6.2-25 Verbal Data - First Study - Percentage of Specific Class Management Used in PE Didactics by Specialist versus Non-specialist Teachers

Moreover, when teachers had to cope with specific social interaction they organized *work* in *groups*, in *couples*, with a *single student* or in *other interaction*, i.e. in *small groups*. Both specialist and non-specialist teachers favoured student organization in big groups. Also for specialist teachers *work in couples* was among their favourite system and they used *single work* less; while non-specialist teachers coped with all social interaction (in *couples*, with a *single student* or in *small groups*). The results for both groups are shown in Figure 6.2-23 and Table 6.2-19.

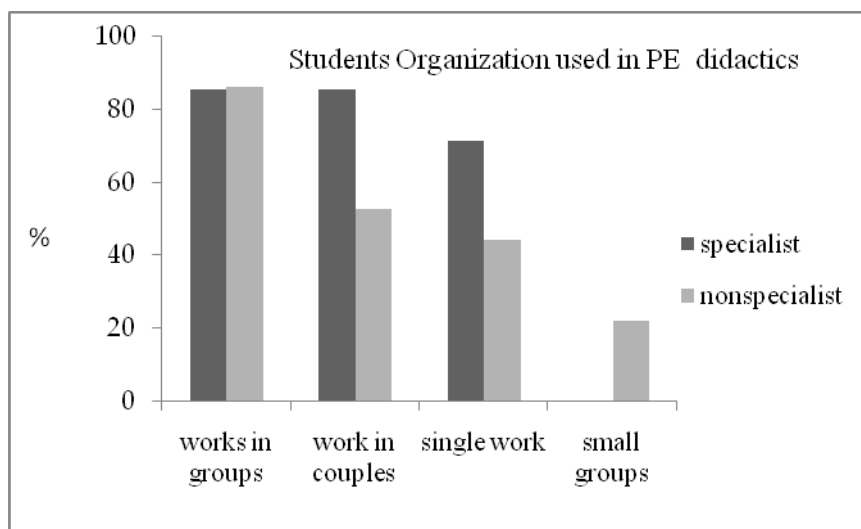


Figure 6.2-23 Verbal Data - First Study - Percentage of Students Organization Used in PE Didactics by Specialist versus Non-specialist Teachers

When specialist and non-specialist teachers answered SD question number 8 “What are your *teaching styles*?” both groups declared they used reproductive styles. The Mosston’s spectrum of teaching styles (Mosston & Ashworth, 2002) was not utilized because this kind of “classification” was not recognized by Italian primary school teachers. Teachers’ answers are showed in Figure 6.2-26 and Table 6.2-22 of the Appendix and were transformed in four categories: a) she/he did not know teaching styles; b) she/he knew productive styles; c) she/he knew reproductive styles; d) she /he declared to use all the range. The results for both groups are showed in Table 6.2-23 of the Appendix.

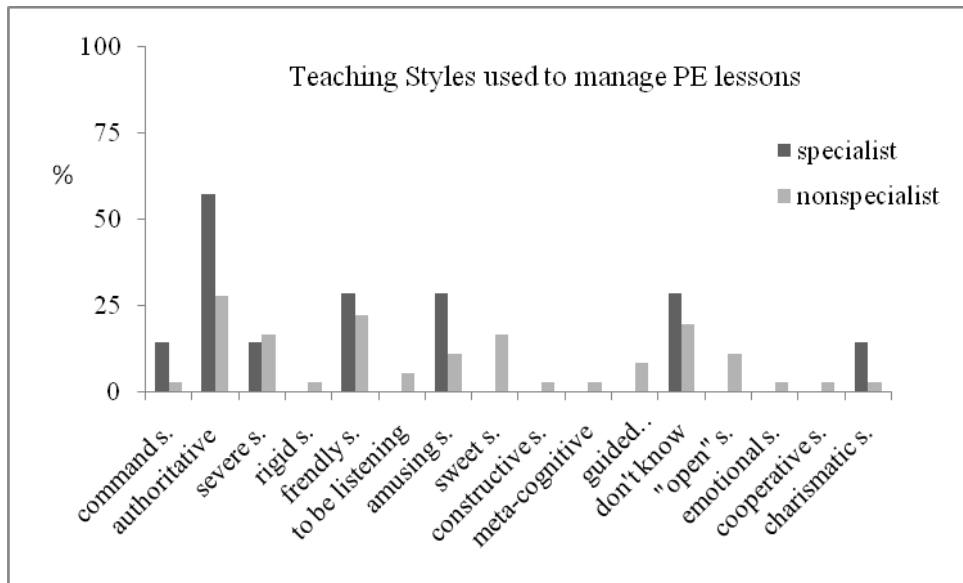


Figure 6.2-26 Verbal Data - First Study - Percentage of Teaching Styles Used to Manage Lessons by Specialist versus Non-specialist Teachers

The percentage of *lesson effectiveness assessed* by specialist versus non-specialist teachers was, for both groups, based on student involvement. Both described assessing mainly *motor* and *social child skills*, and both groups assessed those aspects because they believed that these skills were the most effective. The Instrument used to assess *student performance in PE lessons* by specialists versus non-specialists was “observation”, based on *individual progress*. The results for both groups are presented by Figures 6.2-29, 30, 31, 32 and -33 and from Table 6.2-24 to 6.2-29.

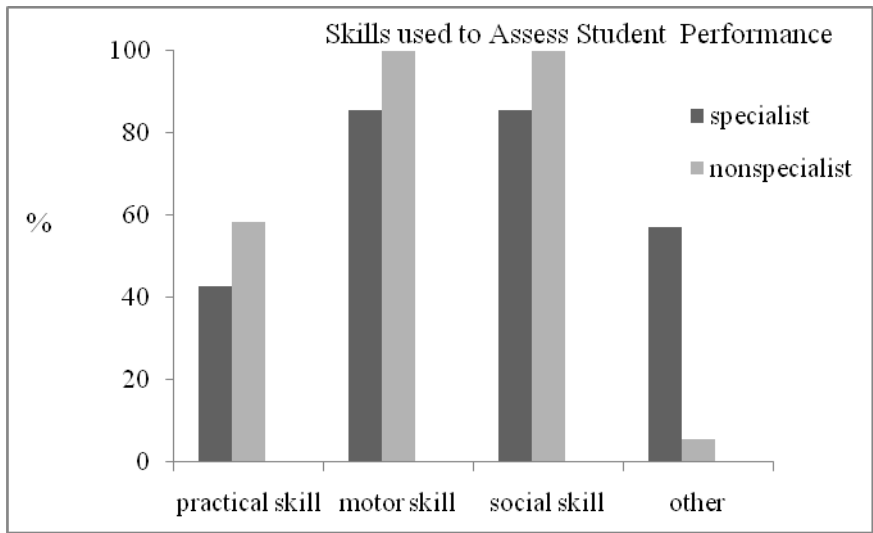


Figure 6.2-29 Verbal Data - First Study – Percentage of Skills Used to Assess Student Performance in PE Lessons by Specialist versus Non-specialist Teachers

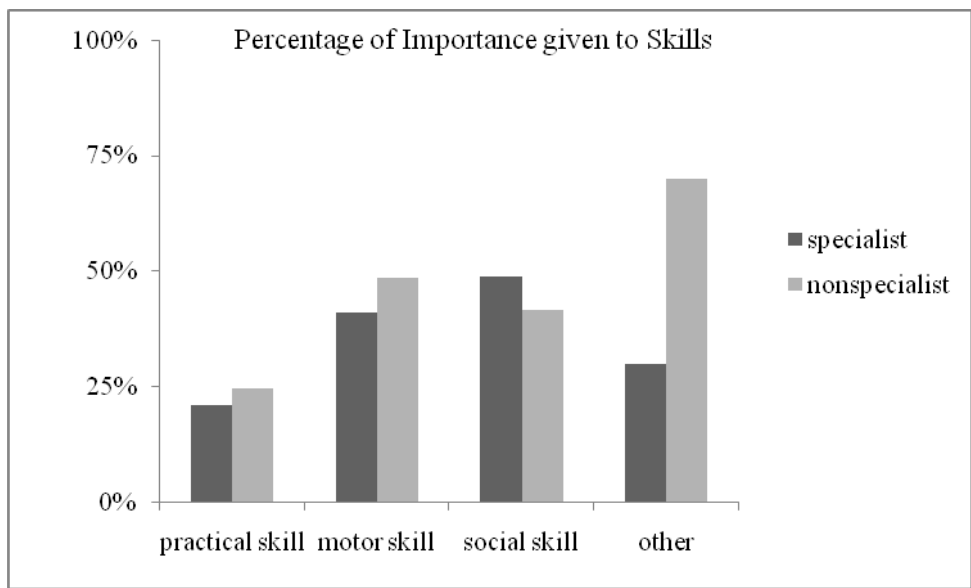


Figure 6.2-30 Verbal Data - First Study - Percentage of Importance Given to Skills Chosen in PE Lessons by Specialist versus Non-specialist Teachers

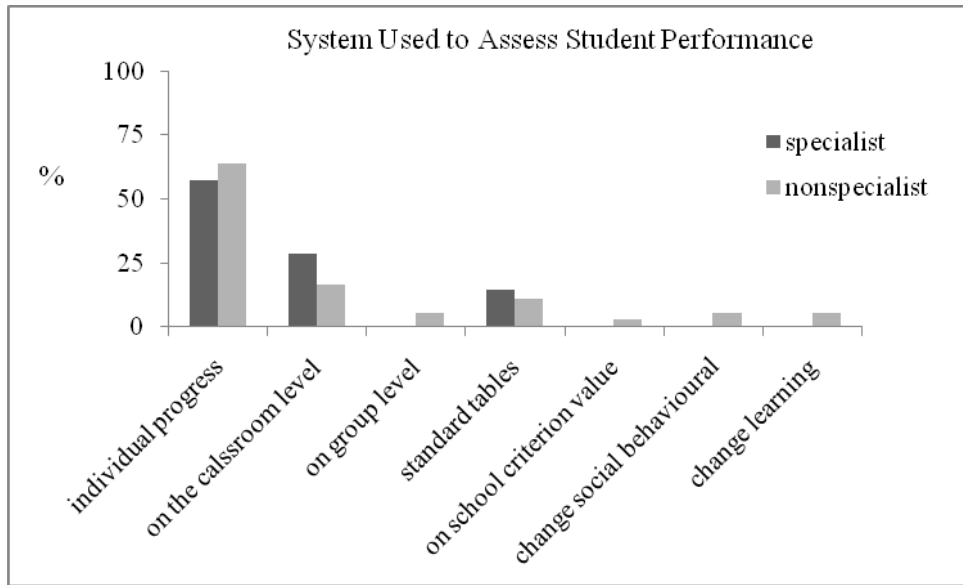


Figure 6.2-31 Verbal Data - First Study - Percentage of System Used to Assess Student Performance in PE Lessons by Specialist versus Non-specialist Teachers

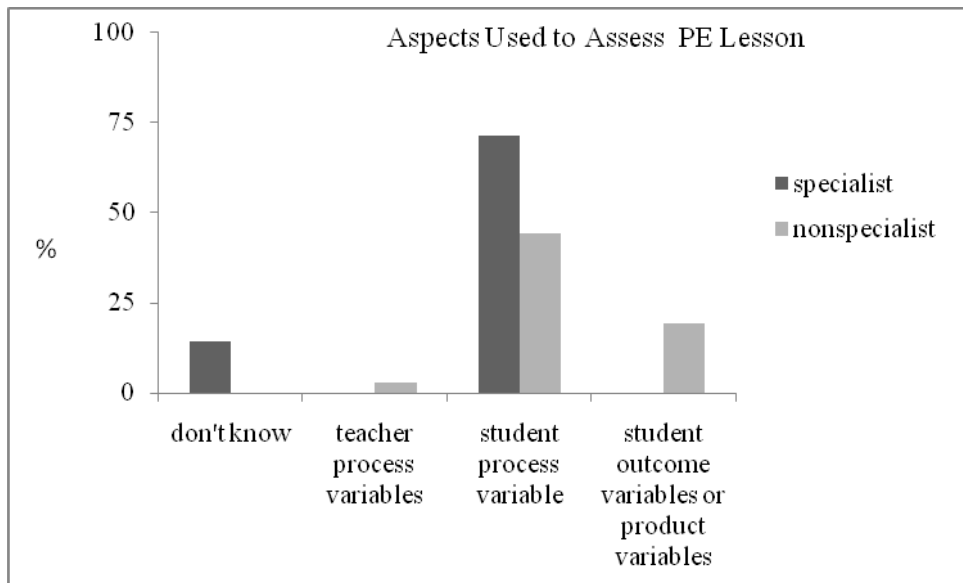


Figure 6.2-32 Verbal Data - First Study - Percentage of Aspects used to Assess PE Lessons by Specialist versus Non-specialist Teachers

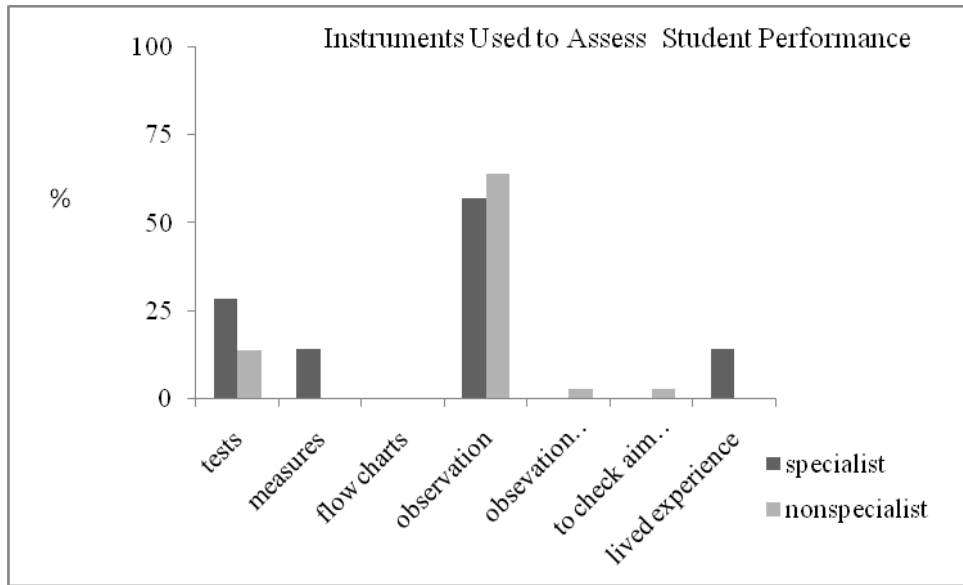


Figure 6.2-33 Verbal Data - First Study - Percentage of Instruments Used to Assess Student Performance in PE Lessons by Specialist versus Non-specialist Teachers

6.2.2 Video Data

The analysis of video data was targeted to the explanatory validation of the ST (Groeben, 1986; Hanke, 1991). Data from the observers' perspective was taken into account for the empirical testing of the ST superstructure. In the first level of observation results indicated that there were more similarities than differences in behaviour among specialists and non-specialists. The different/similar behaviour exhibited by the two groups of teachers was examined using a two-sample independent t-test for each of the *video categories* (see Figure 6 of the Thesis). The means and standard deviations of the two groups and the results of the t-test for Equality of means and of the Levene's Test for Equality of Variances are showed in Table 17 for variables where a difference ($p = .05$) were observed.

Level of observa tion	Categories	Levene's Test for Equality of Variances		M (DS)	t-test for Equality of Means		Sig. (2- tailed)
		F	Sig.		t	df	
I	Feedback non- specialist	.090	.765	12.29% (0.062)	2.315	41	.026
	Feedback specialist			18.41% (0.073)			
III	Feedback verbal non-specialist	.393	.534	11.81% (0.060)	2.377	41	.022
	Feedback verbal specialist			17.94% (0.077)			
IV	Feedback on skill non- specialist	4.956	.032	6.96% (0.052)	2.578	41	.014
	Feedback on skill specialist			13.33% (0.093)			

p < .05

Table 17: Independent samples test on video data, first study

$N = 43$. specialists $n = 7$, non-specialists $n = 36$.

The results of the descriptive statistics for each video category are provided from Figure 6.2-34 to 6.2.4-45 and in Table 8 of the Appendix. In this Table the percentages refer to video data and indicate the mean values of the percentage of time spent on teachers' behaviour.

The average time dedicated in PE lessons by Specialists and Non-specialists teachers to main behaviour categories was calculated and is reported in the following figure. In the first level of observation specialists and non-specialists teachers dedicated 44% of the PE lessons to giving *direction* and 11% to organization. The time dedicated to *observation* was

represented by 17.5% for specialists and 21.8% for non-specialists. For 18.41% of the lesson time specialist teachers gave *feedback*, while non-specialists gave feedback during the lessons for 12.29% of time. See Figure 6.2-34 and Table 8 of the Appendix.

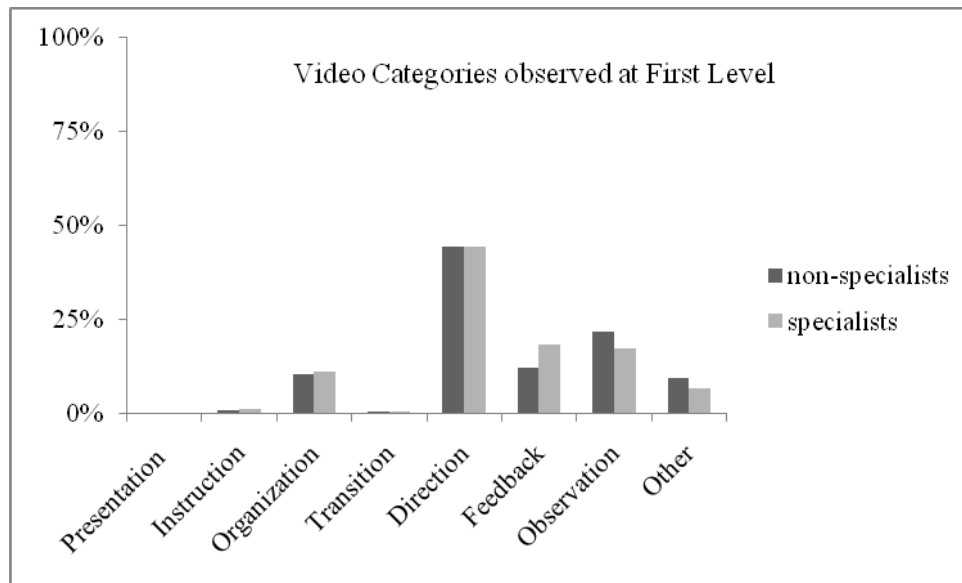


Figure 6.2-34 First Level of Observation – Video Categories

In the second level of observation, both groups dedicated more time to giving *instructions* on *motor activities*, than to other areas (on motor expressive activities or games). See Figure 6.2-35 and Table 8 of the Appendix.

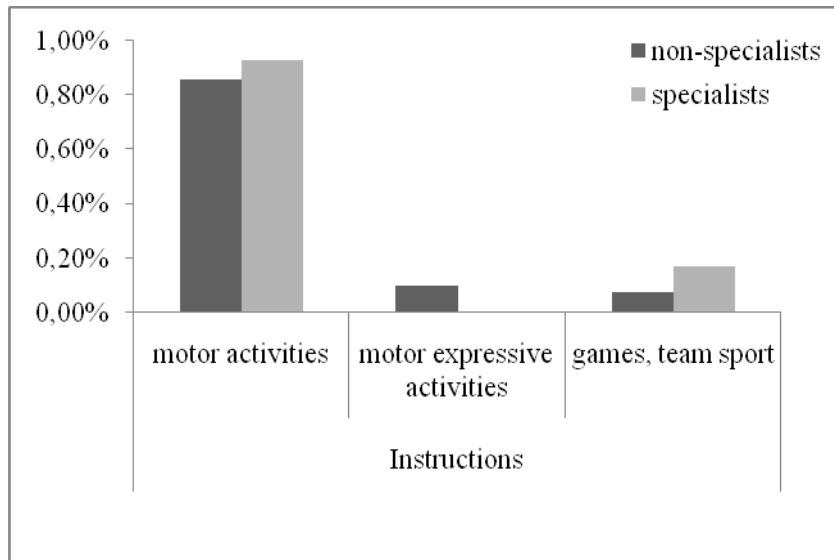


Figure 6.2-35 Second Level of Observation – Instructions – Video Categories

In the first level of observation specialists dedicated 11% of their time *to organizing* the lessons, while non-specialists used 10.43%. In the second level of observation time dedicated to organization was utilized by both groups to *organize work for students* and to *organize the environment*. Respectively for specialist and non-specialist teachers the *organization of students* was 37.7% and 44.6%; while 48.01% and 53.02% of the time was used for the *organization of the environment*. See Figure 6.2-36 and Table 8 of the Appendix.

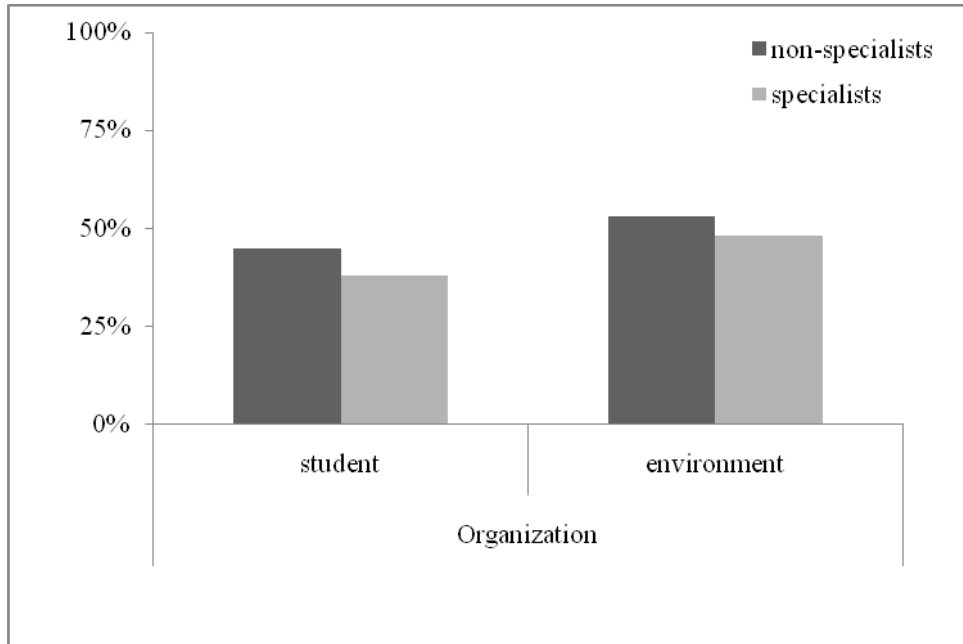


Figure 6.2-36 Second Level of Observation – Organization of the students and of the environment – Video Categories

Both groups presented *directions* preferably by means of the *verbal channel* (Figure 6.2-37 and Table 8 of the Appendix).

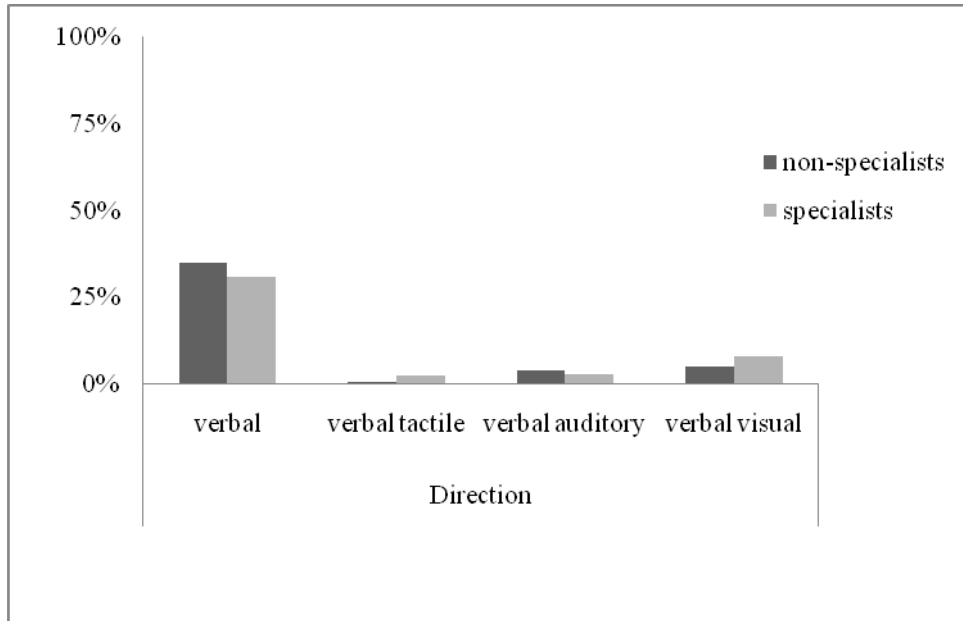


Figure 6.2-37 Second Level of Observation – Direction Channels – Video Categories

Specialist teachers gave *feedback* mainly to *individuals* (10.79%). Both groups gave *feedback* to the *class* as their second most frequent choice (7.23% for specialists vs. 4.97% for non-specialists). See Figure 6.2-38 and Table 8 of the Appendix.

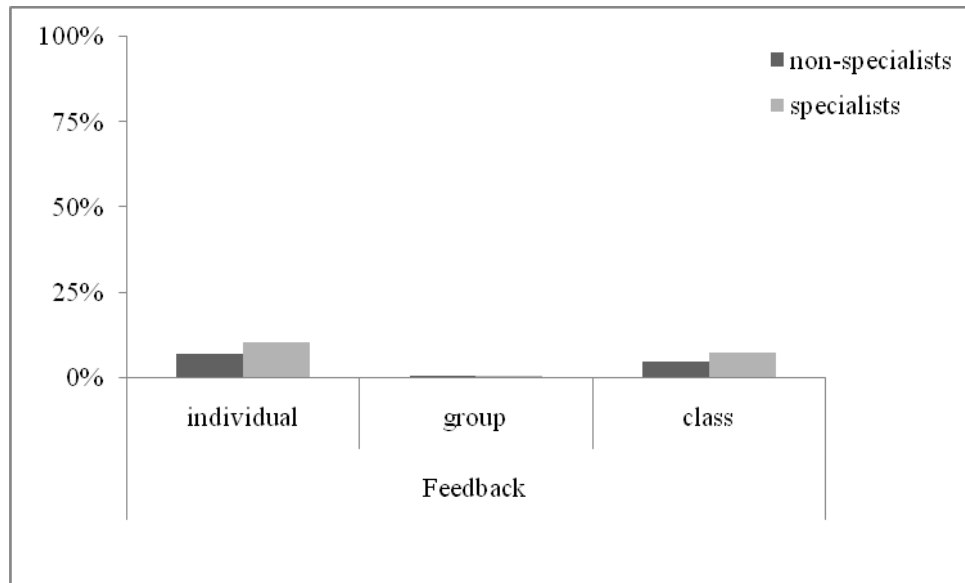


Figure 6.2-38 Second Level of Observation – Feedback Direction – Video Categories

When organizing students both groups dedicated more time to *single work* (37.43% for specialists vs. 42.50% for non specialists) and to *two teams* (22.26% for specialists vs. 35.66% for non-specialists). Working *in groups* was the most frequent third choice for the specialist teachers (17.01%), while non-specialists teachers preferred both organizations *in groups* (10.57%) and *in couples* (11.36%) as third choice. Attention to the use of *mixed gender couples* for student organization (0.89%) was a small prerogative only for specialist teachers. See Figure 6.2-39 and Table 8 of the Appendix.

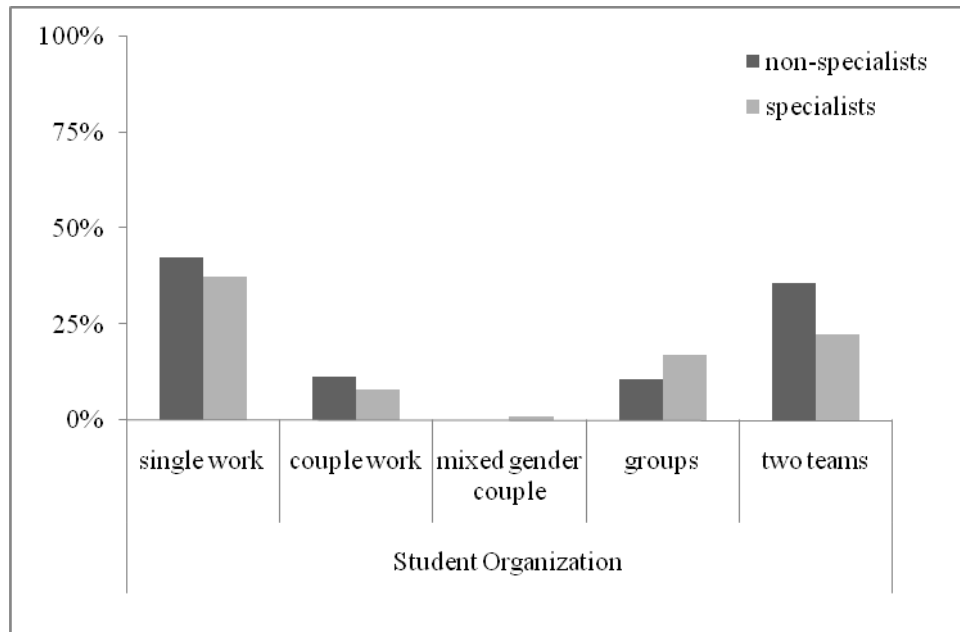


Figure 6.2-39 Third Level of Observation – Student Organization – Video Categories

Doing the third level, in the *organization of environment* both groups of teachers *worked with and without the students' help*. The time dedicated to organize environment by specialists (48.01%) was divided into 38.47% of the time where teachers worked alone, 35.53% where teachers asked the students to help and 11.62% where they delegated organization completely to their students. The time dedicated to organize the environment by non-specialists (53.02%) was divided into 40.94% of time where teachers worked alone, 36.42% where teachers asked the students to help and 14.26% where they delegated organization completely to their students. See Figure 6.2-40 and Table 8 of the Appendix.

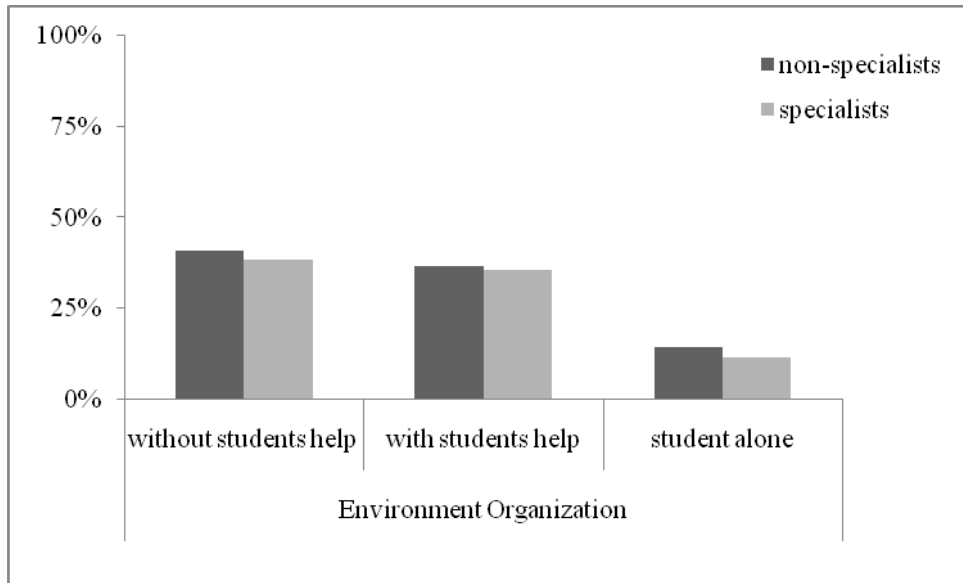


Figure 6.2-40 Third Level of Observation – Environment Organization – Video Categories

Both groups preferred to demonstrate (83.51% for specialists vs. 79.11% for non-specialists) rather than to ask students to demonstrate (16.49% for specialists vs. 12.55% for non-specialists). See Figure 6.2-41 and Table 8 of the Appendix.

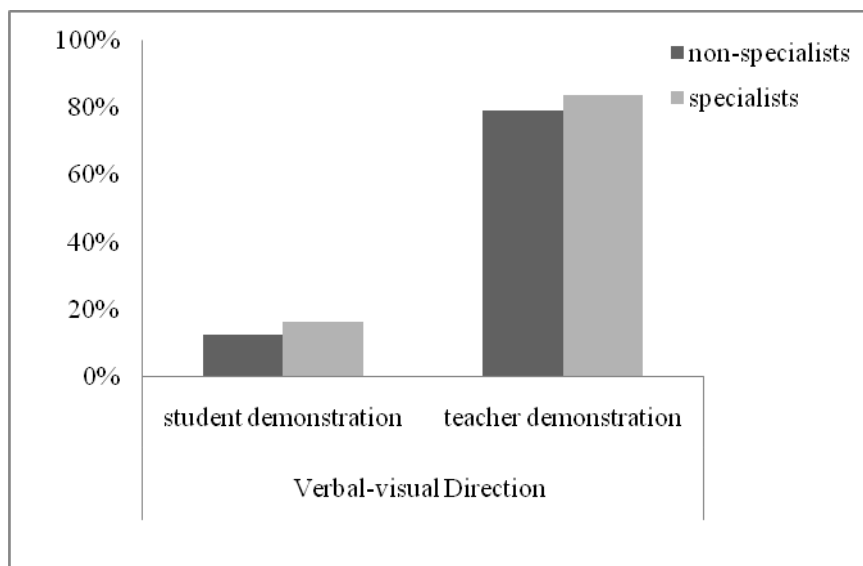


Figure 6.2-41 Third Level of Observation – Verbal Visual Direction – Video Categories

Both groups preferred to use the *verbal channel* (17.49% for specialists vs. 11.81% for non-specialists) to give feedback. See Figure 6.2-42 and Table 8 of the Appendix.

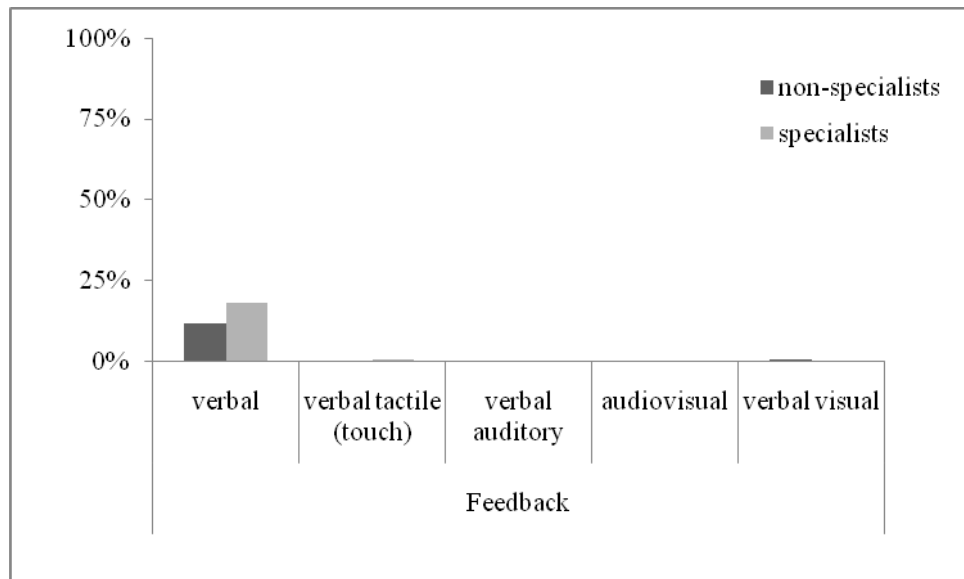


Figure 6.2-42 Third Level of Observation – Feedback Channels – Video Categories

In the fourth level, in the *organization of environment* both groups of teachers dedicated the time to taking and placing small tools (75.23% for specialists vs. 72.11% for non-specialists). See Figure 6.2-43 and Table 8 of the Appendix.

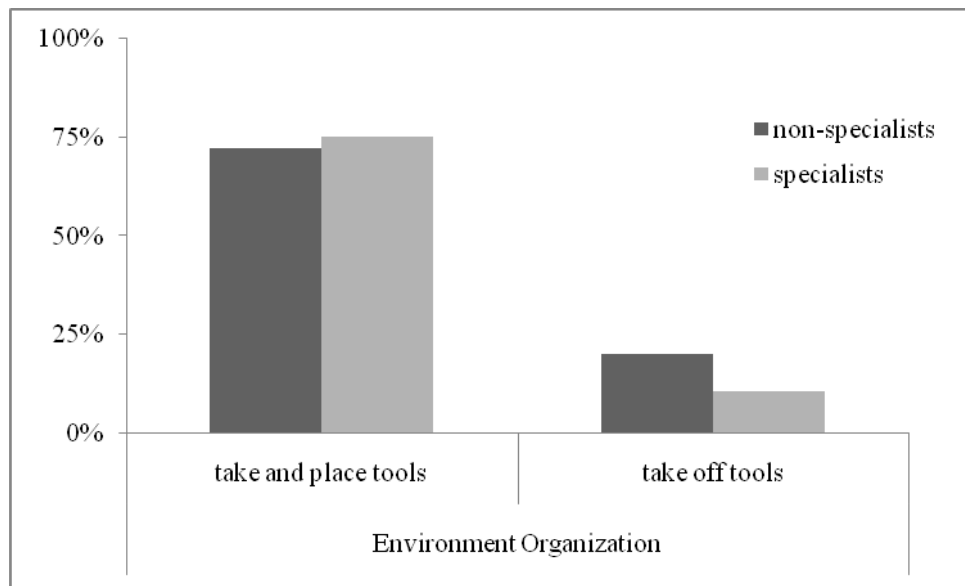


Figure 6.2-43 Fourth Level of Observation – Environment Organization – Video Categories

Teachers with a specialization in PE gave more feedback in the direction of *skills* (13.33%), while non-specialist teachers used feedback mainly on *behaviour* (7.92%). See Figure 6.2-44 and Table 8 of the Appendix.

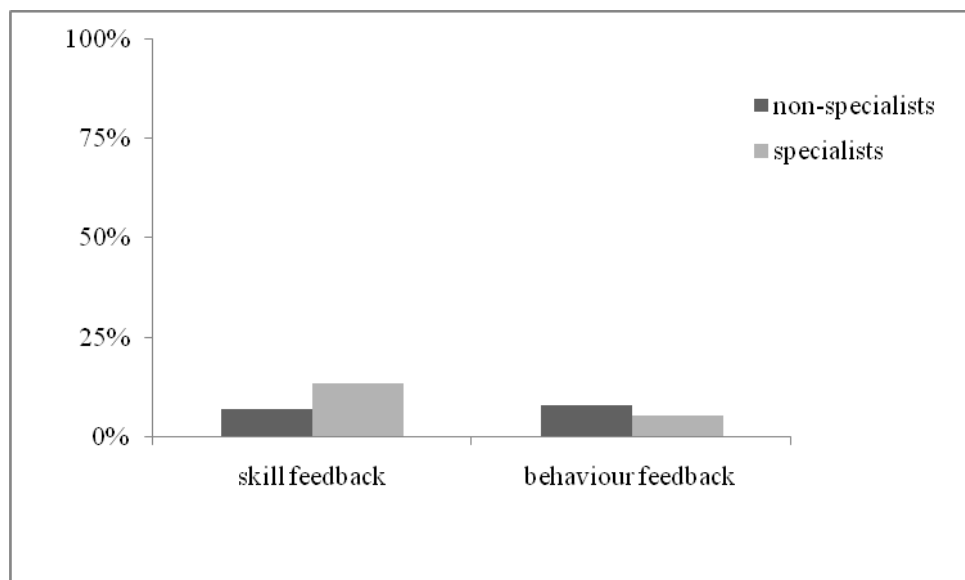


Figure 6.2-44 Fourth Level of Observation – Type of Feedback – Video Categories

6.2.3 Results of Regression Analyses - First Study

The results of the regression analyses performed to investigate whether ST elements identified through *verbal categories* are different in teachers who have/do not have an academic degree or a specific qualification for PE teaching did not show any significant ($p < .05$) difference. Also, the regression analysis performed on the years of past experience in primary school teaching did not yield significant results.

In contrast, some differences emerged from the logistic regression performed on the variable ‘PE teaching experience’, $r^2 = .509$, adjusted $r^2 = .471$, $F(1,39) = 9.662$, $p = .004$. As shown in Table 18, the past PE teaching experience influences the way teachers organize students’ activity. Teachers with more years of experience in PE declared to be more assertive ($\beta = .351$, $t(39) = 3.108$, $p = .004$) and to use eye contacts ($\beta = .351$, $t(39) = 3.122$, $p = .003$) and rewarding ($\beta = .566$, $t(39) = 5.008$, $p < .001$) as specific class management tools more often than less experienced teachers.

<i>Model 3</i>	<i>Unstandardized</i>		<i>Standardized</i>	<i>t</i>	<i>Sig.</i>
	<i>Coefficients</i>		<i>Coefficients</i>		
	<i>b</i>	<i>Std. Error</i>	<i>Beta</i>		
Reward	29.441	5.879	.566	5.008	.000
Eye Contact	7.945	2.545	.351	3.122	0.003
Authoritative	5.988	1.926	.351	3.108	.004

Dependent variable: Years of teaching in PE

Table 18: Logistic regression performed on the variable ‘PE teaching experience’ as a function of verbal categories of the Subjective Theories

The teachers who declared having an authoritative style were the largest in number (57.14% for teachers with a specific qualification and 27.78% for teachers without a specific qualification in PE). Eye contact was used by the teachers with more years of experience as a specific class management tool during PE. Also, teachers with more years of experience in teaching PE seemed to be more inclined to declare the use of an authoritative teaching style (Table 19).

<i>Years of teaching in PE</i>	Reward	Eye Contact	Authoritative teaching style
<i>0 < 5 years</i>	0	7.14%	7.14%
<i>≥ 5 years < 9</i>	0	7.14%	35.70%
<i>≥ 9 years</i>	6.6%	26.66%	46.60%

Table 19: Years of teaching in PE and a specific class management tool

The regression analyses performed to highlight the relationship between observed *behaviour categories* and the teachers' academic level did not show any significant association. That is to say, the characteristic having a further academic degree or not (even if it is the specific title for teaching in primary school) was not associated with the presence of different teaching skills in the gym.

In contrast, marginally significant results emerged in the hierarchical regression analysis performed with the 'specific qualification in PE' as dependent variable (Table 20). Differences between teachers with or without specific qualification in PE emerged as concerns the behavioural category of feedback organization (individual), $r^2 = .540$, adjusted $r^2 = .122$, $F(1,39) = 13$, $p = .093$.

Video Categories	<i>Block 1</i>	<i>Block 2</i>	<i>Block 3</i>
Factors	Beta t p (Std.)	Beta t p (Std.)	Beta t p (Std.)
Presentation	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Instructions	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Organization	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Transition	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Direction	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Feedback	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Observation	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)	.	
Other	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)		
Individual Feedback		<i>n.s.</i> (t-ns) .630 1.754 .093 (t-s)	
R² Change	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)	<i>n.s.</i> (t-ns) .325 (t-s)	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)
F ratio for R² change	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)	<i>n.s.</i> (t-ns) 1.197 (t-s)	<i>n.s.</i> (t-ns) <i>n.s.</i> (t-s)

P	<i>n.s. (t-ns)</i>	<i>n.s. (t-ns)</i>	<i>n.s. (t-ns)</i>
	<i>n.s. (t-s)</i>	.344 (t-s)	<i>n.s. (t-s)</i>
			<i>Total R² = n.s. (t-ns)</i>
			.540 (t-s)
			<i>Adjusted R² = n.s. (t-ns)</i>
			.122 (t-s)

Table 20: Hierarchical logistic regression analyses performed on the variables ‘ teachers’ academic level’ (non-specific academic degree, t-ns) and ‘teachers’ specific qualification’ for PE (t-s) as a function of the behavioural categories of ST

Notes: Significant or marginally significant results are highlighted in bold characters. Only block 2, including a significant predictor.

Teachers with a specific qualification in PE seem to use more feedback, particularly due to a larger amount of individual feedback. See Table 21.

	Feedback	Individual Feedback
<i>Specialist</i>	18.41%	10.79%
<i>Non-specialist</i>	12.29%	6.94%

Table 21: Behavioural feedback categories as a function of the presence/absence of a specific qualification in PE

A specific qualification in teaching PE probably helps teachers to use motor and methodological competencies better. The quality of feedback is more important than quantity. See Figure 9.

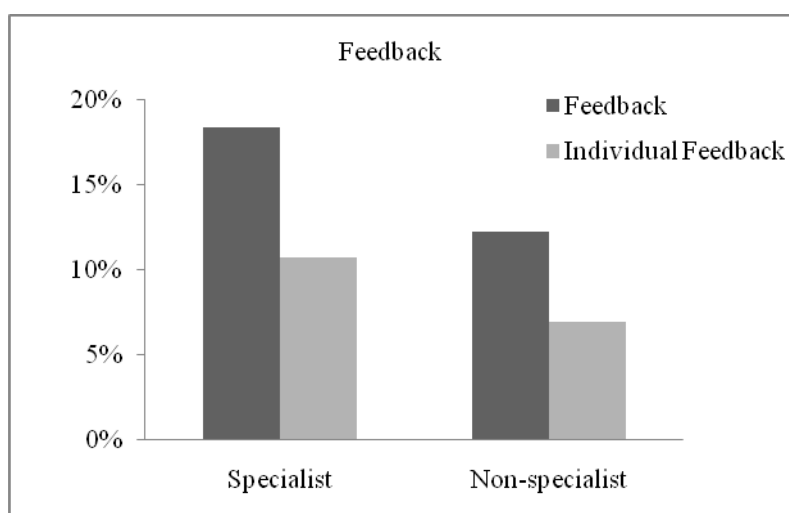


Figure 9: Different percentage of time dedicated to feedback in general and to individual by specialists and non-specialists

Finally, the results of the hierarchical regression analysis performed on the years of

experience either in general primary school teaching or in specific primary PE teaching showed significant or marginally significant associations between the length of the teaching experience and some *behaviour categories*. Particularly, a prolonged experience in general primary school teaching was associated with the amount of organization, $r^2 = .356$, adjusted $r^2 = .227$, $p = .054$ and observation behaviours, $r^2 = .356$, adjusted $r^2 = .227$, $p = .050$, whereas a prolonged experience specifically in PE was linked to the ability to delegate environmental organization to the students, $r^2 = -.724$, adjusted $r^2 = -.227$, $p = .096$ (Table 22).

Video Categories	<i>Block 1</i>			<i>Block 2</i>			<i>Block 3</i>		
Factors	Beta	t	p	Beta	t	p	Beta	t	p
	(Std.)			(Std.)			(Std.)		
Presentation	<i>n.s. (i-g)</i>								
	<i>n.s. (i-m)</i>								
Instructions	<i>n.s. (i-g)</i>								
	<i>n.s. (i-m)</i>								
Organization	-.297 -1.991 .054 (<i>i-g</i>)								
	<i>n.s. (i-m)</i>								
Transition	<i>n.s. (i-g)</i>								
	<i>n.s. (i-m)</i>								
Feedback	<i>n.s. (i-g)</i>								
	<i>n.s. (i-m)</i>								
Observation	-.328 -2.026 .050 (<i>i-g</i>)								
	<i>n.s. (i-m)</i>								
Other	-.333 -2.270 .029 (<i>i-g</i>)								
	<i>n.s. (i-m)</i>								
Environmental Organization Students							<i>n.s. (i-g)</i>		
by							.401 1.776 .096		
							<i>(i-m)</i>		
R² Change	.356 (<i>i-g</i>)			<i>n.s. (i-g)</i>			<i>n.s. (i-g)</i>		
	<i>n.s. (i-m)</i>			<i>n.s. (i-m)</i>			.212 (<i>i-m</i>)		

F ratio for R² change	2.767 (i-g)	<i>n.s.</i> (i-g)	<i>n.s.</i> (i-g)
	<i>n.s.</i> (i-m)	<i>n.s.</i> (i-m)	1.645 (i-m)
	.021 (i-g)	<i>n.s.</i> (i-g)	.059 (i-g)
	<i>n.s.</i> (i-m)	<i>n.s.</i> (i-m)	.198 (i-m)
P			
			<i>Total R² = .356</i> (i-g)
			.724 (i-m)
			<i>Adjusted R² = .227</i> (i-g)
			.227 (i-m)

Table 22: Hierarchical linear regression analysis on years of teaching in general (i-g) and on years of teaching in PE (i-m)

Notes: Significant or marginally significant results are highlighted in bold characters. Only blocks 1 and 3, including significant predictors.

Years of teaching have an influence on the time dedicated to *Organization* and *Observation*. Three different levels of teaching years were calculated and results are shown in Table 23.

<i>Years of teaching in general</i>	Organization	Observation
<i>< 8 years</i>	10.90%	18.60%
<i>9-15 years</i>	12%	29.20%
<i>> 16 years</i>	8.80%	15.80%

Table 23: Year of teaching in general and the organization of PE lesson

In the group with 9 to 15 years of teaching an increase in time dedicated to the organization of the class and environment was observed and thus allowed teachers to increase time dedicated to observation. The above mentioned years of experience in teaching is characterized by a small increase in time dedicated to organization and a big increase in time when students are active and teachers are able to observe. In accordance with Veenman (1984) the most serious problems for new teachers were and are classroom discipline and motivating students. However, a further problem faced by experienced teachers is their loss of motivation. The more experienced in-service teachers' concerns include learning students' names; establishing rules, routines, and expectations; explaining new activities, describing programme development; and making sure that the students enjoy their experience. These differences between the concerns of teachers with or without years of teaching can easily be explained. See Figure 10.

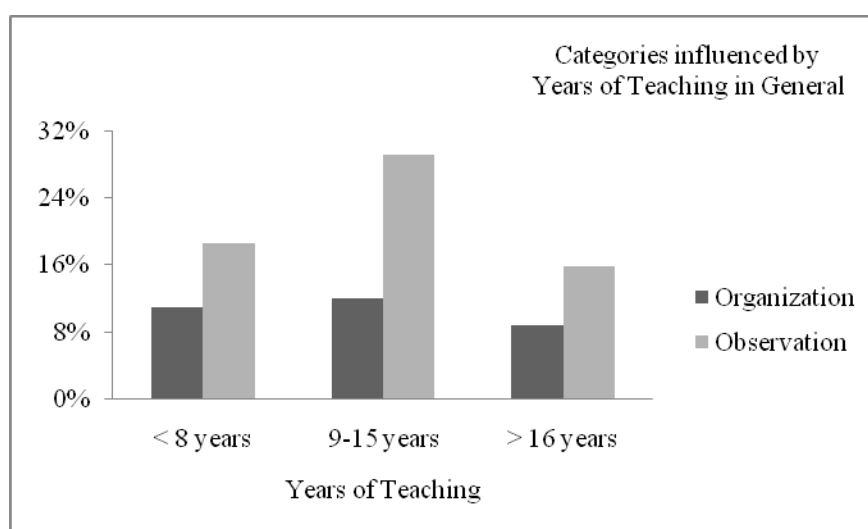


Figure 10: Categories influenced by years of teaching

Furthermore, the ability to organize lessons was linked to teaching experience in PE. The *environment organization* was significant for teachers with a specific qualification (Table 24).

<i>Years of teaching in PE</i>	Environmental Organization by Students
<i>0 < 5 years</i>	8.90%
<i>≥ 5 years < 9</i>	14%
<i>≥ 9 years</i>	17.90%

Table 24: Years of teaching in PE and the environmental organization by students

It can be observed that teachers with a specific qualification in PE improved time during lessons by delegating their students to organize the environment, and this increased in line with their experience in teaching PE. With more years of PE teaching teachers with a specific qualification give more autonomy to their students, delegating the organization of the environment in the gym (Figure 11).

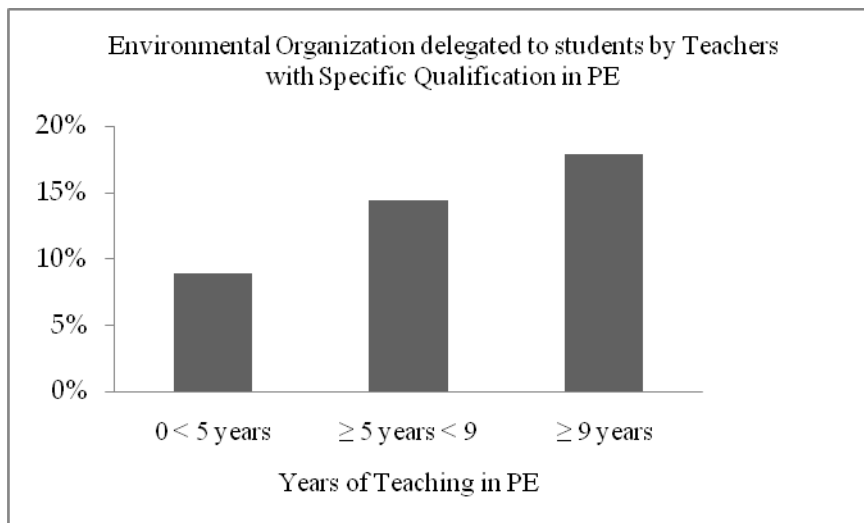


Figure 11: Environmental organization delegated to students by teachers

6.2.4 Comparison of Verbal and Video Data – First Study

The final goal here was to construct clear conclusions based on the correspondence of data collected from different instruments. As more than one teacher was studying, differences among two groups of teachers, teachers with or without a specific qualification in PE, were considered. The data from the different instruments was taken linked to reconstruct the teachers' subjective theory using a reiterative method and the corresponding elements from different sources were added to design the two ST. The graphic representations of the two ST support the description of the ST different characteristics. See Table of corroboration, first study (Table 25).

	SPECIALIST TEACHERS				NON-SPECIALIST TEACHERS			
	Verbal data before lesson	Verbal data deduced from interview	Video data induced from observed behaviours	Corroboration	Verbal data before lesson	Verbal data deduced from interview	Video data induced from observed behaviours	Corroboration
Physical education goals	Motor Goal	Educational function			Motor Goal	Educational function		
1^ Individual objectives		Social Dimensions				Social Dimensions		
Time spent to pursue the objectives		47%				41%		
Individual content orientation		to respect, know, learn social rules				to stay together, to respect others		
2^ Individual objectives		Emotional and Motor Dimensions				Cognitive Dimension		
Time spent to pursue the objectives		30% 50%				27%		
Individual content orientation		to love sport, to know motor language				to learn rules, tactics		
3^ Individual objectives		Cognitive Dimension				Cognitive and Motor Dimensions		
Time spent to pursue the objectives		17.50%				21% 19%		
Individual content orientation		to learn rules, tactics				to develop attention, to develop coordination		
Content of Lessons		team sport, games	motor activities			team sport, games	motor activities	
Teaching methods	did not know	Deductive and global methods			did not know	Deductive and induct methods		

Teaching methods in PE	Prescriptive method, more than one			Not method, Prescriptive Method		
	Prescriptive method	Prescriptive method		Prescriptive method	Prescriptive method	
Instructional format	verbal channel	verbal channel	-	verbal channel	verbal channel	-
Corrections	individual	10.79%	+	individual	6.94%	+
Feedback	verbal channel	18.41%	-	verbal channel	12.29%	+
Didactic support equipment	not use	not use		not use	not use	
Social Organization	big groups	two teams and single work	+	big groups	single work and two teams	+
Environment organization		48.01% of 11%			53.02% of 10.43%	
Teaching styles	Authoritative style			Authoritative style		
Evaluation of learning outcomes	Motor and social abilities	involvement		Motor and social abilities	involvement	
Techniques to assess	observation			observation		
Assessment system	Student individual progress			Student individual progress		
Tools used during lesson	apparatus	apparatus		apparatus	apparatus	
Critical incidents	no			no		

Table 25: Table of corroboration, first study

Notes: “+” = instruments corroborate the hypothesis and there is agreement between them; “-“ = instruments do not corroborate the hypothesis and there is not agreement between them; when the cell is empty means that the instrument is void, there is not corroboration.

To check the teachers' concept of PE goals in primary school, different answers from semi-structured questionnaires were used and corroborated with the observed data. All data confirmed the *general educational function of PE*. The PE goals were defined as perceived factors of reasons (provide by the interview) that could support the presence of PE in primary school. Teachers with or without specific qualifications in PE recognized the development of *social/cooperative behaviour*, inside *social dimension*, as the primary individual objective. Moreover, specialists gave major attention *to the teaching of the respect of social rules*, while non-specialists gave major attention *to developing the ability to be together in the gym*. The perception of the role that PE plays was influenced by the objectives that all teachers tried to reach. The reconstruction of Subjective Theory was reinforced by answers given on how teachers *asses a child's skills* (e.g. practical skill, motor skill, social skill or other...) and on how important these skills were. The percentage of skills used to assess student performance in PE lessons by specialist versus non-specialist teachers was high for *motor and social skills* in general and both groups gave major importance to *student involvement*. Also, non-specialists assessed motor skills with a higher percentage of importance (49% for motor skills, 42% for social skills, 25% for practical skills) While the specialist gave motor skills 41% importance and social skills 49%. This result is congruent with the importance given to develop fine coordination within motor dimension. Specialist and non-specialist teachers declared using *team sports* to obtain the development of *social dimensions* during PE lessons. Also, both groups used congruent examples, but during observations teachers dedicated more time to propose *motor activities* and only in the last part of the lesson did they use *games* or a *team sport*. This incongruence is reinforced by the analysis of social organization. Both groups declared supporting student organization in *big groups*. For specialist teachers *work in couples* was among their favourite system and they used *single work* less; while non-specialist teachers used all types of social interaction (in *couples*, with a *single student* or in *small groups*). During lesson observations the highest frequency of time was used to organize *students for single work*, for both groups. Although teachers have many options for grouping students, they used the individualized one in PE. Several factors must be considered when teachers choose to work with groups of students, rather than the whole class individually (Alfermann, 1999). First, the teacher must develop management skills that ensure that students can work productively with groups. Second, the groups must be

flexible so that the same students are not always in the same group. Third, teachers may want to consider presenting different tasks for different groups. It is clear that an organization in groups requires a great amount of “extra-work”, because merely putting students in groups for a learning experience does not guarantee that learning outcomes will be achieved. 25% of our non-specialist teachers were not conscious of the teaching methodologies used in other subjects and 42% were not aware of any methods used in PE. All specialist teachers declared using more than one method both in PE and in general teaching. Teachers in both groups preferred to use the *prescriptive method* in PE. Specialist teachers declared using *global method* both in *general teaching* and in the *PE context*. These results demonstrate the significant difference between the two groups of teachers. In PE it is easier to give direct indications about what students will have to do. This was the typical approach that the teachers, in this research, used in the gym. Teachers from both groups declared using the *verbal visual channel* giving *Instructions*, but the most relevant aspect in the verbal data was represented by the declared use of *verbal channel* when giving *instructions*, where a significant difference was found. From observations both groups only used the *verbal channel* and completely reduced the amount of time in which teachers demonstrated tasks. Using *verbal instruction* more than other channels means that the teacher is more likely to use the step-by-step approach rather than to go with the flow of the lesson. The teacher may assume that students can not work independently with the content and do need a high degree of supervision. Also *verbal instruction* is used more in the other areas of primary school teaching, like mathematics, and this use is probably transferred automatically into the PE context. It also seems to be the best choice of teaching methodology when basic skills are the content to be learned and when learners need more structure, like students in primary school (Rink, 2006, p. 55). Moreover, for *feedback*, both groups used only the *verbal channel*, while they also declared using verbal-visual, verbal tactile and verbal auditory channels. Teachers with a specific qualification used more feedback in general than other groups (18.41% vs. 12.29%). Non-specialist teachers used feedback directed to skills and behaviour, while specialist teachers predominantly used feedback on skills. Corrections were directed by specialists and non-specialists *on single students* and *on the class*, with less frequency were used *on the group*. These observations were in line with the teachers’ declarations. The teacher’s ability to provide one-on-one corrective feedback in large PE classes is limited for obvious reasons.

The teachers in this research did not establish routines for all basic managerial tasks and did not use clear signals for stopping and starting activities. They declared the use of rules or other class management tools like a whistle, eye contact, a threat or no stopping during lesson activities. As far as *assessment strategies* are concerned (evaluation of learning-outcomes) no lessons with this aim were observed and specialist and non-specialist teachers declared they assessed their PE lesson based on student involvement. They had no expertise on this topic. The most important aspect used to evaluate student performance was the observation of individual student progress. The specialist and non specialist ST superstructures (Figures 12 and 13) show all of the teachers' main concepts.

This research model is used to understand teachers' action and theory and the limits of this paradigm (the low congruence between verbal and video data) could be explained by the adaptive character of teachers' action when confronted with the complexity of subjective theory. This consideration stimulates the development of similar approaches.

6.2.5 Discussion of the Results of the First Study

The objective of the research was to investigate the differences/similarities in the ST and its differences on the teaching behaviour of specialized or non-specialized PE primary school teachers. In addition to these possible differences in ST between more and less experienced teachers were analysed. The effects of the ST on 43 primary school teachers were described and their teaching practices were analyzed. To this aim both analyses followed Groeben's (1986) suggestion to use two phases for validating ST: the communicative validation (based on verbal data) and the explanatory validation (based on video data). On the whole, the results suggest that both a specific qualification and the experience in teaching PE contribute to enhance the quality of PE teaching at primary school level. The qualification seems to strengthen teachers' instructional skills, helping them to transfer STs and pedagogical knowledge into action, whereas the in-service experience seems to reinforce their organizational skills, helping them to optimize the flow of learning experiences within the lesson.

Regarding the comparison of the ST of specialists and non-specialists shows (Figures 12 and 13), there are similarities in all major teaching categories, but differences occur mainly in the amount (feedback in general), type (on skill or behaviour), encoding (by verbal channel or other channels), and organization of feedback (feedback to individual, to small group or to all students).

First, all specialists and the majority of non-specialists share the general view that PE in primary schools has a strong educational function (PE goals category) and believe in an "integrative approach" giving importance to all dimensions of their students' personality (social, emotional, motor, and cognitive dimension categories). Both groups particularly focus on the social dimension, since they mentioned its development as the most important objective to be pursued. However as Rink and Hall (2008) declared, the experience of PE 'per se' is not sufficient to guarantee an automatic positive social outcome. If teachers want to develop desirable social behaviours, they should use appropriate instruction. Secondly, according to the main focus on social development, most specialist and non-specialist teachers declared teaching in large groups and the use of team sports (student's organization category). Nevertheless, this statement could not be explanatorily validated, since they organized students work primarily in an individual fashion without exploiting

the available options for grouping students. It is clear that an organization in groups requires a great deal of “extra-work”, because merely putting students in groups for a learning experience does not guarantee that learning will be achieved. Teachers must develop management skills that ensure students work productively in groups, they may present different tasks to different groups and the groups must be flexible so that the same students are not always in the same group. A further similarity between specialists and non-specialists is that both groups declared to give instruction primarily by verbal-visual channel, but in fact dedicated the most time to verbal direction (instructional format category). Using predominantly verbal instruction more than other modalities means that the teacher is more likely to use step-by-step instructions to maintain a high degree of supervision. It seems to be the best choice when basic skills have to be learned and when learners need more structured learning experiences, as is the case at the primary school level (Rink, 2006). This dominance of stepwise verbal instruction was paralleled by the prevalent use of a prescriptive teaching method (teaching method in PE category) which is in balance with reproductive teaching styles (teaching style category; Mosston, & Ashworth, 2002) and in accordance with descriptive research on teaching in PE (Curtner-Smith, Hasty & Kerr, 2001). Since in the interview, both specialist and non-specialist teachers did not show awareness of the range of teaching styles they could use, an explanatory validation was not performed.

Concerning the differences in beliefs and behaviours of PE specialists and non-specialists, main differences emerged for the feedback category (Table 25, of the Thesis) which is one of the most important factors contributing to effective teaching in PE (Kyrgyridis, Derri & Kioumourtzoglou, 2006), in the present study teachers with a specific qualification in PE generally used more feedback than non-specialists and also differed in the type of feedback and in the way they encoded and organized it. They focused their augmented information on specific skills to be learnt rather than on general behaviours, used the verbal channel more frequently and directed corrective information to single students rather than to groups or to the whole class. According to Rink (2006), verbal direction is most effective with younger students, because individually directed feedback is particularly adequate in primary schools where more active monitoring is necessary than at secondary level, whereas public feedback to an individual student may have more social consequences in the case of older students. This highlights the significance of having a specific qualification

for PE.

While the qualification for PE seems to contribute to enhance the effectiveness of the instructional function of augmented information, the teaching experience seems to support different, but complementary aspects of teaching concerning the organization of students and the learning environment. The present results represent a contribution to the research area focused on novice-expert differences in PE teaching (Durant, 1999). When describing their teaching styles, most experienced PE teachers declared having an authoritative orientation in managing students (Todorovich & Curtner-Smith, 2002). Making management appropriate and flexible for the situations is a good teacher strategy (Rink, 2006). PE lessons take place in spatial and temporal conditions that are extremely different from those of the traditional classroom, e.g., there is more noise than in a classroom; it is not easy to have continuous visual control of all students. Teachers manage these specific tasks utilizing rules, rituals, signs, or other. More experienced PE teachers seem to use simple techniques such as more eye contact and rewards. In accordance with Behets and Meek (1999), the most serious problems of novice teachers are motivating students and classroom discipline. Experienced teachers can deter problems before they observe inappropriate student behaviours. Maintaining eye contact and a positive environment are two good strategies for this. Especially, public praise is often helpful for primary children who are still at the stage in which adult approval is important (Siedentop, 2002a). Furthermore, video data analysis showed that more experienced teachers tend to promote the autonomy and responsibility of their students, delegating more often to organize the environment in the gym. This is in line with the recommendation that teachers' management system should evolve in this direction with the emerging capabilities of students (Rink, 2006).

In the present study, also the congruence/incongruence between the ST of action and behaviour was also evaluated by means of corroboration tables (Lucidi et al., 2008) and represented by means of plus and minus signs in the graphic representation of superstructures (Wagner, 2003). As Figure 12 of the Thesis (superstructures of teachers with a specific qualification in PE) shows the organization of feedback finds a verbal-video corroboration strengthening the evidence that specialist teachers give individual feedback more often than non-specialists. Concerning feedback encoding, in contrast, interview data

was corroborated by behavioural data only in the case of non-specialist teachers, while observations invalidated specialist teachers' communication. Non-specialists (Figure 13) seem to have self-awareness of their limited use of the verbal-visual channel to give corrective information, since they reported primarily using verbal channel. In contrast, specialists declare to prefer the verbal-visual channel, but more frequently rely – although less consciously – on verbal direction.

The results of regression analysis show that motor activity didactics can change with years of teaching. Experience has more relevance for teachers without a specific qualification in PE, but it also has a moderate relevance for teachers with a qualification in PE. Considering these results, the need to develop a teacher training in PE became more important. In the second study the researchers developed a specific PE course for in-service teachers. The results of the first study were useful to prepare in-service teachers training in the theory and practice of didactic methodology.

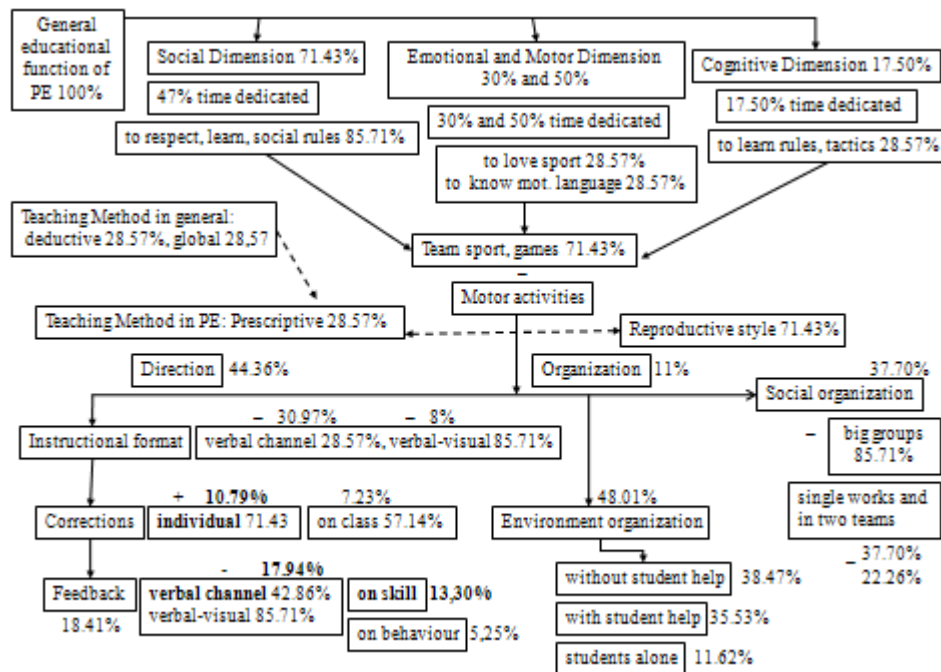


Figure 12: Graphic representation of the ST Superstructure of Teacher with a specific qualification in PE

Notes: The arrows represent relationships between boxes. Dotted-line arrows indicate a flexible relationship. Rectangles aligned close to another represent subordinations. Percentages inside the boxes refer to verbal data and indicate the rate of choices for each category. Percentages close to the boxes refer to video data and are mean values of the percentage of time spent for a given category of teaching behaviour. The “+” and “-“ signs represent the presence or absence of consistency between verbal and video data sources as revealed by the use of corroboration tables. The absence of sign indicates that the verbal-video consistency could not be evaluated because a given category could be extracted only from verbal or video data. The bold fonts represent the differences between specialists and non-specialists teachers

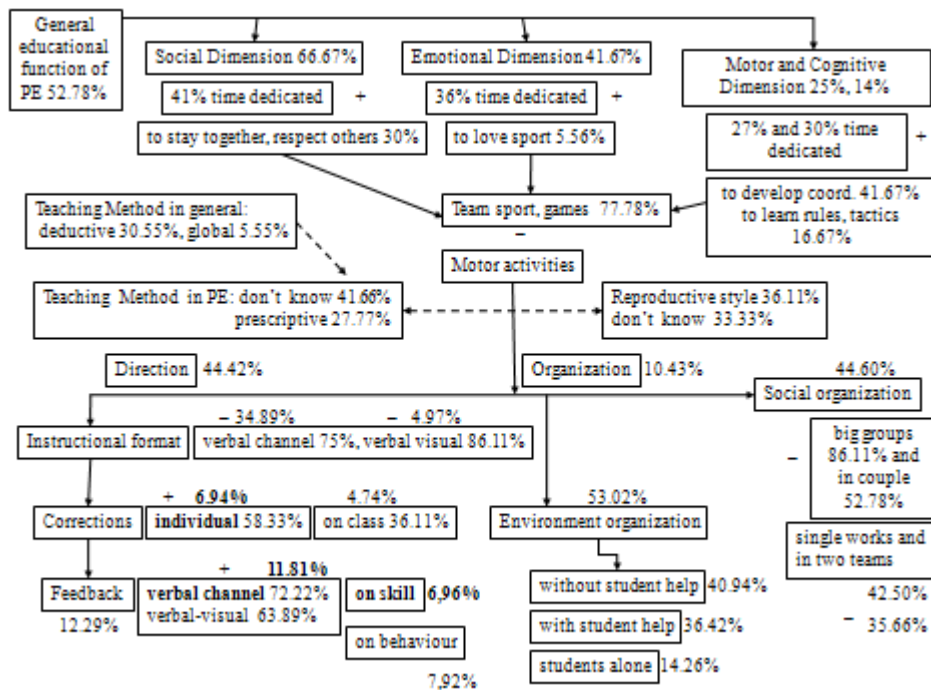


Figure 13: Graphic representation of the ST Superstructure of Teacher without a specific qualification in PE

Notes: The arrows represent relationships between boxes. Dotted-line arrows indicate a flexible relationship. Rectangles aligned close to another represent subordinations. Percentages inside the boxes refer to verbal data and indicate the rate of choices for each category. Percentages close to the boxes refer to video data and are mean values of the percentage of time spent for a given category of teaching behaviour. The “+” and “-” signs represent the presence or absence of consistency between verbal and video data sources as revealed by the use of corroboration tables. The absence of sign indicates that the verbal-video consistency could not be evaluated because a given category could be extracted only from verbal or video data. The bold fonts represent the differences between specialists and non-specialists teachers

6.3 Second Study - ‘Professional Development’ Question: Pre- vs. post-training teacher

6.3.1 Verbal Data

Several of the STs for both pre- (n = 15 teachers) and post-teachers (the same 15 teachers) participating in the training programme (Table 26) showed some differences.

	Specialists		Non Specialists	
Pre-training	3	25%	12	75%
Post-training				

Table 26: Pre-and post-training teachers, second sample

The second research question: (2) “What are the differences/similarities held by teachers before and after the training regarding STs?” was evaluated using Wilcoxon U-test on verbal data. The analysis of this nonparametric test indicated that there were no significant differences between two related samples. In Table 27 the results of a Wilcoxon U-test are presented: the mean rank for each condition (before and after training), the z value and its significance level are presented only for those variables where a tendency toward a difference was observed.

		M rank	z	Asymp. Sig.[2-tailed]
Expressive activities and motor dimension	Pre-training	0.00		
	Post-training	2.00	-1.732	.083
Team sport and motor dimension	Pre-training	4.00		
	Post-training	4.00	-1.890	.059
Team sport and social dimension	Pre-training	4.00		
	Post-training	4.00	-1.890	.059
No Method in PE	Pre-training	0.00		
	Post-training	2.00	-1.732	.083
Rituals	Pre-training	2.00		
	Post-training	0.00	-1.732	.083
Rules	Post-training	4.00		
	Post-training	4.00	-1.890	.059

*p< .001

Table 27: The results of a Wilcoxon U-test on verbal data, second study

The results of the descriptive statistics are mentioned in the following pages. In the following figures the percentages refer to verbal data and indicate the rate of choices for each verbal category (see Figure 6 and Table 3 of the Thesis). The frequencies were converted to percentage to make comparative statements. Given the possibility of giving multiple answers, the sum of all percentage values may be higher than 100%.

Pre-training teachers identified the *formative and educational function of PE in the school* as their main PE goal, while post-training teachers identified that the main PE goal was the *educational function* in general. Post-training teachers highlighted the role of *general goals* (e.g. motor or social goals) in PE as their second choice. Before training teachers identified a *body formative function* as their second choice. The results are provided in Figures 6.3-1 and -2 and Table 6.3-1 of the Appendix.

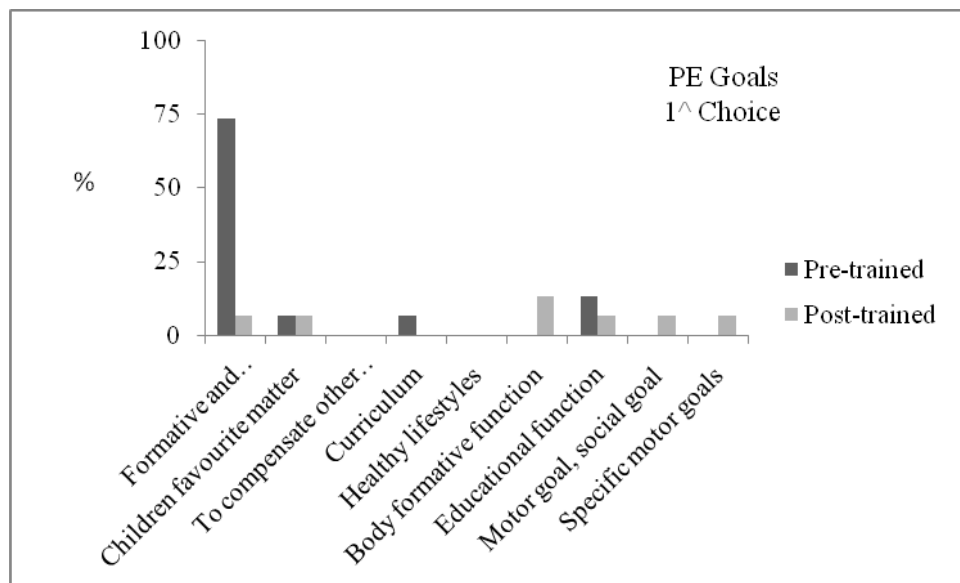


Figure 6.3-1 Verbal Data - Second Study - PE Goals-first choice

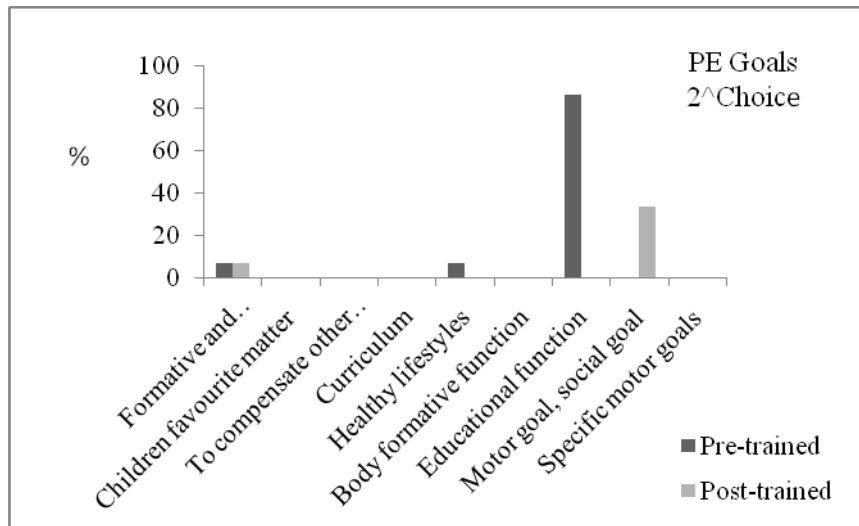


Figure 6.3-2 Verbal Data - Second Study - PE Goals-second choice

The second and third SD questions were: “What are the most important outcomes of a PE lesson that you teach? Can you give me a hierarchical structure? How do you spend time (a percentage indication) pursuing these objectives?” Teachers described what she/he saw as being the most important *individual objectives* (outcomes) of the PE didactics that he/she taught. Despite the National Indications, published by the Italian Ministry of Education, given for major goals in PE, every teacher had his/her own personal ideas about what effects the lesson should have on his/her students.

Pre- and post-training teachers declared they regard the *social dimension* as the most important outcome of PE lessons (Figures 6.3-3, -4, -5, -6 and Tables 6.3-2 and -3 of the Appendix), but they dedicated more time to pursuing the *emotional dimension* (Figures 6.3-9 and-10 and Tables 6.3-6 and -7 of the Appendix).

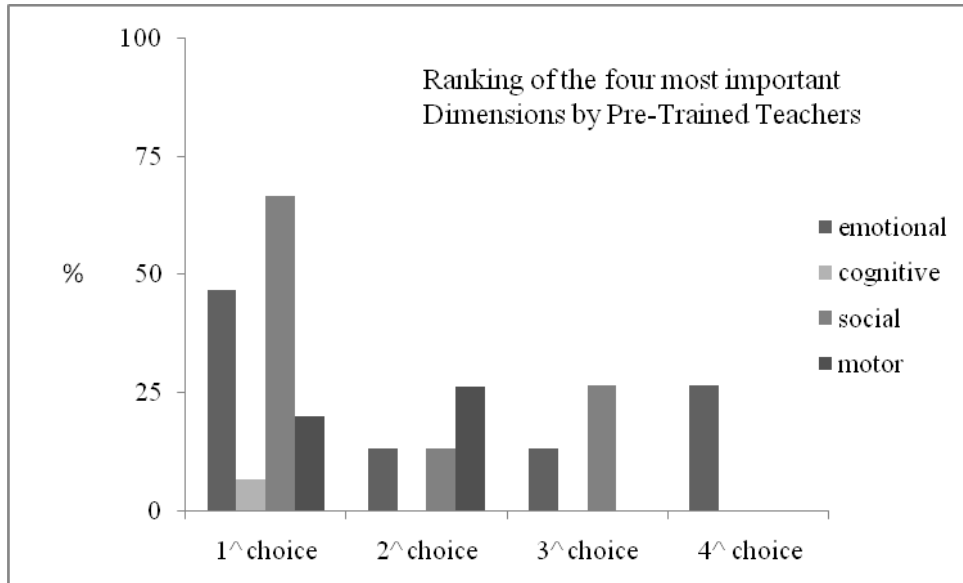


Figure 6.3-3 Verbal Data - Second Study - Ranking of Four Most Important Dimensions in PE Didactics by Pre-Training Teachers

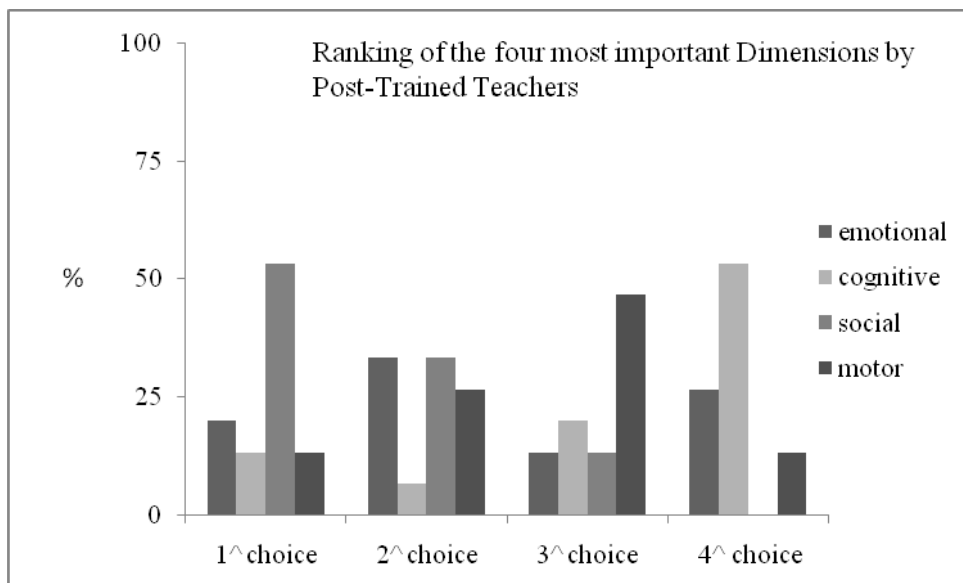


Figure 6.3-4 Verbal Data - Second Study - Ranking of Four Most Important Dimensions in PE Didactics by Post-Training Teachers

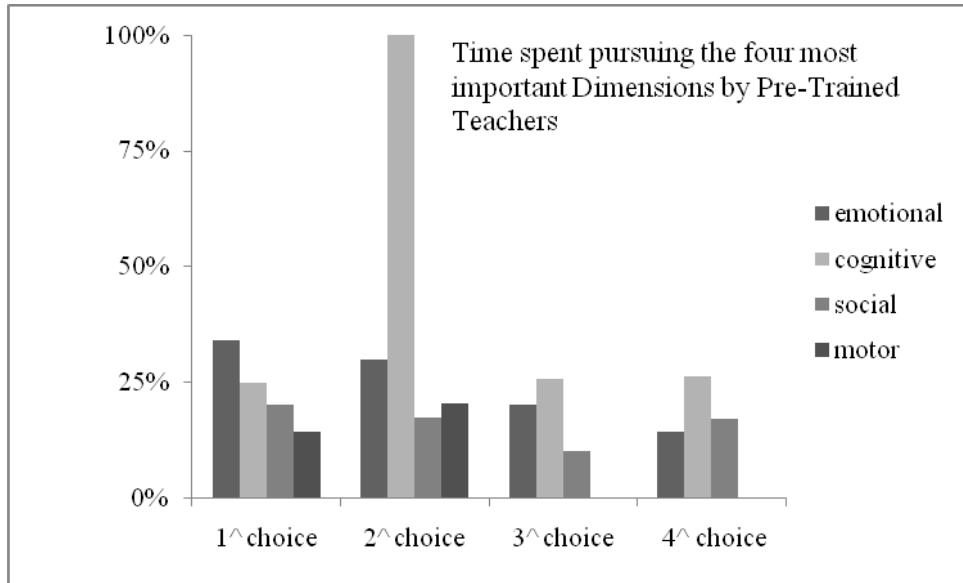


Figure 6.3-5 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics by Pre-Training Teachers

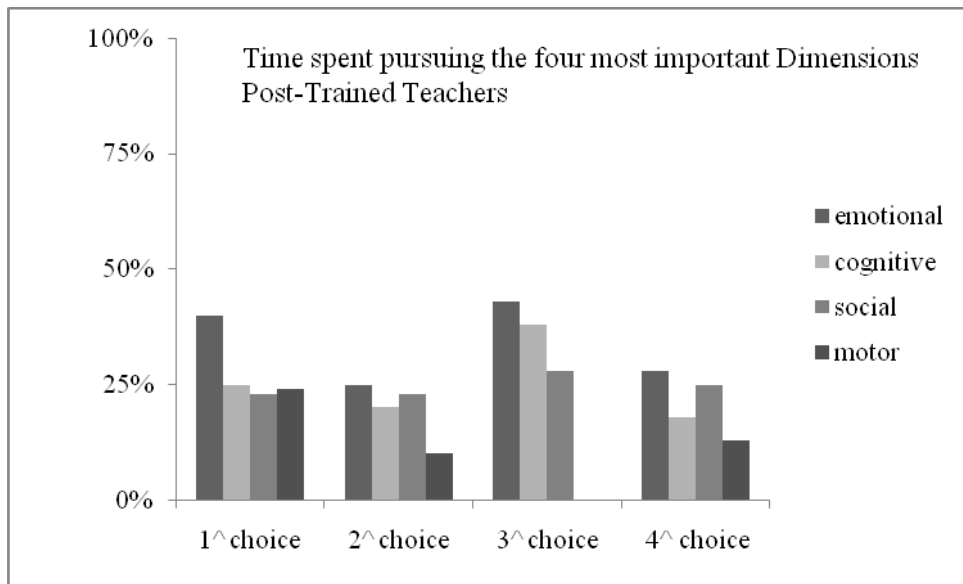


Figure 6.3-6 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics by Post-Training Teachers

Before and after training their choices were unchanged regarding their second most important outcome. The *emotional* and *motor dimensions* received higher frequency as a second choice. After training a high number of teachers identified the *motor dimensions* as

their third choice. Within the description of these social dimensions there were more differences than similarities between pre- and post-training teachers. Pre-training teachers explored the most important objective inside *social dimension* and the major frequency was identified in the category: “*to be together, to respect others*”. Post-training teachers identified that *to respect, know, and learn social rules* were the most important *social dimension objectives* of PE Didactics. The last answer was congruent with the declared average time spent by teachers before training to pursue these objectives. Post-training teachers used their time to develop *interaction behaviour/ communication*. The results are provided in Figures 6.3-7 and -8 and Table 6.3-4 and-5 of the Appendix.

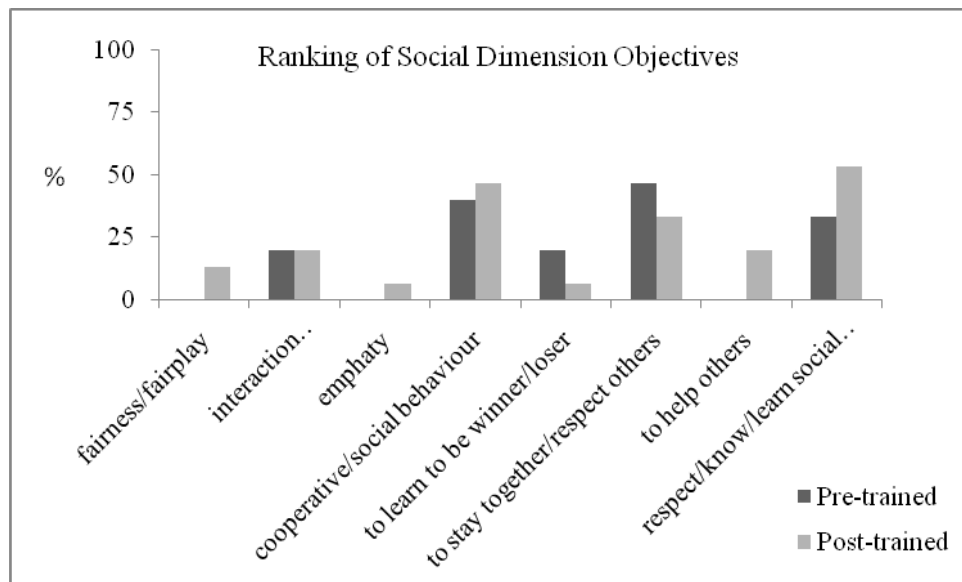


Figure 6.3-7 Verbal Data - Second Study - Ranking of Social Dimension Objectives of PE Didactics by Pre versus Post-Training

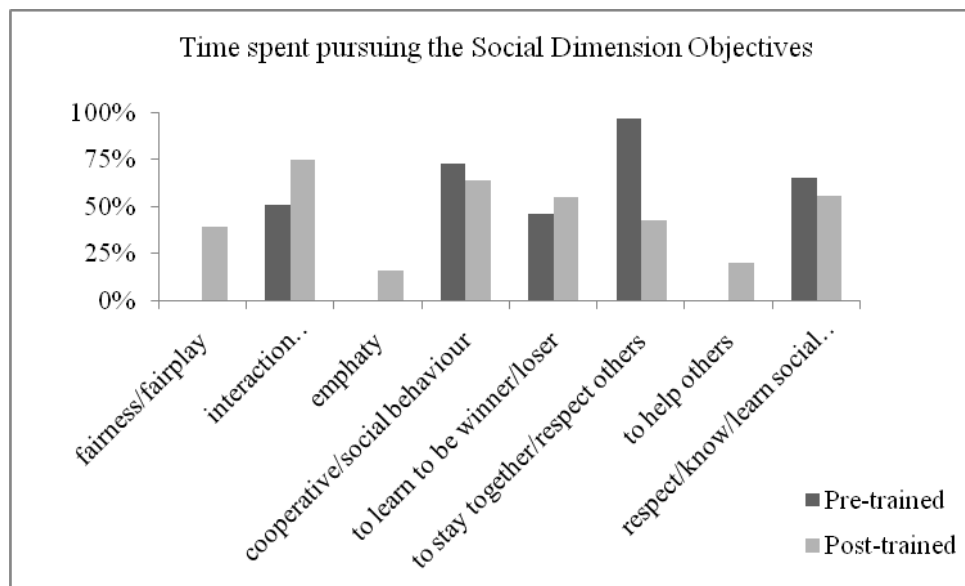


Figure 6.3-8 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Social Dimension Objectives in PE Didactics by Pre versus Post-Training Teachers

Within the emotional dimension, both groups declared to pursuing the development of student *self-esteem*. The results are shown in Figures 6.3-9 and-10 and Tables 6.3-6 and-7 of the Appendix).

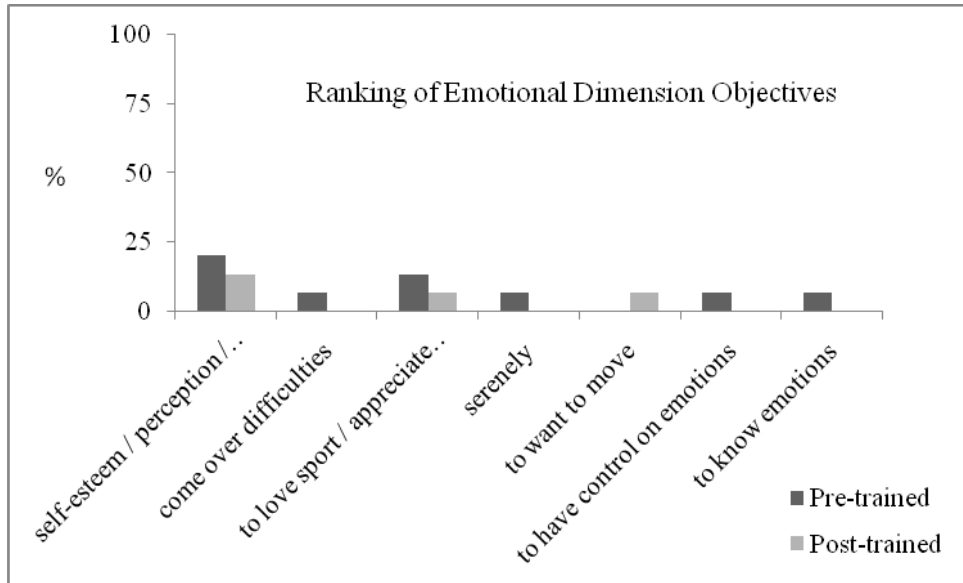


Figure 6.3-9 Verbal Data - Second Study - Ranking of Emotional Dimension Objectives of PE Didactics by Pre versus Post-Training Teachers

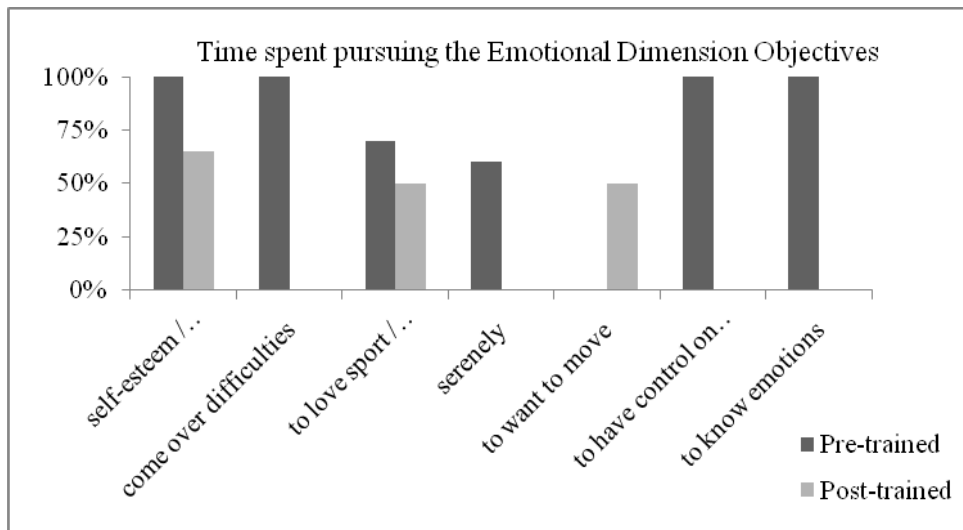


Figure 6.3-10 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Emotional Dimension Objectives in PE Didactics by Pre versus Post-Training Teachers

Within the description of these *cognitive dimensions* Pre- and Post-training teachers stated that the most important objective is *to learn rules and tactics* (Figures 6.3-11 and-12 and Table 6.3-8 and-9 of the Appendix).

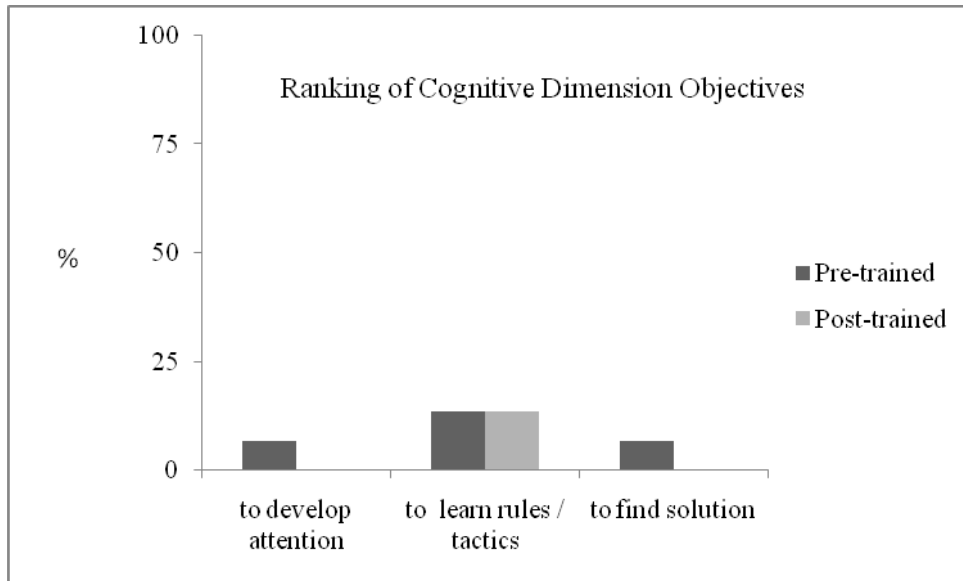


Figure 6.3-11 Verbal Data - Second Study - Ranking of Cognitive Dimensions Objectives of PE Didactics by Pre versus Post-Training Teachers

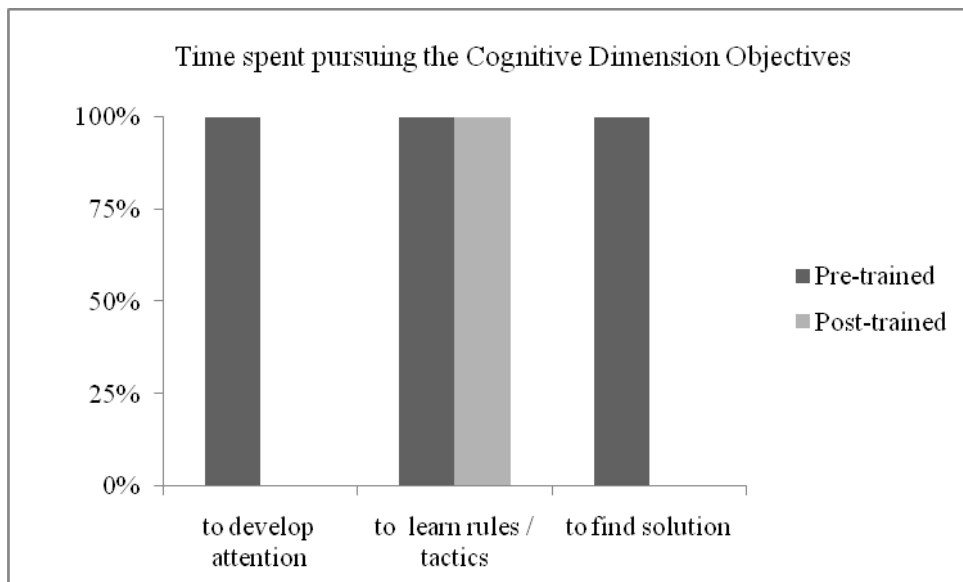


Figure 6.3-12 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Cognitive Dimension Objectives in PE Didactics by Pre versus Post-Training Teachers

Within the description of these *motor dimensions* pre- and post-training teachers stated that the most important objective is *to know how to develop small co-ordination* (Figures 6.3-13 and-14 and Tables 6.3-10 and -11 of the Appendix).

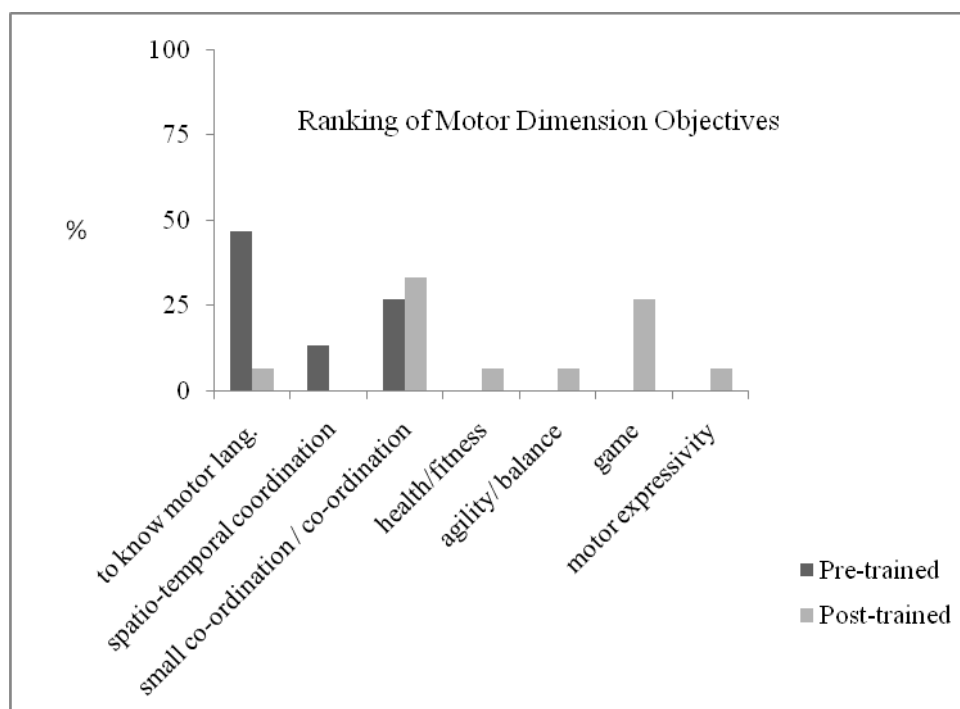


Figure 6.3-13 Verbal Data - Second Study - Ranking of Motor Dimension Objectives of PE Didactics by Pre versus Post-Training Teachers

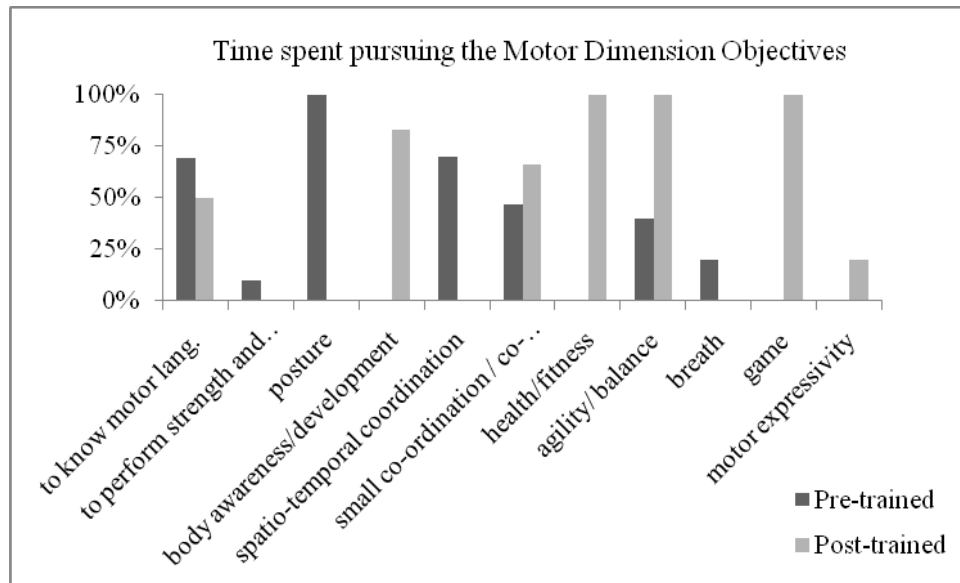


Figure 6.3-14 Verbal Data - Second Study - Average Percentage of Time Spent Pursuing the Motor Dimensions Objectives in PE Didactics by Pre versus Post-Training Teachers

The frequency of *lesson contents* linked to social dimensions used during PE lessons by pre-training teachers focused on *team sport*. Post-training teachers declared using more *expressive motor activities* linked to the social dimension. The results are shown in Figures 6.3-15, -16 and Table 6.3-12).

At the beginning of this Chapter the results of a Wilcoxon U-test were presented. A tendency to a significant level of differences was found between pre- post-training groups in the declared use of *expressive activities* combined with the development of *motor dimensions* and in the declared use of *team sport* combined with the development of *motor dimensions* and *social dimensions*.

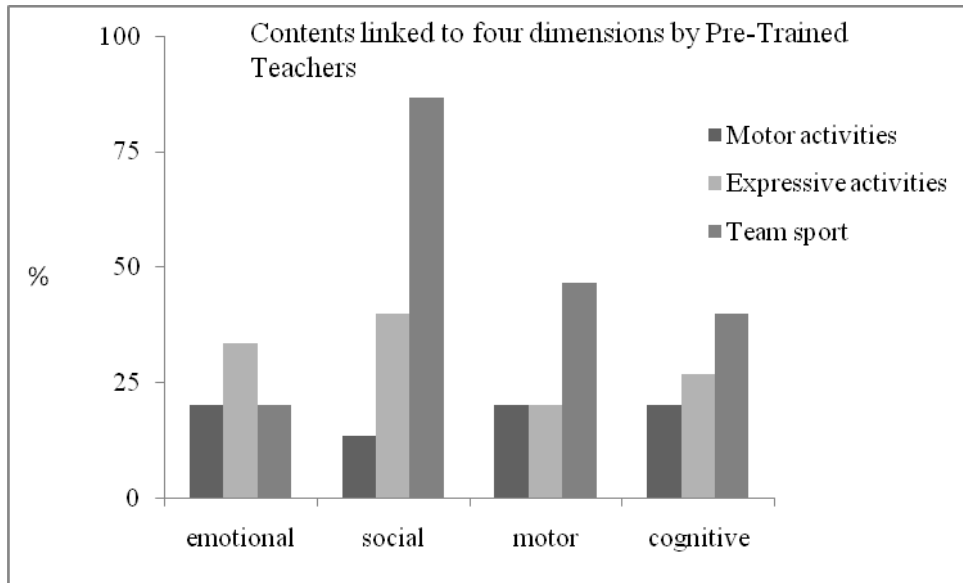


Figure 6.3-15 Verbal Data - Second Study - Percentage of Lesson Contents Linked to Emotional, Social, Motor, Cognitive Dimensions by Pre-training Teachers

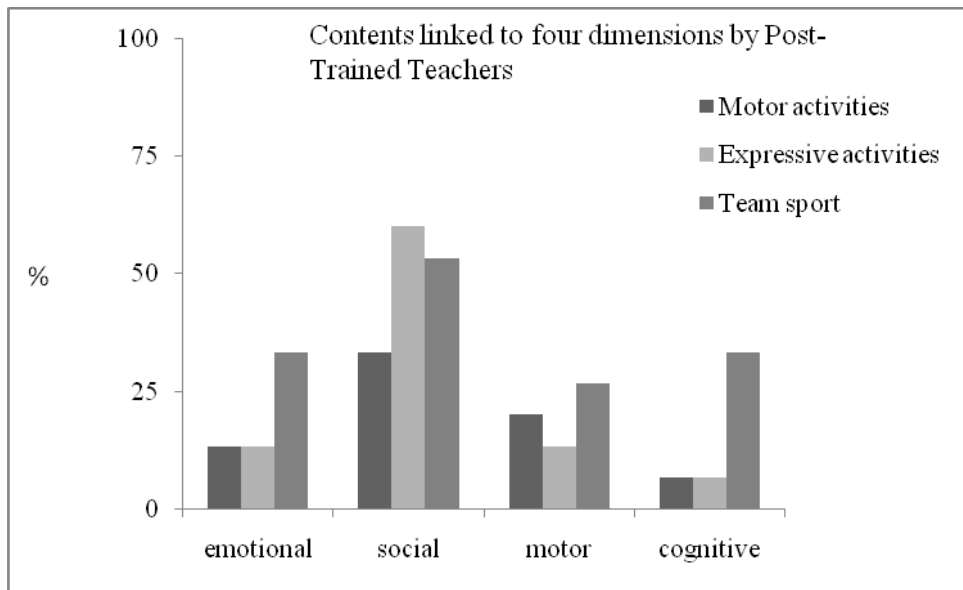


Figure 6.3-16 Verbal Data - Second Study - Percentage of Lessons Contents Linked to Emotional, Social, Motor, Cognitive Dimensions by Post-training Teachers

Both groups preferred to use more than one method in general teaching. Post-training teachers declared using *prescriptive* and *heuristic methods* in PE (Figures 6.3-17, -18 and Table 6.3-13).

A tendency to a significant level of difference between pre- post-training groups regarding the use of no method in PE was observed. Before training the percentage of teachers that declared they did not use any method in PE was lower than after training.

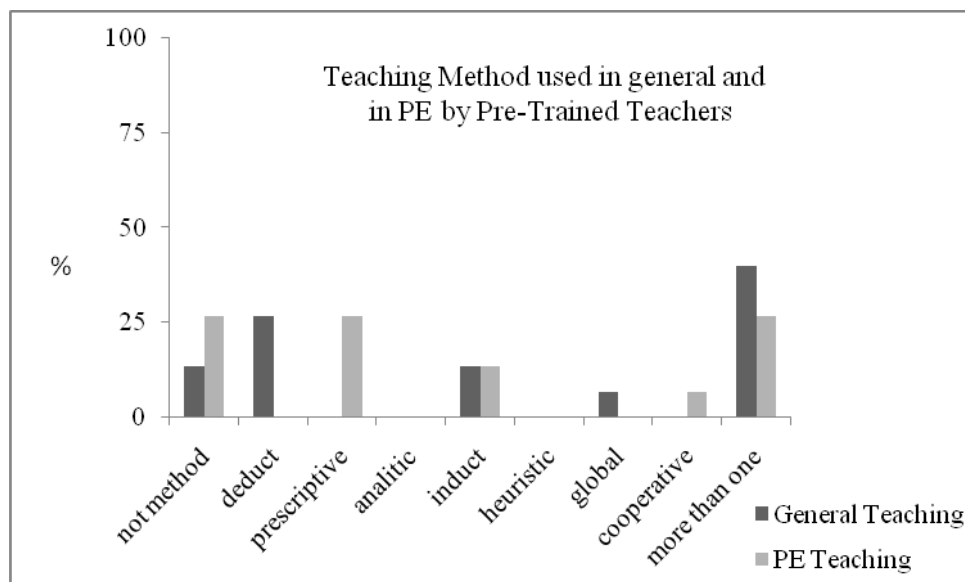


Figure 6.3-17 Verbal Data - Second Study - Percentage of Teaching Methods used in General and in PE Lessons by Pre-Training Teachers

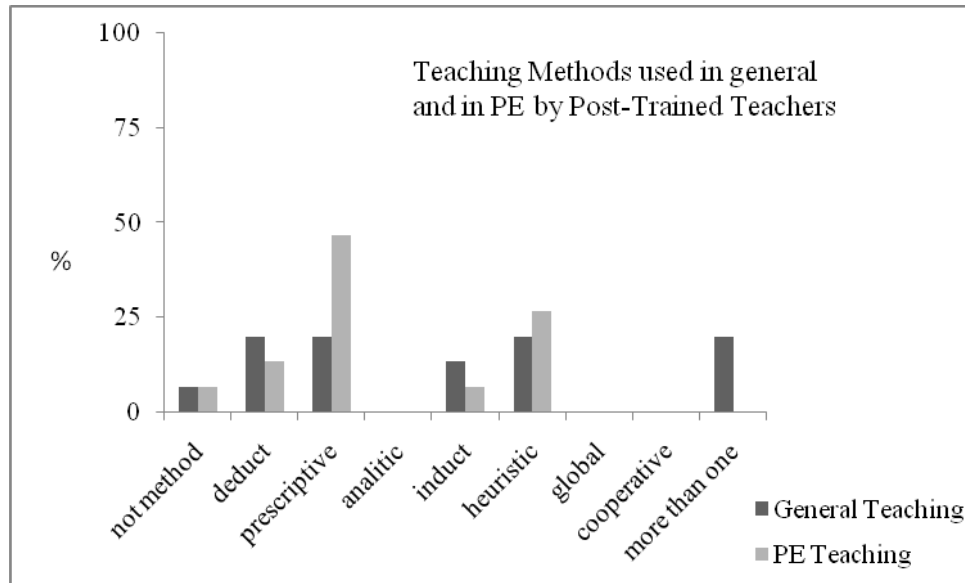


Figure 6.3-18 Verbal Data - Second Study - Percentage of Teaching Methods used in General and in PE Lessons by Post-Training Teachers

Regarding instructions, demonstrations and feedback teachers were asked: “Which channels of communication do you prefer to use (verbal, verbal-visual, verbal-tactile, verbal-auditory, and audiovisual)?” and “How do you normally correct your students? Do you make corrections to all the class, to small groups, to individuals or based on the situation? Which channels of communication do you prefer to use when you make corrections (verbal, verbal-visual, verbal-tactile, verbal-auditory)?” Pre-training teachers preferred to give *instructions* using the *verbal-visual channel*, post-training teachers adopted both the *verbal* and *verbal-visual channels*. Both groups used the *verbal-auditory channel* before and after the training Figure 6.3-19 and Table 6.3-14 of the Appendix).

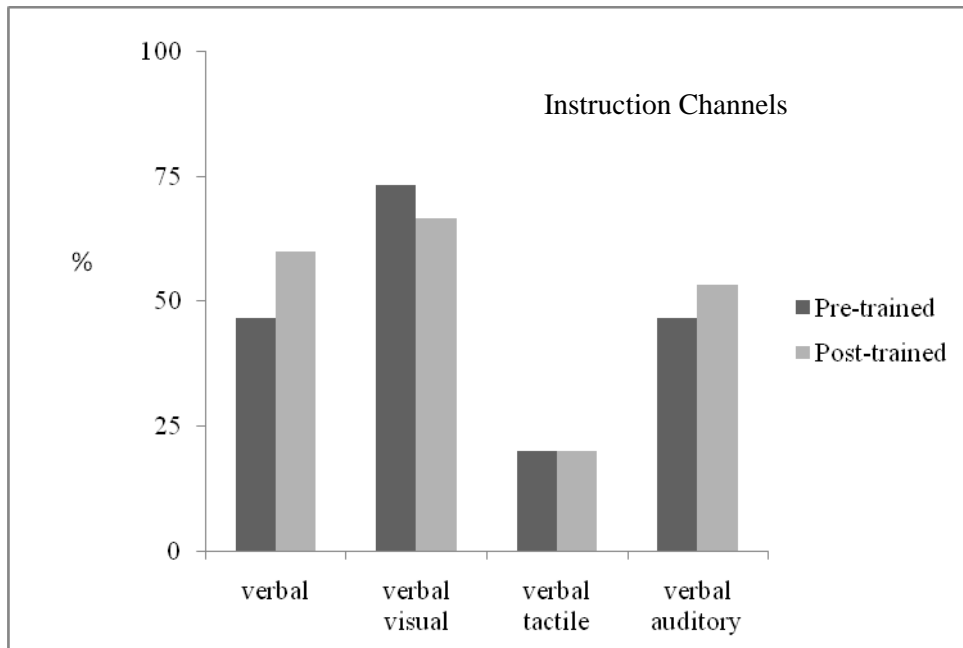


Figure 6.3-19 Verbal Data - Second Study - Percentage of Instruction Channels Used in PE Didactics by Pre versus Post-Training Teachers

The *feedback channel* rated by both groups remained unchanged before and after training (Figure 6.3-20 and Table 6.3-15 of the Appendix).

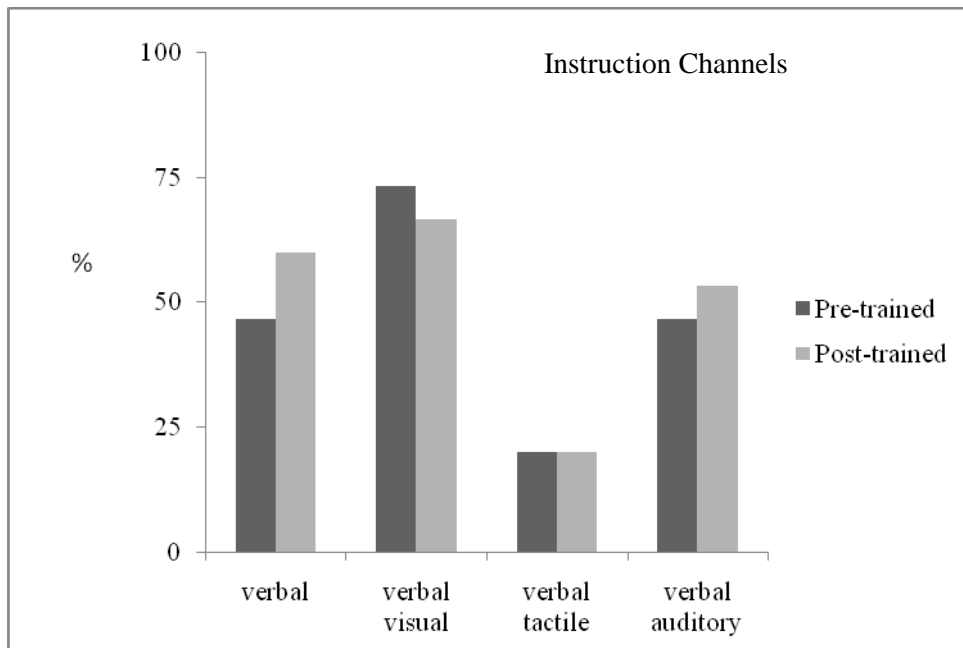


Figure 6.3-20 Verbal Data - Second Study - Percentage of Feedback Channels Used in PE Didactics by Pre versus Post-Training Teachers

The percentages of *correction groups* (on all students, small groups, single, or based on situation) used in PE didactics by pre- versus post-training teachers were similar (Figure 6.3-21 and Table 6.3-16). Both groups based their corrections *on the situation* and *on a single* student. Both groups did not normally use *didactic equipment* in PE lessons. This result did not change before or after training (Figure 6.3-22 and Table 6.3-17 of the Appendix).

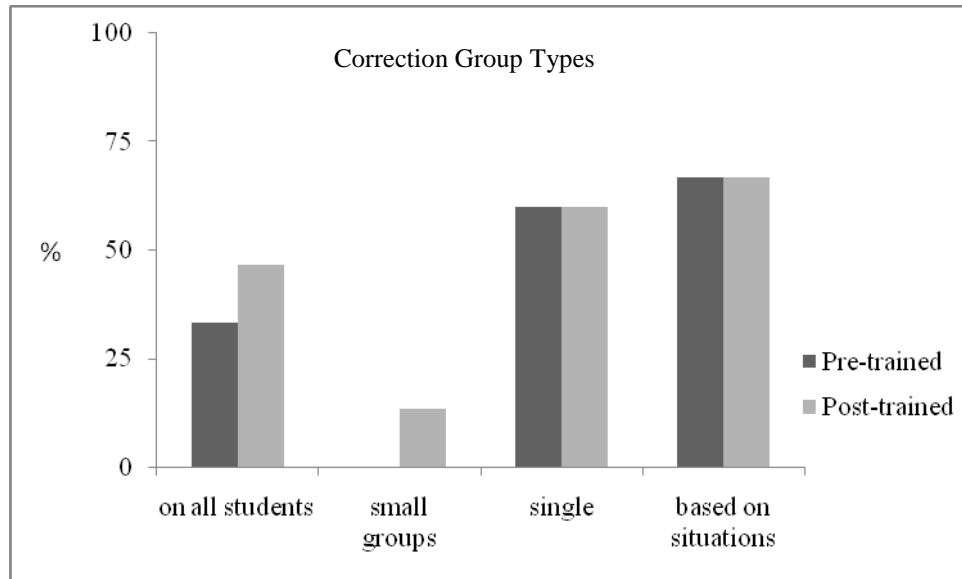


Figure 6.3-21 Verbal Data - Second Study - Percentage of Correction Group Types Used in PE Didactics by Pre versus Post-Training Teachers

During PE lessons teachers had to manage specific tasks linked to the spatial and temporal conditions in the gym. The post-training group stated they used more *rules* than prior to training and for both groups *other systems* represented a good strategy to manage student organization. As regards *other systems* the pre-training teachers directed students using their voice and proposing interesting activities; while after training they directed students using *an effective organization of the lesson*. The results are provided in Figures 6.3-25 and -26, Tables 6.3-20 and -21 of the Appendix.

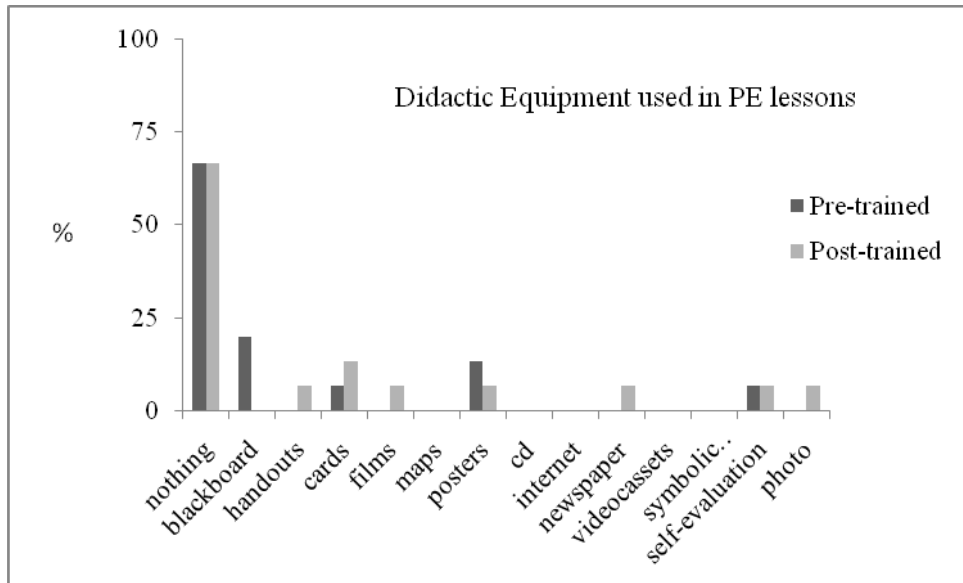


Figure 6.3-22 Verbal Data - Second Study - Percentage of Didactic Equipment Used in PE Lessons by Pre versus Post-Training Teachers

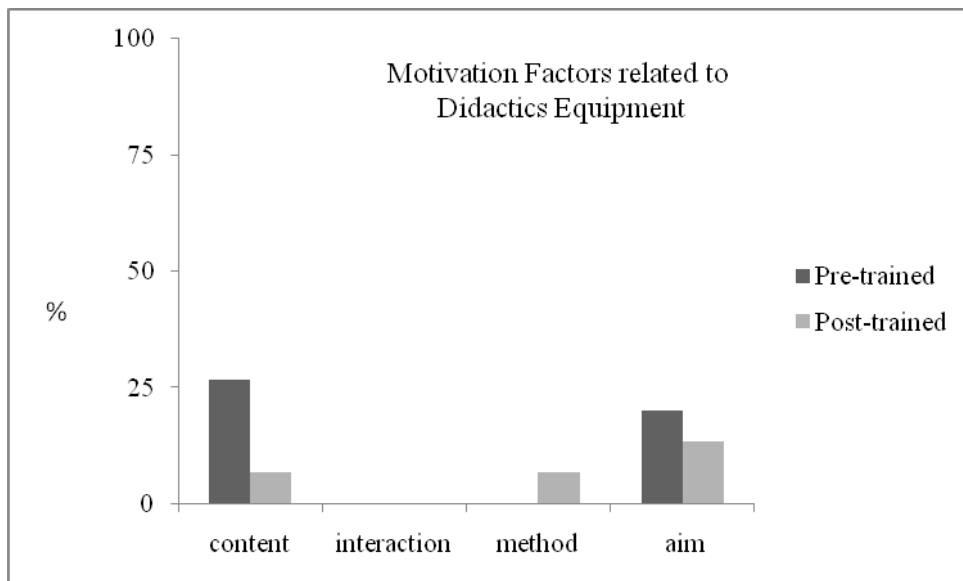


Figure 6.3-23 Verbal Data - Second Study - Percentage of Motivation Factors Related to Didactics Equipment Used in PE by Pre versus Post-Training Teachers

Moreover when teachers had to cope with specific social interaction they organized *work in groups*, in *couples*, to a *single student* or in *other interaction*, e.g. in *small groups*. Before and after training they did not show any change in social interaction (Figure 6.3-24 and Table 6.3-19 of the Appendix).

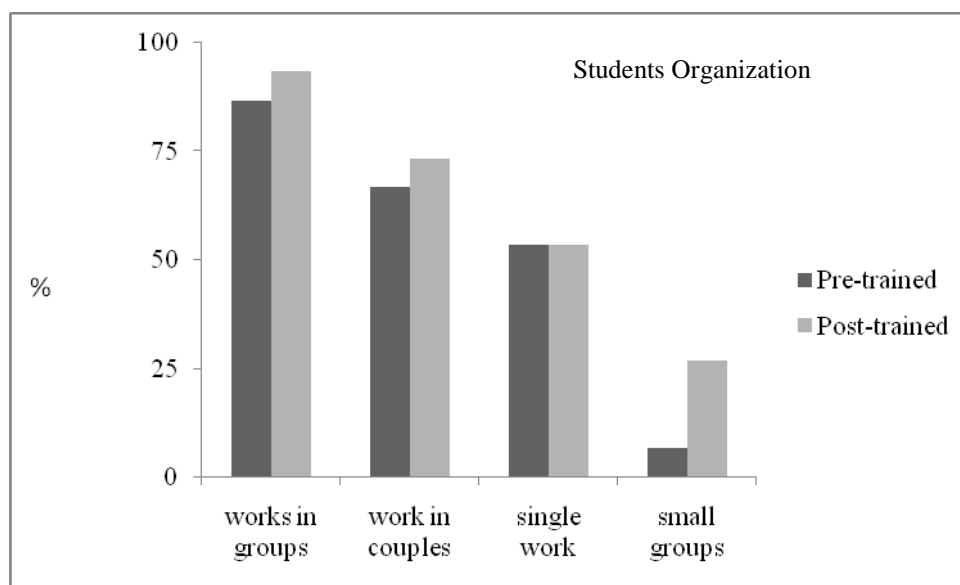


Figure 6.3-24 Verbal Data - Second Study - Percentage of Students Organization Used in PE Didactics by Pre versus Post-Training Teachers

PE lessons take place in spatial and temporal conditions that are extremely different from those of the traditional classroom. For example there is more noise than in a classroom; it is not easy to look at all students at once. When asked how teachers manage these specific tasks a tendency towards a significant level of difference between pre- post-training groups appeared in the Wilcoxon U-test. An increase in the declared use of *rules* can be observed; while after training teachers did not declare any use of *rituals*. See Figures 6.3-25, -26 and Tables 6.3-20, -21 of the Appendix.

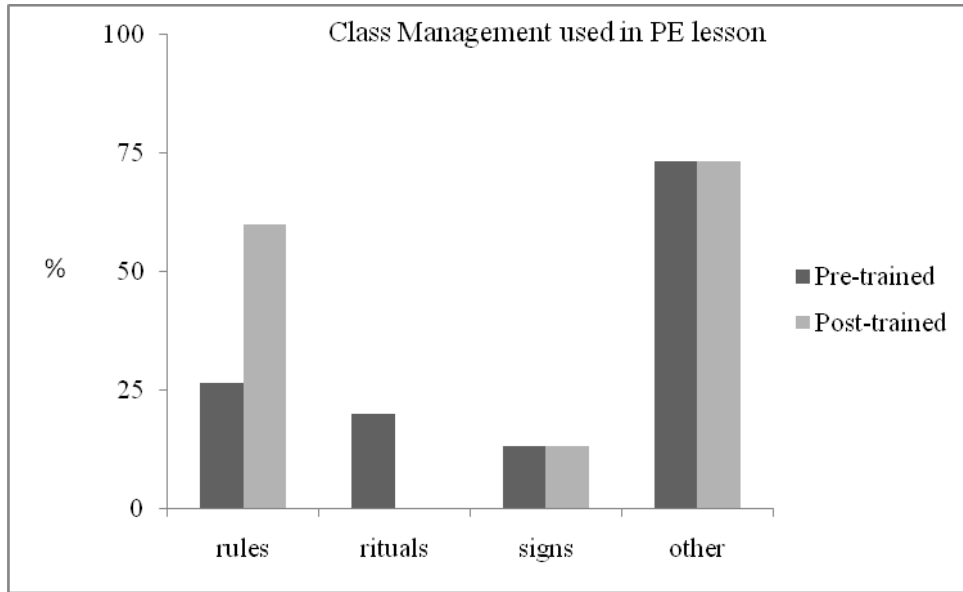


Figure 6.3-25 Verbal Data - Second Study - Percentage of Class Management Used in PE Didactics by Pre versus Post-Training Teachers

After training teachers declared to using the *organization of students* as a specific class management tool (Figure 6.3-26).

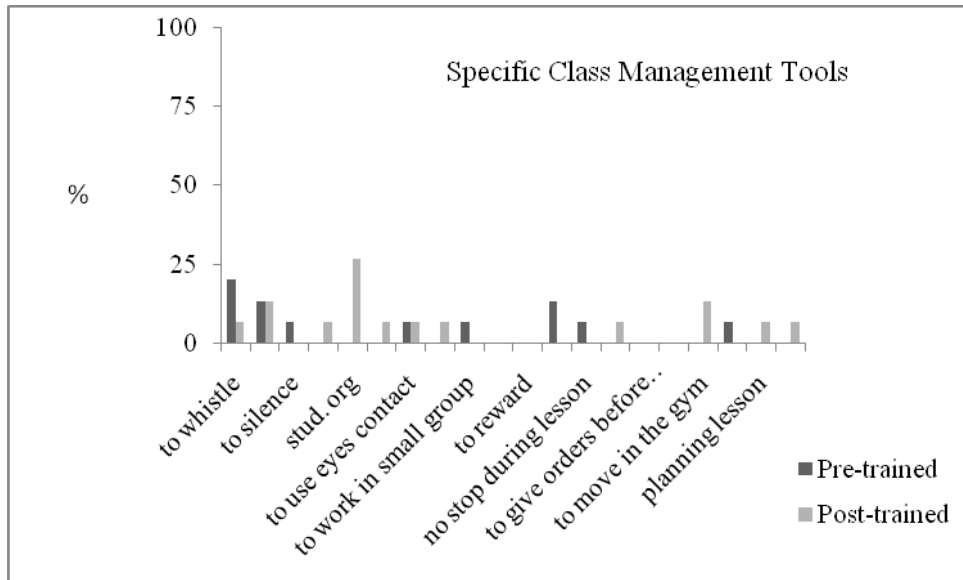


Figure 6.3-26 Verbal Data - Second Study - Percentage of Specific Class Management Used in PE Didactics by Pre versus Post-Training Teachers

Regarding the question: “What are your *teaching styles*?”, after training teachers declared to using more than one method to organize the lesson, while before training they were not aware of the meaning of teaching styles. This last question was an open question and the teachers answered how low they were aware of the meaning of teaching styles.

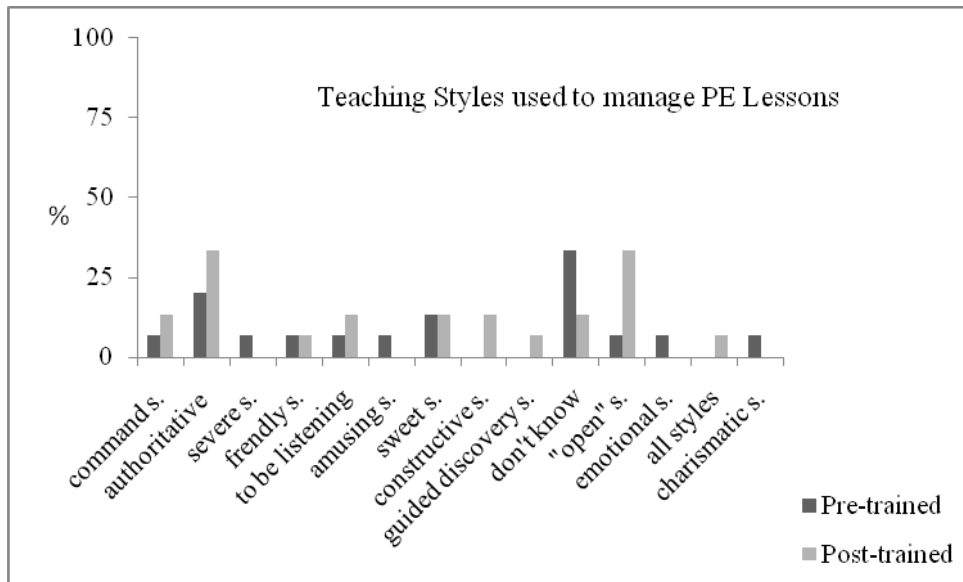


Figure 6.3-27 Verbal Data - Second Study - Percentage of Teaching Styles Used to Manage Lessons by Pre versus Post-Training Teachers

The Mosston’s spectrum of teaching styles (Mosston & Ashworth, 2002) was not utilized because this kind of “classification” was not recognized by Italian primary school teachers. The teachers’ answers were transformed in to four categories: a) she/he did not know teaching styles; b) she/he knew productive styles; c) she/he knew reproductive styles; d) she /he declared using all of the range (Figure 6.3-28 and Tables 6.3-22, -23 of the Appendix).

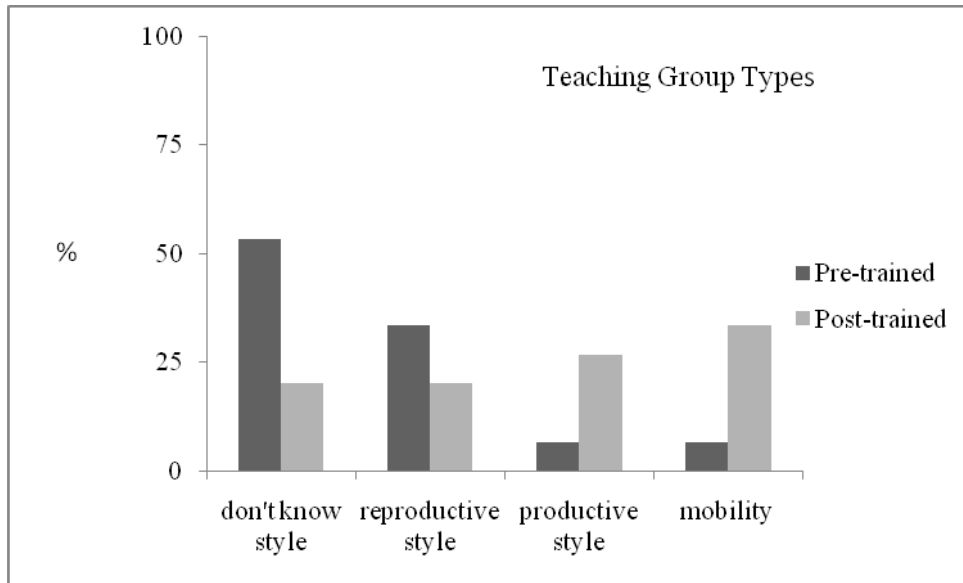


Figure 6.3-28 Verbal Data - Second Study - Percentage of Teaching Group Styles Used to Teach Lessons by Pre versus Post-Training Teachers

Teachers used *observation* as an instrument to assess student performance (Figure 6.3-29).

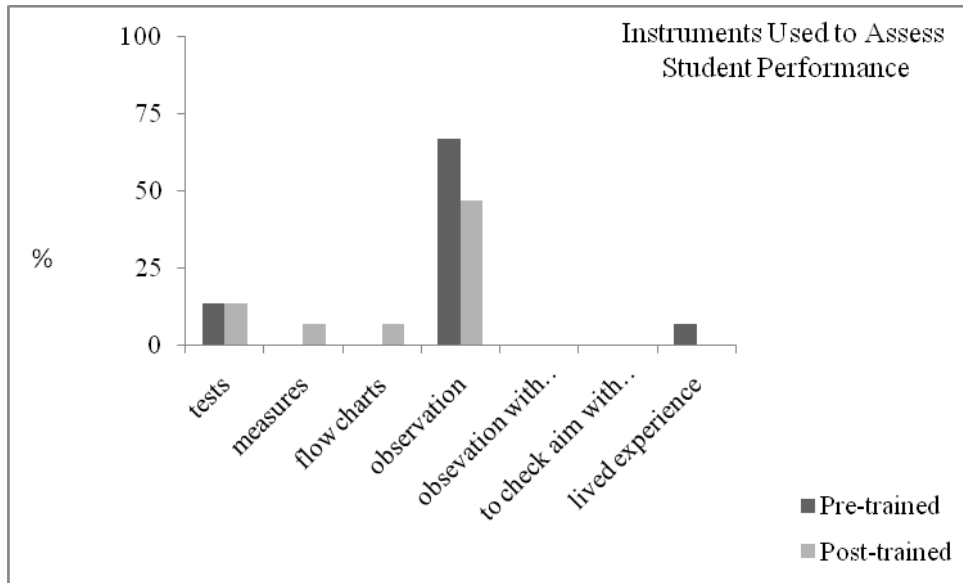


Figure 6.3-29 Verbal Data - Second Study - Percentage of Instruments Used to Assess Student Performance in PE Lessons by Pre versus Post-Training Teachers

The instrument used to assess *student performance in PE lessons* by pre-training versus post-training teachers was “observation”, based on *individual progress* (Figure 6.3-30).

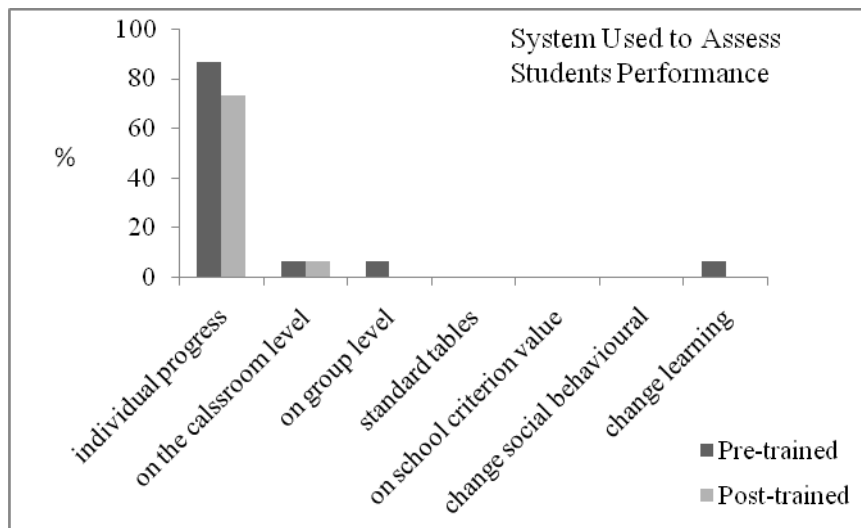


Figure 6.3-30 Verbal Data - Second Study - Percentage of System Used to Assess Student Performance in PE Lessons by Pre versus Post-Training Teachers

To assess the effectiveness of his/her PE lesson *the respect of rules* was used. This element remained the category used after training. Percentage of *lesson effectiveness assessed* by both groups was based on student involvement. In addition post-training teachers declared the importance of unchanged *enthusiasm* in the PE lesson. See Figure 6.3-31 and Table 6.3-24 of the Appendix.

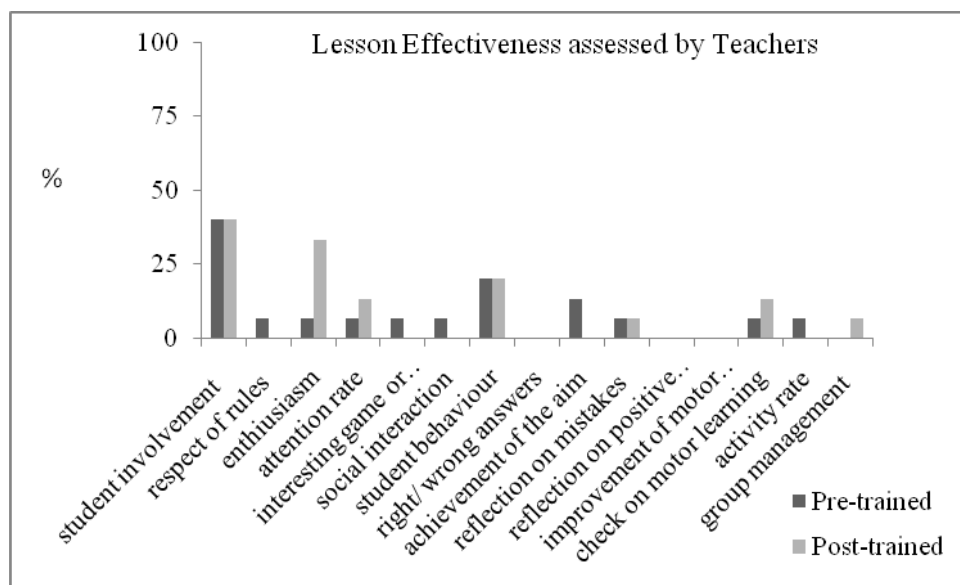


Figure 6.3-31 Verbal Data - Second Study - Percentage of Lesson Effectiveness Assessed by Pre versus Post-Training Teachers

Before and after training they mainly assessed *motor* and *social child skills*, because they believed them to be most effective. The results are shown from Figures 6.3-32 and Table 6.3-25 of the Appendix.

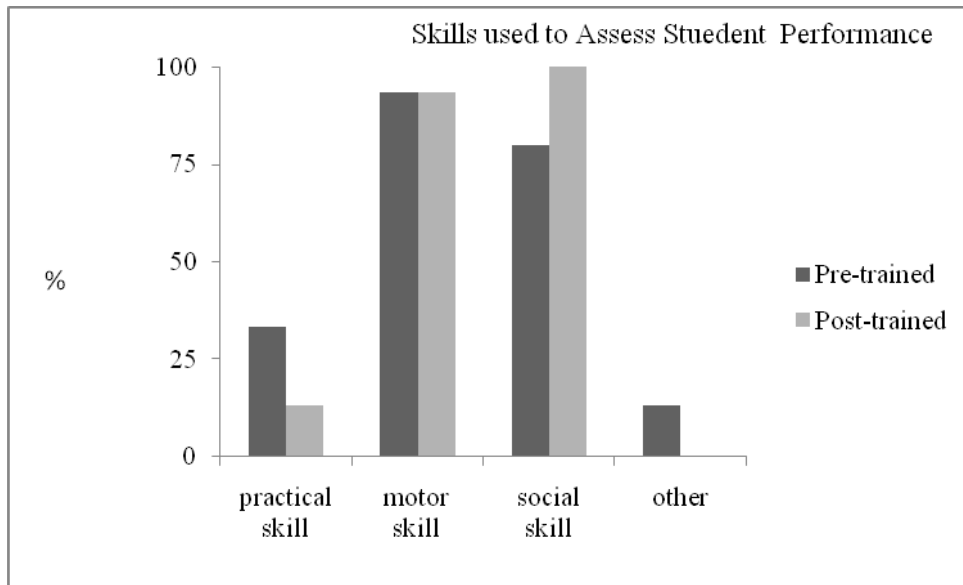


Figure 6.3-32 Verbal Data - Second Study - Percentage of Skills Used to Assess Student Performance in PE Lessons by Pre versus Post-Training Teachers

The highest percentage was categorized by *other*, e.g. involvement before training (Figure 6.3-33 and Table 6.3-26 of the Appendix).

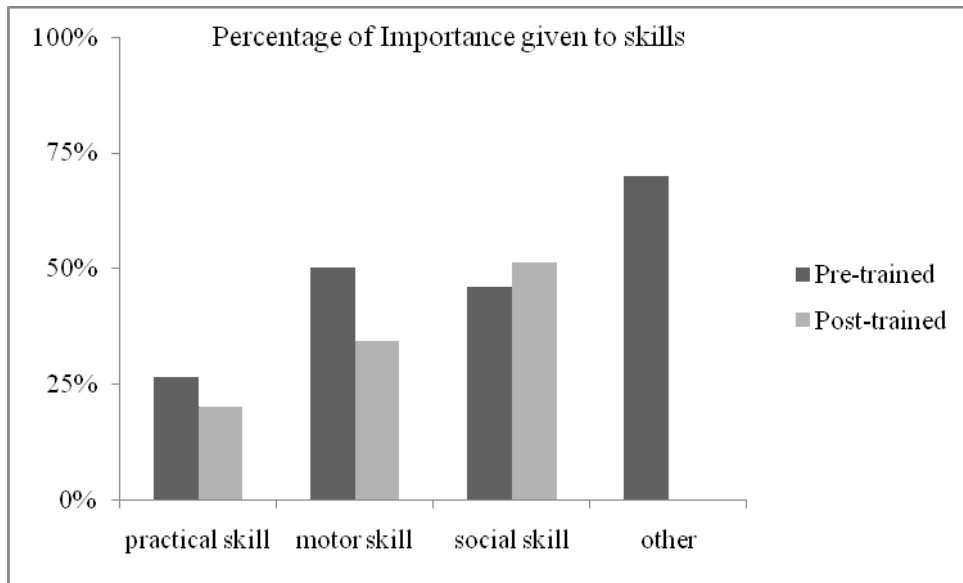


Figure 6.3-33 Verbal Data - Second Study - Percentage of Importance Given to Skills Chosen in PE Lessons by Pre versus Post-Training Teachers

The results for the last SD questions (about *assessment in PE*) indicated that there were no differences in responses given by training and non-training teachers. The results are shown Figures 6.3-34 and Tables 6.3-27.

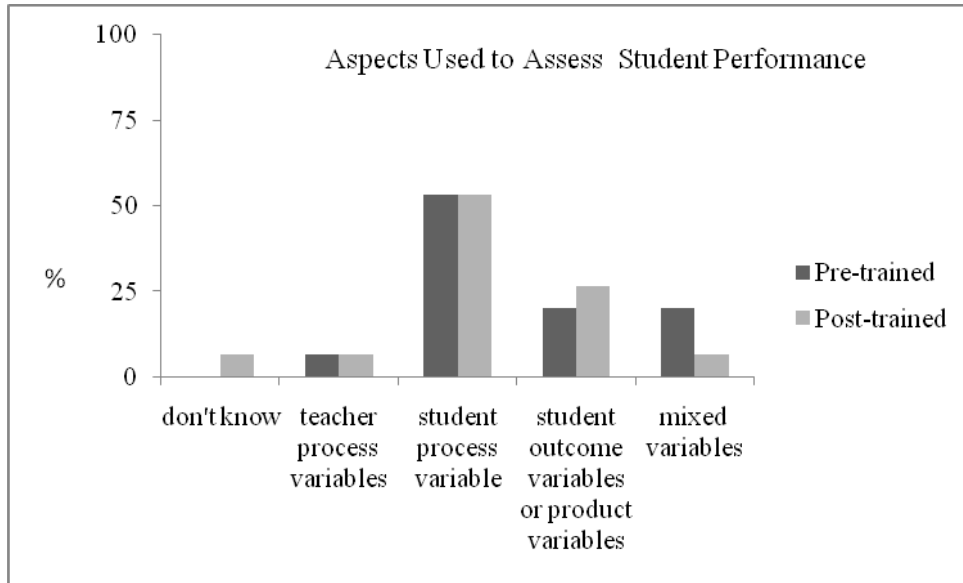


Figure 6.3-34 Verbal Data - Second Study - Percentage of Aspects Used to Assess Student Performance in PE Lessons by Pre versus Post-Training Teachers

6.3.2 Video Data

Data from the observers' perspective was taken into account for the empirical testing of the superstructure ST (see Figure 8 of the Thesis). In the first level of observation results indicated that there were differences in the time dedicated to organization and observation among pre-training and post-training teachers. The different/similar behaviours exhibited by the two groups of teachers were examined using a two dependent samples t-test (15 teachers x 2, pre- post-training). In Table 28 only significant factors and factors that have a tendency to a significant difference were reported.

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	Feedback Pre Feedback Post	.046667	.093059	.024028	-.004868	.098201	1.942	14	.073
Pair 2	Observation Pre Observation Post	-.103533	.215375	.055610	-.222804	.015737	-1.862	14	.084
Pair 3	Org.stud.Pre Org.stud.Post	-.2783867	.3201872	.0826720	-.4557004	-.1010729	-3.367	14	.005
Pair 4	Org.envirn.Pre Org.envirn.Po:	.2184067	.3918788	.1011827	.0013914	.4354219	2.159	14	.049
Pair 5	Individual Feedback Pre Individual Feedback Post	.066000	.103305	.026673	.008792	.123208	2.474	14	.027
Pair 6	Behaviour Feedback Pre Behaviour Feedback Post	.024480	.049475	.012774	-.002918	.051878	1.916	14	.076

Table 28: Paired samples test on video data, second study

The results of the descriptive statistics for each video category are provided from Figure 6.3-35 to Figure 6.3-44 and Table 9 of the Appendix. In the following figures the percentages refer to video data and indicate the mean values of the percentage of time spent on teachers' behaviour.

A significant difference between pre- and post-training groups appeared in the average time used to observe students. After training the average time dedicated *to observe* the class increased from 24% to 32.76%. Also, the average time dedicated to giving *feedback* was reduced from 14.27%, to 9.40% after training (Figure 6.3-35 and Table 6.3- of the Appendix). It may seem surprising that a PD training led to a reduction of the amount of feedback given to the students. However, this reduction must be considered and interpreted jointly with other changes in teaching behaviour that occurred as a consequence of the training.

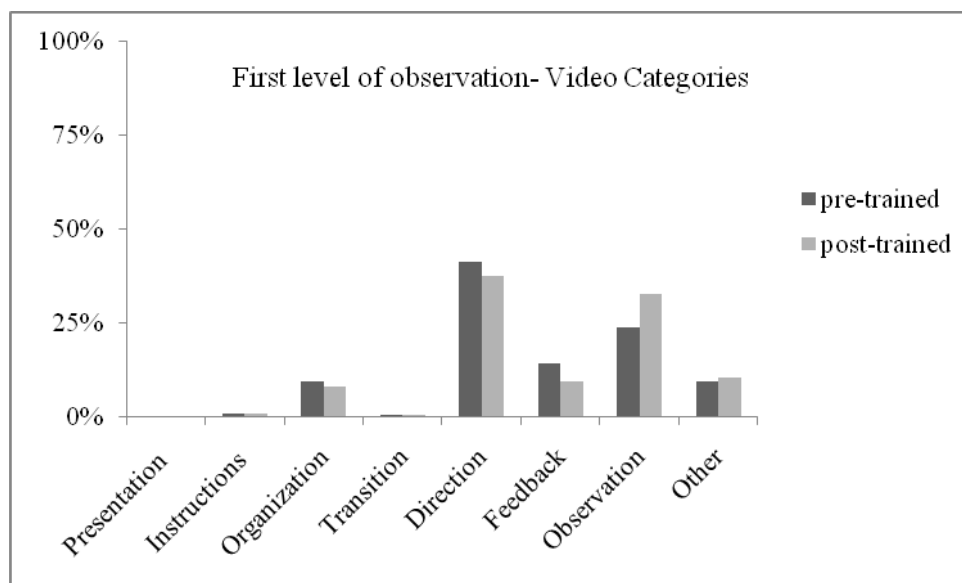


Figure 6.3-35 First Level of Observation – Video Categories

In the second level of observation, after training teachers changed and dedicated more time to giving *instructions* on motor expressive activities, reducing time for *games*. Before and after training the instruction on *motor activities* represented the main activity during PE

lessons. Instructions directed at lesson contents and used to present tasks did not increase or decrease significantly for pre- and post-training groups. The limited amount of time dedicated to the use of instructions directly related to presenting lesson content and lesson tasks is an element that clearly characterizes Italian teachers (Figure 6.3-36 and Table 9 of the Appendix).

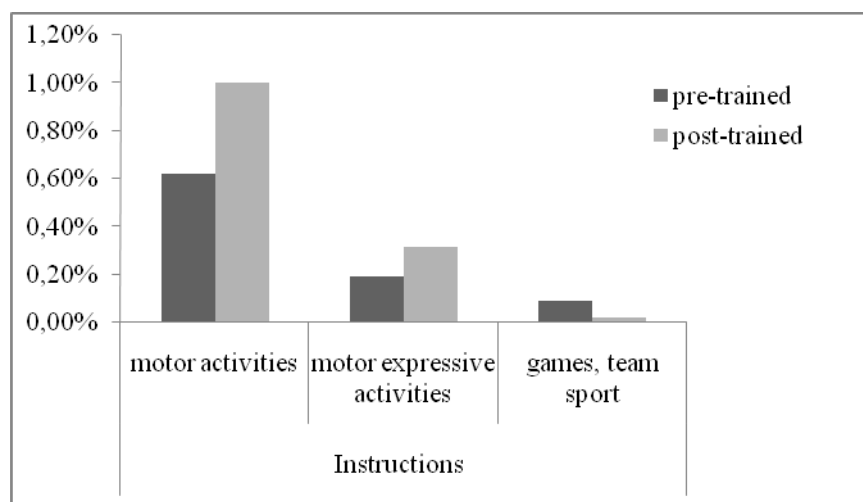


Figure 6.3-36 Second Level of Observation – Instructions – Video Categories

Teachers used less time during the lessons in *organizing work for students* before training and reduced time in *organizing environment* after training. A significant level of difference between pre- and post-training groups in the average time used to organize student activity and environment was found. After training the average time dedicated to *organize students* increased from 37.46% to 62.88%. The average time dedicated to *organize environment* was reduced from 55.40% to 36.40% (Figure 6.3-37 and Table 9 of the Appendix).

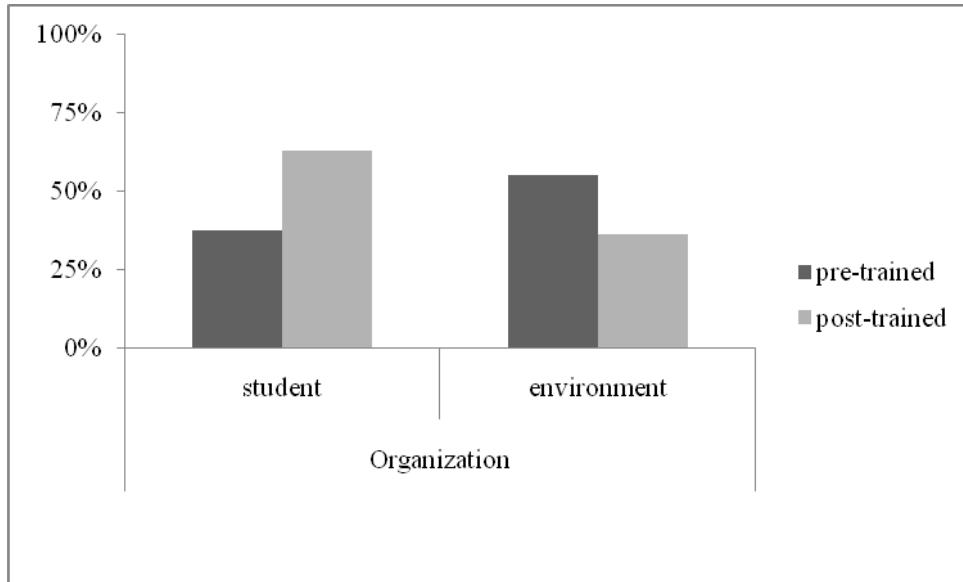


Figure 6.3-37 Second Level of Observation – Organization – Video Categories

Teachers did not change the use of verbal *direction channel*; it was their favourite channel before and after training. Before and after training the verbal channel was 30.78% and 27.62% respectively. The use of the *verbal channel* remained constant (Figure 6.3-38 and Table 9 of the Appendix).

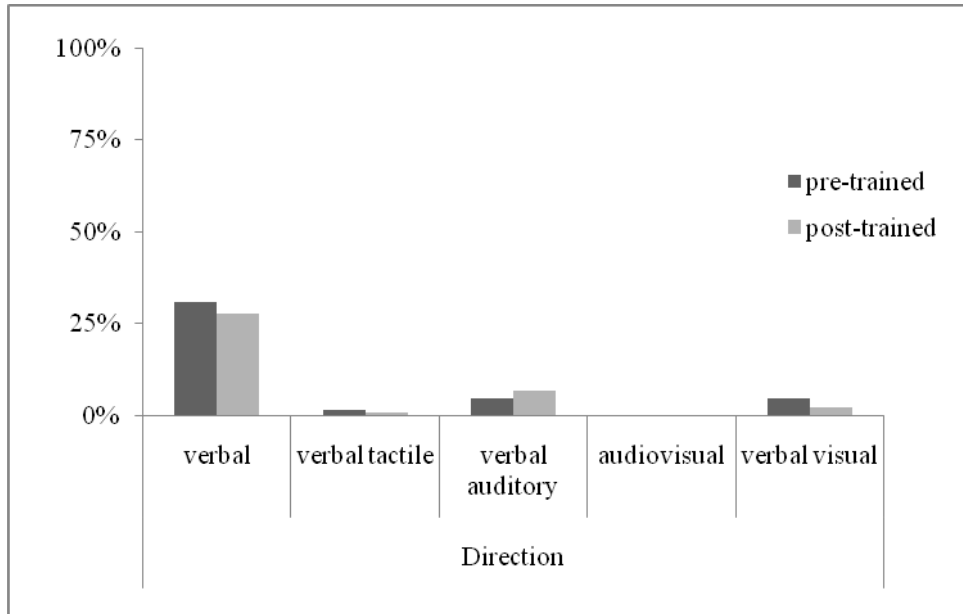


Figure 6.3-38 Second Level of Observation–Direction Channels– Video Categories

After training teachers reduced the quantity of *individual feedback*. A difference between pre- and post-trained groups in the average time used to give individual feedback can be observed. After training the average time dedicated *to give individual feedback* was reduced from 11.79% to 4.76% (Figure 6.3-39 and Table 9 of the Appendix). Again, the apparently surprising reduction of individual feedback after training must be analyzed in association with other training-related changes.

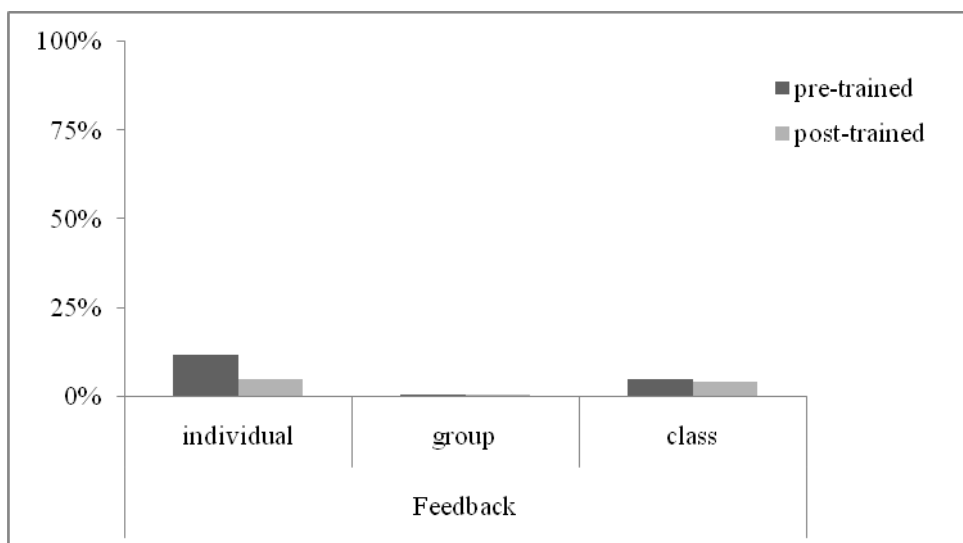


Figure 6.3-39 Second Level of Observation – Feedback Direction– Video Categories

In the organization of students, teachers dedicated more time to *group work* (from 6.10% to 24.23%) while reducing other areas of student organization (Figure 6.3-40 and Table 9 of the Appendix).

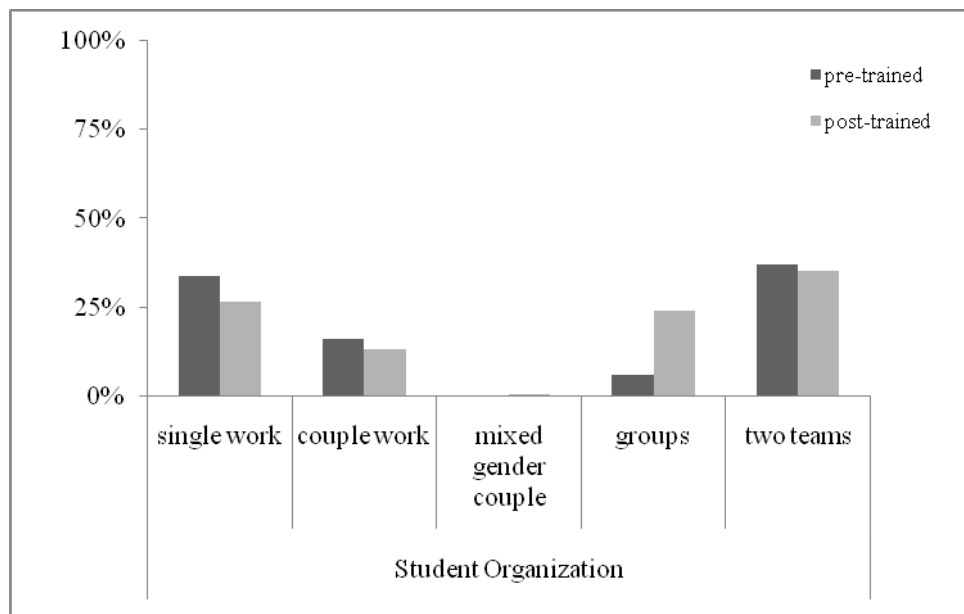


Figure 6.3-40 Third Level of Observation – Student Organization– Video Categories

In the organization of the environment the time remained constant. No significant difference between pre- and post-training groups was observed. Also, in the third level of observation, regarding the *organization of the environment* teachers continued to *work alone*, but student autonomy changed (Figure 6.3-41 and Table 9 of the Appendix).

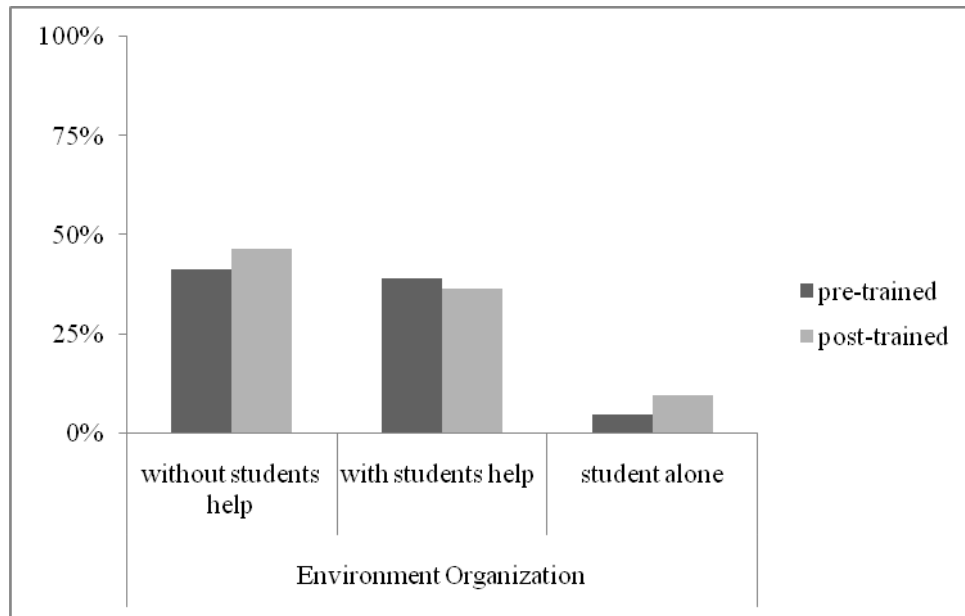


Figure 6.3-41 Third Level of Observation – Environment Organization– Video Categories

In the *verbal-visual direction* teachers preferred to demonstrate exercises before and after training even if there was the opportunity to delegate demonstrations to their students (Figure 6.3-42 and Table 9 of the Appendix).

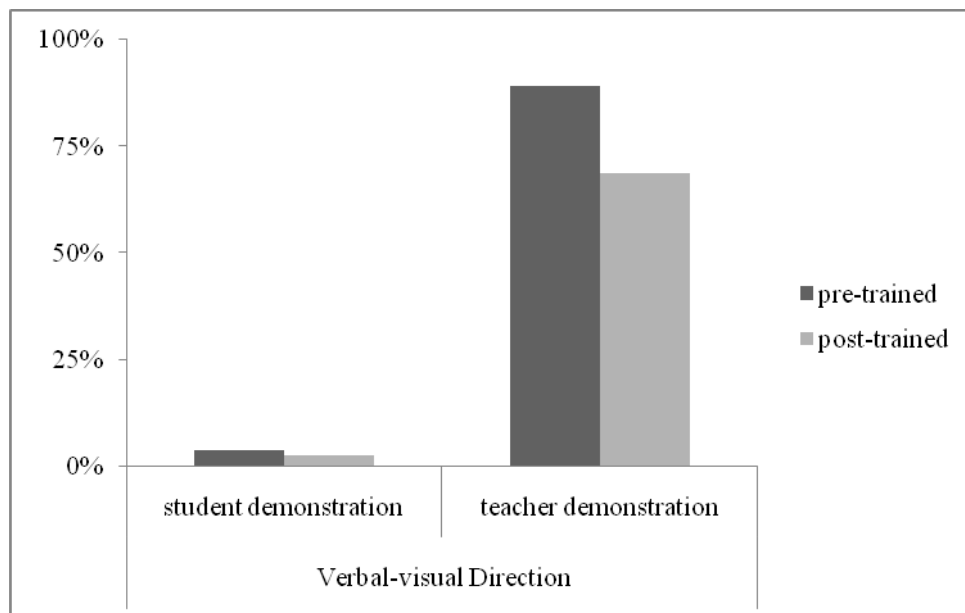


Figure 6.3-42 Third Level of Observation – Verbal Visual Direction– Video Categories

Teachers did not change the use of the verbal *feedback channel*; it was their favourite channel before and after training. The use of *feedback channels* remained constant and before and after training *verbal feedback* was the 13.57% and 15.53% respectively (Figure 6.3-43 and Table 9 of the Appendix).

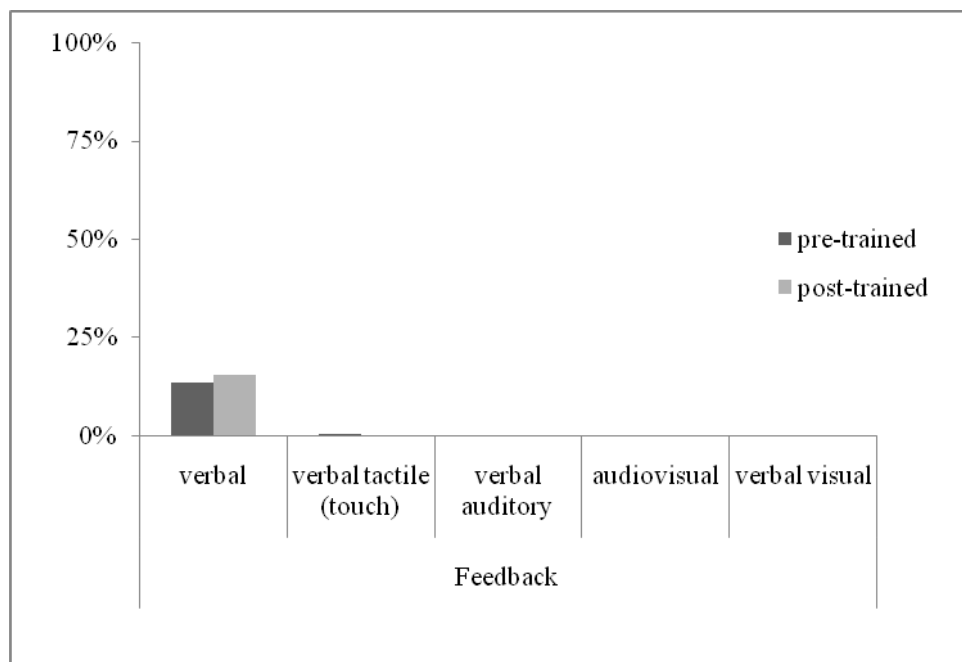


Figure 6.3-43 Third Level of Observation – Feedback Channels– Video Categories

In the fourth level of observation in the *environment organization*, the time dedicated to taking and placing tools increased from 65.62% to 70.74% (Figure 6.3-44 and Table 9 of the Appendix).

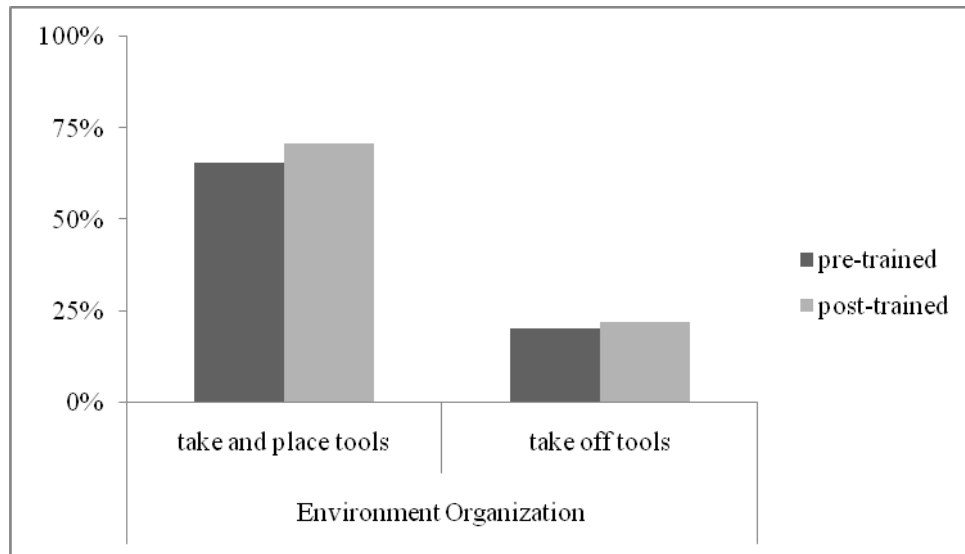


Figure 6.3-44 Fourth Level of Observation – Environment Organization– Video Categories

A substantial difference between pre- and post-training groups in the average time used to give the *behaviour feedback* appeared. After training in the fourth level of observation (see Table 9) the average time dedicated to giving feedback on behaviour was reduced from 7.24% to 4.44%. The average time dedicated to feedback on skill was reduced too, from 7.10% to 5.12% (Figure 6.3-45 and Table 9 of the Appendix).

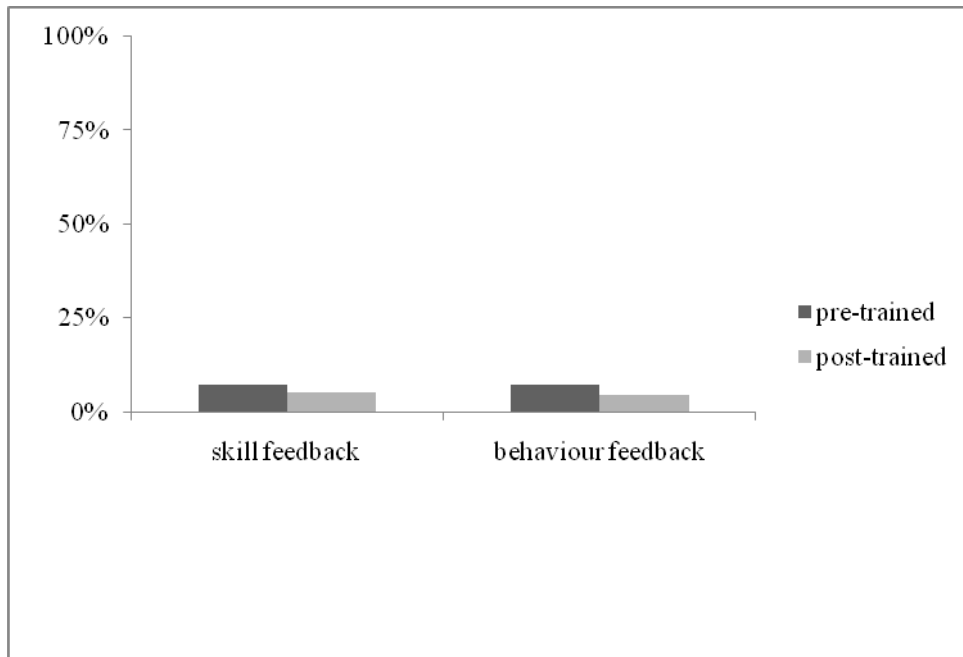


Figure 6.3-45 Fourth Level of Observation – Type of Feedback– Video Categories

6.3.3 Comparison of Verbal and Video Data

Data from different instruments was linked to reconstruct the teachers' subjective theory. Using a reiterative method the corresponding elements from different sources were used to design table of corroboration, second study (Table 29). The graphic representations of the two ST superstructures support the description of the different ST characteristics. See Figures 13 and 14.

	PRE-TRAINED TEACHERS				POST-TRAINED TEACHERS			
	Verbal data before lesson	Verbal data deduced from interview	Video data induced from observed behaviours	Corroboration	Verbal data before lesson	Verbal data deduced from interview	Video data induced from observed behaviours	Corroboration
Physical education goals	Motor Goal	Formative and Educational function in the school			Motor Goal	Educational function		
1^ Individual objectives		Social Dimensions				Social Dimensions		
Time spent to pursue the objectives		20%				23%		
Individual content orientation		to stay together, to respect others				to respect, know, learn social rules		
2^ Individual objectives		Motor Dimensions				Emotional and Social Dimension		
Time spent to pursue the objectives		20%				25% 10%		
Individual content orientation		to know motor language.				to develop self-esteem, to respect, know, learn social rules		
3^ Individual objectives		Emotional Dimension				Cognitive Dimensions		
Time spent to pursue the objectives		20%				38%		
Individual content orientation		to develop self-esteem				to learn rules, tactics		
Content of Lessons		team sport, games	motor activities			motor activities	motor and expressive activities	
Teaching methods	did not know	Deductive and more than one methods			did not know	Deductive, prescriptive and heuristic methods		
Teaching methods in PE		Prescriptive method, more than one	Prescriptive method			Heuristic and Prescriptive method	Heuristic and Prescriptive method	
Instructional format		verbal visual channel	verbal channel	-		verbal visual channel	verbal channel	-

Corrections	based on situation			based on situation		
Feedback	verbal channel	13,57%	+	verbal channel	15,53%	+
Didactic support equipment	not use	not use		not use	not use	
Social Organization	in groups	two teams and single work	+	in groups	two teams and single work	+
Environment organization		55,40% of 9,39%			36,40% of 8,17%	
Teaching styles	did not know			mobility in the spectrum		
Evaluation of learning outcomes	Motor and social abilities	involvement		Motor and social abilities	involvement	
Techniques to assess	observation		+	observation		+
Assessment system	Student individual progress			Student individual progress		
Tools used during lesson	apparatus	apparatus		apparatus	apparatus	
Critical incidents	no			no		

Table 29: Table of corroboration, second study

Notes: “+” = instruments corroborate the hypothesis and there is agreement between them; “-“ = instruments do not corroborate the hypothesis and there is not agreement between them; when the cell is empty means that the instrument is void, there is not corroboration.

To check the teachers' concept of PE goals before and after training different answers from semi-structured questionnaires were analyzed. The data confirmed the major attention given to the *general educational* (first choice) and *general goals* (second choice) *functions of PE* after training. Before training, the teachers declared the *formative and educational function in the school* as first choice and the *body formative functions* as second choice. The ranking of four of the most important dimensions in PE didactics by pre- and post-training teachers did not change in the first choice. Before and after training teachers identified the development of *social dimension* as the most important goal. Their intention to reach this goal was congruent with the higher time declared. After training the development of *motor dimension* became forth choice. Before training teachers declared to developing the *motor dimension* as second goal. Before training the development of *cognitive dimension* was the forth choice. Before training, teachers identified the *ability to be together, to respect others*, inside *social dimension* as the primary individual objective. While after training teachers recognized the development of the *ability to respect and learn social rules* inside *social dimension* as the primary individual objective, after training the development of *emotional dimension* become the second choice. Before training teachers declared using *team sport* and we observed the use of *motor activities* during PE lessons, while after training they also rated *expressive motor activities*. Nevertheless, before and after training teachers gave congruent responses, but only during post-training observations did teachers propose new *expressive motor activities*. Teachers stated they had learned new contents during training and had understood the meaning of quality of practice and student interest better. They also started to use *heuristic methodology* in *PE* after training. Teachers declared using more than one *teaching style* and we observed the use of *productive styles* in general. The use of the *prescriptive method*, more than reproductive styles was observed and an increase in time dedicated to *observation* (24% before vs. 32.76% after training) was noticed. The Mosston's Spectrum of Teaching Styles could not be used for analyzing teachers' behaviours and theories, because this kind of classification was unknown to Italian teachers. The Time dedicated to *environmental organization* decreased (55.406% vs. 36.40% after training), while the time dedicated to *observation* increased (24.00 % vs. 32.76%). *Social organization* remained invariable, only *work in small groups* increased after training and it is clearly linked to the presence of new contents. Verbal data was confirmed by video data. Only *student work in groups* changed

from 6.10% of lesson time before training to 24.23% after training. Also there was a percentage increase in *correction* directed at *small groups* (0% to 13.13%). In the video data a significant decrease in average time dedicated to give *feedback* on *behaviour* (7.24% vs. 4.44%) was stated. During the training teachers started to understand the specific use of feedback. Types of feedback can be classified in many ways and any type of feedback should direct the students' attention to the task and not to their egos. The reduction of average time in giving behaviour feedback presupposes the use of it with a specific intent. Teacher functions and behaviours are necessary to maintain an on-task, safe and productive learning environment, but the researchers observed an excessive use of praise on its own (e.g., "You are very good"), by pre-trained teachers. Recognizing the important role of feedback, teachers showed an inhibition to use it after training, particularly feedback directed at individual (11.79% vs. 4.76%). They shifted attention from the ego to the task, although it was not an explicitly defined aim of the training. Also, when considering that the major focus of the employed PD training was on the development of teaching skills to promote students' competence in motor problem solving tasks and motor creativity, emphasizing cooperative solutions, the training-related reduction in the use of *feedback in general* (14.27% vs. 9.40%) and *individual feedback* (11.47% vs. 4.76%) is no longer surprising. After training teachers increased the percentage of lesson time used to make corrections to *small groups*. Teachers before and after training declared using the *verbal visual, verbal and verbal auditory channels* giving *instructions*. From observations we noticed that teachers before training only used the *verbal channel* and the situation remained unchanged after training. As far as *feedback* is concerned both groups could be observed only using the *verbal channel*, while declaring they used also verbal-visual, verbal tactile and verbal auditory channels. Teachers moderately increased the use of *feedback in general* after training. The teachers, neither before nor after training, established *routines* for all basic managerial tasks and did not use clear *signals* for stopping and starting activities. They declared using more *rules* after training and managing student organization better. Time dedicated to *student organization* increased (37.46% vs. 62.88% after training), linked to a wider variety of activities proposed. Pre-training and post-training ST superstructures (Figures 14 and 15, pp. 180, 181) show all of the teachers' main changes.

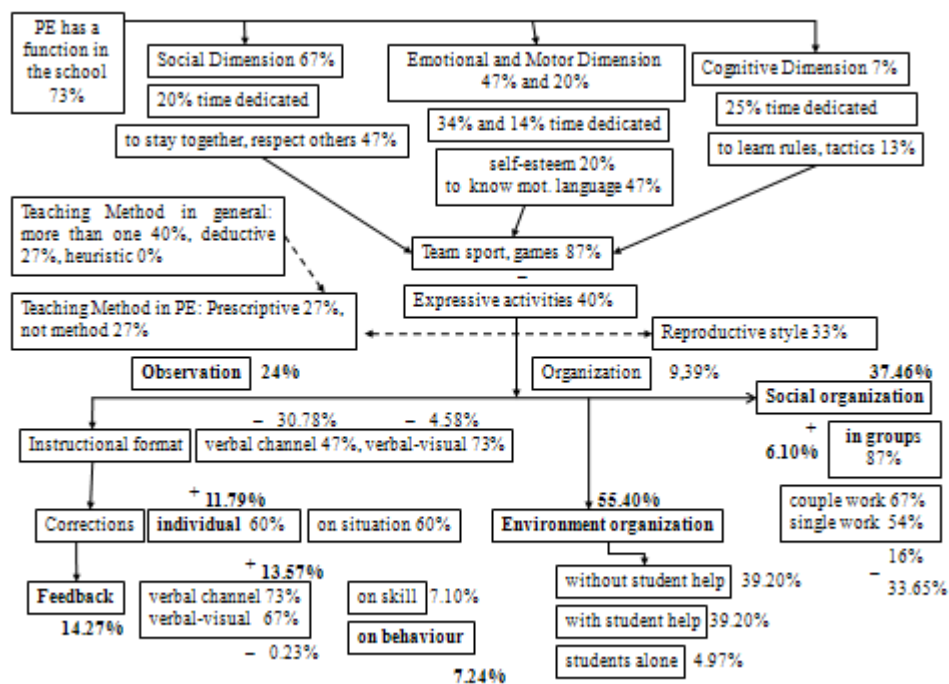


Figure 14: Graphic representation of the ST Superstructure of Teacher pre-training in PE

Notes: The arrows represent relationships between boxes. Dotted-line arrows indicate a flexible relationship. Rectangles aligned close to another represent subordinations. Percentages inside the boxes refer to verbal data and indicate the rate of choices for each category. Percentages close to the boxes refer to video data and are mean values of the percentage of time spent for a given category of teaching behaviour. The “+” and “-“ signs represent the presence or absence of consistency between verbal and video data sources as revealed by the use of corroboration tables. The absence of sign indicates that the verbal-video consistency could not be evaluated because a given category could be extracted only from verbal or video data. The bold fonts represent the differences between pre- and post-trained teachers.

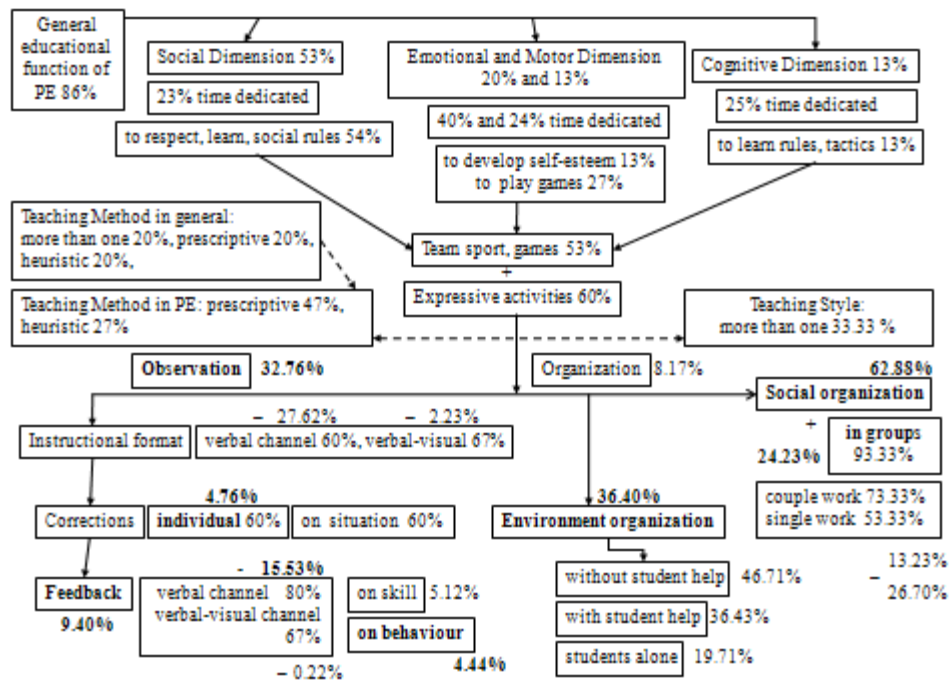


Figure 15: Graphic representation of the ST Superstructure of Teacher post-training in PE

Notes: The arrows represent relationships between boxes. Dotted-line arrows indicate a flexible relationship. Rectangles aligned close to another represent subordinations. Percentages inside the boxes refer to verbal data and indicate the rate of choices for each category. Percentages close to the boxes refer to video data and are mean values of the percentage of time spent for a given category of teaching behaviour. The “+” and “-“ signs represent the presence or absence of consistency between verbal and video data sources as revealed by the use of corroboration tables. The absence of sign indicates that the verbal-video consistency could not be evaluated because a given category could be extracted only from verbal or video data. The bold fonts represent the differences between pre- and post-trained teachers.

6.3.4 Discussion about the Results of the Second Study

The research topic was to investigate the changes in the ST and its effects on the teaching behaviour of pre- and post-training PE primary school teachers. The effect of the ST concerning PE of 15 primary school teachers was described and their teaching practices were analyzed before and after PE training. To this aim both analyses followed Groeben's (1986) suggestion to use two phases for validating ST: the communicative validation (based on verbal data) and the explanatory validation (based on video data). Results obtained from the first study helped to diagnose the deficiencies in teachers' ST and to prepare specific training materials for the modification of these deficiencies. On the whole, the results suggest that the introduction of an in-service Primary PE teacher training programme had had an influence on teachers ST and their behaviours. Results show training effectiveness in the increase of time dedicated to student organization and in the decrease of time dedicated to environmental organization linked to an increase in time dedicated to observation. Also teachers showed an inhibition to use individual feedback after training. As the comparison of the ST for pre- and post-training PE teachers shows (Figures 14 and 15, the superstructures), there are similarities in all major teaching categories, but differences occur mainly in the organization of feedback (direct to individual, on behaviour and on skills) and in the time dedicated to organizing students and the environment. This general reduction of feedback on behaviour and skills at individual level was not an explicitly defined aim of the training. However, it is coherently associated with a reduction of demonstration by the teacher and an increment in time spent for organizing student work in groups. This pattern of changes is consistent with a shift toward an heuristic teaching method centred on cooperative discovery learning which involves the minimization of demonstration and individual feedback in favour of a more skilled organization of students cooperative discovery work. The first study on teacher beliefs helped the researchers to recognize which were the real needs and the real opportunities for a change. During the training course the staff worked especially on different teaching methods and styles that teachers would be able to use in the gym. Results indicated that pre-training teachers spent more of their time using direct styles of teaching and using mainly students' group organization during the lesson (the frontal lesson). After training researchers stated an increase in the *heuristic method* in PE and teachers proposed new contents organizing work in *small groups*. The concept of the transfer of learning refers to

the influence of having learned one skill or ability on learning other skills and abilities (Rink, 2006, p. 36). Transfer can be facilitated by the teacher encouraging students to use information they already know and abilities that they already have, such as “this is...” and giving concrete examples. The increase in the heuristic method and the reduction of the prescriptive method in the PE context are used appropriately when the teachers’ role is to help the learner organize and structure learning experiences so that information can be retrieved for a new situation. This concept is linked to the use of the productive teaching styles in PE, such as problem solving, guided discovery, divergent style (Mosston & Ashworth, 2002), to teaching through questions (Siedentop & Tannehill, 2000, pp. 22-40) and other terms have been used to describe approaches and to the content that engage the learner in formulating responses rather than duplicating the motor response. The teacher has several alternatives if the objective is to cognitively involve students: e.g., to use more than one method and teaching style, different student group organization. Most teaching strategies can be used for either direct or indirect instruction and consequently the learning process. Teachers should be able to appropriately use all of the teaching strategies for different lessons and for different parts of the lesson. The aim of the in-service Primary PE teacher training programme was to cover many teaching strategies.

As concerns the differences in the beliefs and behaviours of PE pre-training and post-training teachers, main differences emerged for the time dedicated to organizing students and environment categories (Figures 14 and 15). In general the majority of time dedicated to students organization during PE lessons could be recognized as a wide variety of tasks. In the present study after training teachers dedicated more time to organizing students in small groups than before training and after training teachers decreased the amount of time dedicated to environmental organization by asking students to organize the environment on their own. It may have been that these teachers perceived the importance of academic learning time using more than one teaching strategy (Silverman, Devillier & Ramirez, 1991). Also an increase in time dedicated to observation was analyzed; this means an increase in time during lessons where students were active. One way towards effective organization for PE teachers is the use of established routines for students entering and leaving class, for selecting and putting away equipment and for starting and stopping a task. After training teachers rated that they used clearer rules and rituals to manage students in the gym.

As concerns other differences which emerged for the feedback category (Figures 14 and 15) which is one of the most important factors contributing to effective teaching in PE (Kyrgyridis, Derri & Kioumourtzoglou, 2006), in the present study after training teachers reduced the use of feedback in general and directed feedback to individuals (organization of feedback category). They dedicate more attention to give feedback, because during training the problems linked to the amount, the modality and the organization of augmented information emerged as critical factors. In particular, the task-orientation, cooperative learning, teaching methods and feedback (the aware use of feedback) concerned the guidelines that researchers suggested helping them to establish a high learning oriented class climate.

Changes in ST corresponding to teachers' intentions can be regarded as a positive and encouraging result. At the same time, the research staff had to accept the limitations of a short-period of intervention. The predictive validity for a PD programme is limited, when intervention is short and does not continue over a longer period of time (Tozer & Horsley, 2006). A qualitative investigation could be undertaken (a longitudinal study) to try to study the pre-, early and late phases of teacher learning better.

7 General Discussion

The research on beliefs and behaviours of primary physical educators in Italy, within the metatheoretical framework of the RPST, explores the purpose and function of primary PE on the communicative and explanatory validation of teachers' ST. The aggregated analysis of the STs shows that all teachers are not totally aware of the potential of PE. They show rational behaviour and generally act according to their STs but it can be concluded that the research results on teaching in PE and on teacher education presented in the Chapter 6 can help teachers to improve competencies in a realistic way.

Research on teaching has analyzed numerous differences that can be observed between specialists and non-specialists in PE teachers, but this study of primary teachers' PE Subjective Theory did not support previous research regarding differences in theory and /or practical aspects between specialists and non-specialist.

Results of the First study suggested that teachers without or with a specific qualification in motor science did not hold well articulated views about what constitutes a PE lesson. They did not give real opportunities to train students' skills because they organized lessons, for example, which included games with a decreased number of students and one student as winner. A lot of activities offered only one opportunity to practice. We observed a big difference in total lesson time and real academic learning time. Instructions were not clear. Lessons were not well planned. At the beginning of a lesson teachers did not present the objective of the lesson. At the end of the lesson teachers did not use a way to close the lesson, for example a reflexive circle. The most common teaching strategy should be lesson planning, but teachers who declared to use this approach were difficult to find.

This research has the advantage of taking into account primary school conditions which we know are preconditions for the modification of behaviour (Hanke, 1987). The other aspect of research analyzed is the link between the reconstruction and modification of teachers' internal and external points of view. A satisfactory implementation of RPST has the following effects on teachers (ibidem): (1) confirmation of the argumentation process to reinforce teachers' subjective theory or modify some aspects; (2) to acquire confidence in the effectiveness of integrative research on intervention approaches since this kind of research begins with the analysis of real school environment and teachers needs; (3) to

increase the willingness of teachers to apply skills which have been learned through an extremely interesting experience of working with PE teacher educators, seeing different teaching styles and new teaching methods. Instruments, such as the SD, the videotaped lesson and the Development Programme for in-Service Primary PE Teachers used in this research, helped teachers to reach satisfactory results in teaching. Despite the need for more studies to be undertaken, these results give information on what teachers learned during training and an indication of the aspects that facilitated change. The subjective theory of teachers clearly influences their coping behaviour. Taking the teachers' STs into consideration, it is also possible to discover new ways of coping, which are perhaps not yet known to the researcher but which could possibly explain the behaviour of teachers. During the intervention in-service teachers were confronted with their STs. Teachers can cope more easily with problems if they know what will happen (to anticipate consequence), and if they are aware that their teaching behaviour will lead the lesson in a certain direction.

The findings confirm the epistemological concept of the human being on which the RPST is based. For example, Italian teachers did not focus on the important goal of helping students to personally value physical activity. Developing a healthy student lifestyle is difficult to achieve, because the problem is in the individual nature of human perception and motivation (Rink & Hall, 2008), and students can participate in physical activities for different reasons, e.g. because they enjoy social interaction with others or the challenge of the activity. Nevertheless, there is no definite sport pedagogy that will make every activity attractive and ultimately common to every student (Rink & Hall, 2008). It is essential for teachers to ensure a wide variety of activities (dance, games, and gymnastics) in the primary programme. It is also important to invest time in informing and counseling teachers with regard to the origin, perpetuation and the consequences of their teaching. The teachers in this sample need help to develop new curriculum content if they are to help students value physical activity. Moreover they need to achieve strategies aimed at anticipating class events, reducing the mental workload associated with class management and supervising students' work, and deferring contradictions inherent in the teaching task. Teaching with or without expertise did not use routines in an effective teaching-learning process. It is necessary that teachers be given opportunities to reflect on actual pedagogical issues and/or problems. In addition, teachers need opportunities to share, analyze, assess

and justify their professional theories and actions. By providing teachers with time to observe and discuss teaching experiences that occur naturally within the classroom or school context, teacher educators can help teachers bring to light the theories that guide their actions so that these theories and actions can be refined, adjusted, or restructured appropriately. A change toward the use of new teaching methods and styles, also of new content (i.e. expressive motor activities) as a result of our analyses and intervention programme could be observed. It is possible to become a good PE teacher based on academic knowledge and teaching skills acquired through training programmes and also by developing personal professional experience. This experience is enriched when associated with a reflective attitude and practice (Durand, 1999). There is an awareness that quality teaching makes a difference to student learning and that teachers can improve their practices through professional learning. Currently there is very little agreement in Italy about how CPD should be designed.

The framework based on subjective theory puts into evidence the role of basic personal change and the strategy to widen teachers' personal points of view. The focus of this research was implicitly on the teacher, as the unit of change. We support results of other researchers (McCaughy et al., 2006b), who made suggestions to anticipate and be receptive to important emotional responses that teachers may have when asked to change. Teacher education and staff development programmes need to create opportunities for teachers not only to learn new knowledge but also to clarify their own professional theories and learn from them.

In conclusion, this study shows that educational change, in addition to being a cognitive process of understanding new content and new instructional procedures, is a human affair where teachers feel change as well as understand the process of change. The research and training approach presented in the Chapter 6 showed to be effective in increasing self-reflection on values, objectives and methods and in changing observable behaviour as well. There is the need to continue relevant PD in PE, and such opportunities must be part of a formalized system of career support and must be designed for the needs of teachers rather than being subjected to the rules imposed by bureaucracy or the state (Macdonald, Mitchell, & Mayer, 2006). Armour and Yelling (2004a) suggest that PE teachers, in England, identified a 2-year CPD as "going on a course," but, in reality, they learned in a

variety of ways. The most striking finding was the high value they placed on learning informally (yet strategically) with and from each other. The authors argued, therefore, that the traditional relationship between teachers and CPD provision needs to be altered so that teachers in their professional learning communities or networks play a leading role. In addition, we can not undervalue the role of personal change in this process and “from a psychological point of view”, the highly complex, multifaceted teaching task of PE teachers.

Moreover, knowledge which has been gained in such an innovative study can contribute to testing the effectiveness of the RPST on PE teachers’ STs. Our findings confirm the epistemological concept of the human being on which this research model is based. The application of the RPST to the combination of several STs is an innovation. Continued innovations are necessary not only on the subject matter of research, but also on the methodological level.

8 Conclusions, Limitations and Outlook

8.1 Conclusions

Qualitative analysis of teachers' beliefs on teaching offers a more diverse and interpretative method of gaining access to the concerns of PE primary teachers than traditional teaching courses. This research provides greater knowledge and insight into the relationship between teachers' educational theories and practice. This kind of research is important because of the implications it has on the PE programme conducted in primary schools. Primary PE that is appropriately provided has been shown to have an impact on lifelong physical activity (Gallahue et al., 2003, pp. 2-23). The theoretical approach of this research (RPST) allows it to find real applications in the school context, facing teachers needs, overcoming dichotomy between teaching theory and practice, and helps in-service teachers to understand the difficult process of teaching better. Through a reflective and empowering process, professional theories that are educationally sound should be reinforced while others that are inappropriate should be challenged and reconstructed. Developing and maintaining a teaching portfolio requires that teachers reflect on what they do and collect information on the teaching-learning process. It is important, therefore, for in-service and pre-service programmes not only to expect teachers to articulate their theories of teaching but also to provide opportunities for them to develop, refine and practice their new theories. This kind of research approach can reduce the discrepancy between what physical educators think they do and what they really do. There is an urgent need to conduct more studies which help to make policy decisions regarding initial teacher education and in-service training.

PE is an essential component of the education of children and youth but resources for PE in the public school are diminishing. Even though the Italian government has not yet accepted the important role PE teachers play, Italian university teachers have organized this public education course emphasizing the role of the specialist PE teacher in primary schools and the urgent need to develop professional programmes in PE for in-service primary teachers.

This project has been made up of much sustained effort directed at a small group of teachers, but the Italian situation is not very different from other nations, e.g., children get too little exercise, have diets that are too fatty, have violent behaviour. Considering the

relevance of the results obtained at the end of this research, it is necessary to organize a conference where researchers can speak up regarding the situation and convince school administrators about the importance of changing the Italian approach to PE, even if educational spending is the hot topic in Italy at the moment. As there are few funds available for the Italian government to invest in PE, it is unfortunate that the current economic situation can only limit how much governments are able to strive towards reaching the major goals of PE and youth sports.

8.2 Limitations

The study had limitations that may have influenced findings. First, the presence of our video-camera was an invasive element. The presence of researchers during the PE lessons may have led to the misrepresentation of information and may have caused answers that were influenced by desirableness, even though the best and worst of teaching will be confined to embedded practice. Secondly, the qualitative analysis of data required a long period and complex study. To summarize and corroborate the findings of this study was a complex task, as a wide sample and variety of data had to be analyzed. A smaller number of subjects would have helped researchers to study different aspects better. Thirdly, there was an objective problem in evaluating the change process not on a personal basis, but by using the group average. Nevertheless the personal process of reflection could be facilitated through the use of the videotaping of lessons (one of the research instruments), a teacher's continued professional growth depends largely on personal ability and it could be interesting to analyze this personal process. Teachers' STs showed that the realistic assessment of primary PE lessons results from information and experience, which teachers gained and interpreted in the course of their careers. Our challenge will be to analyze data with different statistical tests in which we can discover discriminatory categories to classify teachers in different groups and to discover what the common characteristics are. It would be interesting to come back to teachers and repeat the analysis after one or two years, to understand if this approach has managed to trigger permanent change in the teaching process. Checking to instigate the change progress is necessary because new teaching behaviours must be practiced until they become an automatic routine.

Finally, since the study was conducted only with Italian teachers would be necessary to conduct additional research in other countries using the same approach. It would also be of use to develop a cross-cultural research as interesting aspects linked to different cultures were found (Pühse & Gerber, 2005).

8.3 Outlook

We noticed new perspectives on the role of the video in a teacher's education. Video has played a useful role for teachers since its introduction to teacher education in the sixties (Sherin, 2002). By means of the video and programmes to analyse it, researchers and teacher educators are able to identify different activities in detail.

In general the video analysis offers the opportunity to analyse teaching in a way that is completely different from other types of practices. The most important point is that watching a video-tape offers the opportunity to develop a more in-depth knowledge of teaching. Not only in terms of what teachers can do next time, but how to interpret and reflect on gym practices. Sherin (2002), suggested a number of new applications of using video with teachers (e.g. video clubs, hypermedia representation of practice, video analysis tools and so on), but the most important suggestion is that such a system can become an important part of a teacher's professional identity. We suggest that one idea could be to develop videotaped exemplary models of teacher education and PD in PE. Knowledge of teaching concerns of PE teachers could help university supervisors to direct their supervisory strategies and especially during pre-service teacher education programmes, future teachers should be equipped to resolve their concerns. Rink (2006, p. 338) suggested: 1) to reflect on relationships between what you do as a teacher, why you do it, and the effects of what you do on your students in relation to your teaching goals; 2) to collect information on the teaching-learning process that will help you make judgments about what is occurring and use information that you collect to make changes in what you do.

Considering these suggestions university PE teachers training programmes should provide more in-dept opportunities for teachers to grow professionally and personally and therefore, the extent to which the method used in this research can assist the access of teachers' concerns is an interesting aspect of research in itself.

The Italian government (MIUR, 2010) has just strengthened cooperation with CONI (the Italian National Olympic Committee) proposing the presence of new transitory (by a short-term contract) PE teachers in primary school. This new staff will be adopted in the schools and will work together with in-service primary school teachers from February 2010 to the

end of this school year. Despite this improvement in PE in schools, the recruitment of “specialist PE teachers” is ambiguous as it is not linked to the concept of quality and systematic school-oriented pedagogic competencies.

CONI only promotes sport in general. They are lacking in the specific educational skills which are needed in order to be effective in primary schools. What has been forgotten is that the ultimate goal is to employ teachers who can not only promote sport but who are also aware of the school environment with its specific needs and requirements.

The teaching is a profession. Although it is reasonable for new teachers to learn a lot during their first few years from experience, it is unreasonable to expect that these teachers will acquire their skills independently by practice alone or with the support of in-service primary teachers.

The university setting has the resources to help young teachers acquire teaching skills and it is unacceptable that the Italian government does not consider the importance of research in this field and the opportunity of implementing university findings in primary schools.

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Table 1: Structured Dialog

Date _____	Class and grade level _____
School _____	Students _____
Teacher _____	Female students _____
Observer _____	Male students _____
	Students with disabilities _____

Do or did you practice sport?
 If yes, which kind of sports do or did you practice?
 At what level did you practice your sport (competitive or not competitive level)?
 How many years did you practice it?
 Are or were you a trainer?
 If yes, what sports do or did you teach?
 At what level do or did you teach (competitive or not competitive level)?
 How many years have you been doing or did you do it?
 How old are you?
 How many years have you been teaching in this school?
 How many years have you been a teacher?
 How many years have you been a physical education teacher?
 Did you teach all subjects in elementary school or predominantly just few?
 If you teach some subjects, which ones?
 Do you have a degree in Physical Education?
 Apart from your teaching qualification do you have any other degrees?
 What is the objective of today's lesson?
 What are the contents?
 What are the methods?
 Will you use special physical education equipment (e.g. footballs or basketballs, jump ropes, cones, bean bags, etc.)?
 Are there problems or difficulties that you think will be present during today's lesson, e.g. didactic content is new or difficult?

Question number one**1) Physical education goals:**

Discuss with the interviewer what she/he sees as major goals for physical education.

Can you describe why physical education exists in the school curriculum? So tell me reasons why physical education is taught in elementary schools?

	Kinds of Goals
a	Children's favourite subject
b	To compensate other subjects
c	Curriculum
d	Healthy lifestyles
e	Formative and educational function in the school
f	Body learning function
g	Educational function (to do sport, to learn motor ability, to learn through sport)
h	Motor goal, social goal (general goals)
i	Specific motor goals

Delimiting question:

What do you mean exactly by...?

Question number two

2) Individual objectives

Describe what she/he sees being the most important individual objectives (outcomes) of physical education didactics that he/she teaches.

National Indications give the major goals for physical education. Apart from these indications, every teacher has personal ideas about what effects the lesson should have on his/her students. What are the most important outcomes of a physical education lesson that you teach?

Spontaneous answer, free speech (don't read the answers)

SOCIAL DIMENSION	EMOTIONAL DIMENSION	MOTOR DIMENSION	COGNITIVE DIMENSION
fairness/fair-play	self-esteem / perception / control /acceptance	to use motor language	to develop attention
Interaction behaviour/communication	overcome difficulties	basic motor abilities	to learn rules tactics
empathy	to love sport / appreciate motor activities	to promote strength and endurance	psycho-motor ability
cooperative/social behavior	serenity	to check body movement	to understand verbal instructions
to overcome individuality	to want to move	psycho-motor ability	to learn symbolic signs
To learn how to win/lose	to express emotions through your body	posture	to learn numbers
to learn how to use the gym	emotional development	harmonious development	to find solutions
integration	to have control over emotions	body awareness/development	
to be together/respect others	relax	to use space	
to help others	to enjoy	Spatial-temporal coordination	
cohesion	to understand emotions	small co-ordination / co-ordination	
respect/know/learn social rules		to use new language	
respect notices		(to move with music)	
		health/fitness	
		To develop body composition	
		agility/ balance	
		breathing	

Delimiting question:

- a) *General concepts - also ask the teachers to give you specific objectives;*
b) *Specific objectives - also ask the teachers to give you general concepts.*

Question number three

3) Hierarchical structure of physical education objectives

The teacher has just described to you what s/he sees as the most important individual objectives (outcomes) of physical education didactics that he/she teaches.

(Read the answers to the teacher)

These important physical education objectives have an impact on the development of emotional, cognitive, social and motor functions.

What are the most important dimensions (emotional, cognitive, social, and motor)? Can you give me a hierarchical structure?

How do you spend time pursuing these objectives? Give me a percentage indication with reference to a one year program.

What are the most important objectives that he/she has described? Can you give me a hierarchical structure inside every dimension?

How do you spend time pursuing these objectives? Give me a percentage indication with reference to a one year program.

(Use the answers that teacher gives you in question no. 2)

SOCIAL DIMENSION	EMOTIONAL DIMENSION	MOTOR DIMENSION	COGNITIVE DIMENSION
fairness/fair-play	self-esteem / perception / control /acceptance	to use motor language	to develop attention
Interaction behaviour/communication	overcome difficulties	basic motor abilities	to learn rules tactics
empathy	to love sport / appreciate motor activities	to promote strength and endurance	psycho-motor ability
cooperative/social behavior	serenity	to check body movement	to understand verbal instructions
to overcome individuality	to want to move	psycho-motor ability	to learn symbolic signs
To learn how to win/lose	to express emotions through your body	posture	to learn numbers
to learn how to use the gym	emotional development	harmonious development	to find solutions
integration	to have control over emotions	body awareness/development	
to be together/respect others	relax	to use space	
to help others	to enjoy	Spatial-temporal coordination	
cohesion	to understand emotions	small co-ordination / co-ordination	
respect/know/learn social rules		to use new language	
respect notices		(to move with music)	
		health/fitness	
		To develop body composition	
		agility/ balance	
		breathing	

Question number four

4) Contents (individual content orientation)

Start from the major physical education objective, how does the teacher plan her/his lessons? Describe what are the general contents of physical education teaching.

- a) motor activities
- b) motor expressive activities
- c) team sport, games

Question to provide clarification:

How do you combine these three big categories inside the development of four dimensions (motor, cognitive, emotional, social dimensions)?

Can you give me some examples?

Objective / Contents	motor activities	motor expressive activities	team sport, games
Emotional dimension			
Social dimension			
Cognitive dimension			
Motor dimension			

Question number five

5) Methods (don't read categories)

Share some of your teaching methodologies (in other subjects).

Deductive
Prescriptive, To give indications
Analytic, To give examples

Inductive
Heuristic, Guided discovery
Global

Repeat the preferable method and link this answer to the answer given in question number 4 (content).

Specify if you also use these methodologies in physical education teaching.

If you do not use the same methodologies, what physical education teaching methods do you use?

Question number six

213

6) Instructions, demonstration and feedback (*read categories*)

How do you give instructions, demonstrations and guidelines?

Which channels of communication do you prefer to use? (Verbal, verbal-visual, verbal-tactile, verbal-auditory, audiovisual)

How do you normally correct your students? You make corrections to all the class, to small groups, to individuals or based on the situation.

Which channels of communication do you prefer to use? (Verbal, verbal-visual, verbal-tactile, verbal-auditory)

Question number seven

214

7) Didactic support equipment (*don't read categories*)

Describe if you use any didactic support equipment during physical education lessons.

If she/he doesn't give you quick answer, tell her/him,

"I don't intend apparatus, but for example posters, a blackboard, cards, films, handouts from students, cds, or internet".

Describe if your use of didactic support equipment depends on lesson content, method, on objectives or kinds of social interaction.

Question number eight**8) Teaching Styles**

Physical education lessons take place in spatial and temporal conditions that are extremely different from those of the traditional classroom.

For example there is more noise than you have in a classroom; it is not easy to look at all students at once!

How do you manage these specific tasks?

- Rules
- Rituals
- Signs
- Other

Apart from these specific tasks, the physical education lesson has specific social interaction characteristics unique to its teaching!

Do you cope with these specific aspects?

How do you organize students?

Work in groups

Work in couples

Single work

Or...small groups

How do you manage interaction with your students?

What are your teaching styles?

Question number nine

9) Assessment strategies (evaluation of learning-outcomes)

Tell me how you assess your physical education lesson.
(*Open question*)

Describe how you assess a child's skills.
(*Read categories*)

E.g. practical skill, motor skill, social skill or other...

Tell me how important, in percentage, these skills are.

Question to provide clarification:

Describe how you practically assess child's skills: tests, measures, flow-charts...

What system do you use to assess the child's performance (*read answers given above*)?

Table 2: Comparison of different data

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
PHYSICAL EDUCATION GOALS		<i>Discuss with the interviewer what teacher sees as major goals for physical education</i>	Physical education goals	X		European Physical Activity Goals
INDIVIDUAL OBJECTIVES		<i>Describe what teacher sees being the most important individual objectives (outcomes) of physical education didactics that he/she teaches</i>	Spontaneous answer (more than one can give us indications about the multiple point of view)			Curricular theories (program priorities)
INDIVIDUAL OBJECTIVES		<i>The teacher describes the hierarchical structure of physical education objectives</i>	- 4 dimensions (emotional, cognitive, social, motor) - Hierarchical structure	X		Curricular theories (program priorities)
		<i>The teacher describes the time spent to pursue these objectives and gives a percentage indication with reference to a one year program.</i>	- 4 dimensions (emotional, cognitive, social, motor) - Percentage of time that teachers dedicated			
INDIVIDUAL CONTENT ORIENTATION		<i>The teacher describes the hierarchical structure of the most important objectives inside every dimension</i>	- Goals inside 4 dimensions - Hierarchical structure	X		Curricular theories (program priorities)
		<i>The teacher describes the time spent to pursue these objectives inside every dimension and gives a percentage indication with reference to a one year program.</i>	- Goals inside 4 dimensions - Percentage of time that teachers dedicated			

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
GOALS OF LESSON	X			X		
CONTENTS OF LESSONS	X	<i>The teacher describes what are the general contents of physical education teaching: Motor activities, Expressive activities, Team sport The teacher describes how he/she combines these three big categories inside the development of four dimensions (motor, cognitive, emotional, social dimensions) and gives some examples</i>	Description of contents - Motor activities, - Expressive activities, - Team sport,	X		Curricular theories (content focus)
NUMBER OF ACTIVITIES			X (more than one can give us indications about the multiple point of view)	X		
TEACHING METHODS		<i>The teacher shares some of his/her teaching methodologies in other subjects</i>	- no method - deduct - prescriptive - analytic - inductive - heuristic - global - cooperative - all above	/		

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
TEACHING METHODS / TEACHING METHODS IN P.E.	x	<i>The teacher shares some of his/her teaching methodologies in PE teaching</i>	<ul style="list-style-type: none"> - no method - deduct - prescriptive - analytic - inductive - heuristic - global - cooperative - all above 	Induced from video?	Fieldnotes	
INSTRUCTIONAL FORMAT (A DELIVERY SYSTEM FOR GETTING THE CONTENT TO THE LEARNER)		<i>The teacher describes how she/he gives instructions, demonstrations and guidelines and which channels of communication she/he prefers to use: Verbal, verbal-visual, verbal-tactile, verbal-auditory, audiovisual</i>	<ul style="list-style-type: none"> - Verbal - Verbal-tactile - Verbal-visual - Verbal-auditory - Audio-visual 	x	<ul style="list-style-type: none"> - Instructional strategy or style (Rink, 1993): - the content, - the objectives of the teacher, - the characteristics of the learner 	<ul style="list-style-type: none"> - Pedagogical Theories - Pedagogical Issue

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
CLIMATE			/			Pedagogical Theories
TASK			/	- Task type - Task organization - Task explicitness		Task structures (Silverman, 1998)
INSTRUCTIONAL TASK			/		Instructional task (the selection, the presentation and structure of task)	- Pedagogical Theories - Pedagogical Issue
COOPERATION AND NEGOTIATION					To maintain students' cooperation	Pedagogical Theories
CORRECTIONS		<i>The teacher describes how she/he normally corrects his/her students and makes corrections to all the class, to small groups, to individuals or based on the situation</i>	<ul style="list-style-type: none"> - on all students - small groups - single - by situations 		Task explicitness is based on : <ul style="list-style-type: none"> - Outcome, - Situation, - Criteria-product, - Criteria-form, 	

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
FEEDBACK		<i>The teacher describes which channels of communication she/he prefers to use giving feedback: (Verbal, verbal-visual, verbal-tactile, verbal-auditory)</i>	<ul style="list-style-type: none"> - Verbal - verbal visual - verbal tactile - verbal auditory - audiovisual 	x	Monitoring: <ul style="list-style-type: none"> - Auditory - Visual - Tactile - Auditory-visual - Auditory-tactile - Visual-tactile - Auditory-visual-tactile, 	Feedback coding (Silverman, 1998)
Didactic support equipment	x	<i>The teacher describes if she/he uses some didactic support equipment during physical education lesson</i>	x	x		
SOCIAL ORGANIZATION		<i>The teacher describes how she/he manages social organization: with Rules, Rituals, Signs or Other</i> <i>The teacher describes how she /he copes with student organization: Work in groups, Work in couples, Single work or in Small groups</i>	<ul style="list-style-type: none"> - Rules - Rituals - Signs - Other 	x		<ul style="list-style-type: none"> - Pedagogical Theories - Pedagogical Issue - Social Issues (Siedentop & Tannehill, 2000)

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
TEACHING STYLES		<i>The teacher describes his/her teaching style</i>	Teaching styles	x	Mosston Teaching Styles: - No style - Productive style - Reproductive style - All styles	Mosston Teaching Styles
EVALUATION OF LEARNING OUTCOMES		<i>Teacher describes how she/he assess his/her physical education lesson and how assess a child's skill: practical skill, motor skill, social skill or other...</i> <i>The teacher describes how important, in percentage, these skills are</i>	<ul style="list-style-type: none"> - Social skills - Motor skills - Practical skills 	<ul style="list-style-type: none"> - Students' Commitment - Students' Interest 	<ul style="list-style-type: none"> - teacher process variables - student process variable - student outcome variables or product variables 	
TECHNIQUES		<i>The teacher describes how she/he practically assesses child's skills: tests, measures, flow-charts...</i>		/	<ul style="list-style-type: none"> - Objective assessment measures - Subjective assessment measures 	

	VERBAL DATA BEFORE LESSON	QUESTIONS ASKED IN SEMI-STRUCTURED DIALOGUE	VERBAL DATA DEDUCED FROM INTERVIEW	VIDEO DATA INDUCED FROM OBSERVED BEHAVIORS	CATEGORIES DEDUCED FROM LITERATURE	CLUSTERS OF CATEGORIES *
ASSESSMENT SYSTEM		<i>The teacher describes what system she/he uses to assess the child's performance</i>			<ul style="list-style-type: none"> - student achievement, - student improvement, - student effort, - student conduct. 	
TOOLS USED DURING LESSON	X		/	X		
CRITICAL INCIDENTS	X			X		

Table 3: Definition of video categories of teacher behaviours in PE classes

PRESENTATION of the LESSON	the way in which the lesson is arranged, general verbal information about lesson activities (the essay of the day). E.g. What are we doing today?
INSTRUCTIONS on ACTIVITIES (explanation or presentation of activities)	verbal communication, the use of media materials is the most common form of task communication. E.g. What are we doing now? Why are we doing it? And the teacher informs the students about the skills they need to complete the task and tells them what they have to do. This is usually the first step in a sequence of steps. During the lesson teachers can change the kind of activity (e.g. warm-up, a game...).
	As a second step: Which kind of activity? MOTOR ACTIVITIES; EXPRESSIVE MOTOR ACTIVITIES; TEAM SPORT, GAMES.
ORGANIZATION	it is a term reserved for almost everything the teacher does that is directly related to the content to be taught.
STUDENTS ORGANIZATION	As a second step: STUDENTS ORGANIZATION. This event starts with the teacher asking or ordering and ends when teacher starts to explain or students start to play.
	As a third step: SINGLE WORK (facing the students); COUPLE WORK; MIXED GENDER COUPLE; GROUPS (3, 4 or more groups, or all student interaction); TWO TEAMS.
ENVIRONMENTAL ORGANIZATION	As a second step: ENVIRONMENTAL ORGANIZATION. This event starts with the teacher asking students to take equipment and stops when equipment is taken off
	As third step: WITHOUT STUDENTS' HELP; WITH STUDENTS' HELP; STUDENTS ALONE.
	As fourth step: TAKE AND PLACING EQUIPMENT and TAKE OFF EQUIPMENT
TRANSITION	Teacher gives directions, commands or orders to change from one activity or exercise to another (e.g. "stop"...in single file, or in line, or sit down). Also it is not directly related to the content to be taught.
DIRECTION	Teacher is involved in same activity or game or task or skill. Refining, extending, repeating task...
	As second step: Which kind of channel does the teacher use? VERBAL; VERBAL TACTILE (TO TOUCH); VERBAL AUDITORY (she/ he uses a small drum or whistle); AUDIO-VISUAL (she/he uses a video).
	VERBAL VISUAL DIRECTION has at third level two subcategories: STUDENT DEMONSTRATION or TEACHER DEMONSTRATION.
FEEDBACK	Teachers can help students utilize feedback on knowledge of results and performance inherent in a skill and can use teacher feedback to maintain student focus and motivation to continue practice.
	As second step: INDIVIDUAL (Feedback directed one to one); GROUP (Feedback directed to two or more students); CLASS (feedback directed to all students).
	As third step: Which kind of channel does the teacher use? VERBAL; VERBAL TACTILE (TO TOUCH); VERBAL AUDITORY; AUDIO-VISUAL; VERBAL VISUAL.
	As fourth step: SKILL FEEDBACK, Feedback is related to the skill or BEHAVIOUR FEEDBACK, Feedback is related to management (also punitive action or when she/he threatens action).
OBSERVATION	Teachers observe, students move.
OTHER	PAUSE; when the teacher is not in the videotape and we don't know what he/she is doing; TEACHER-STUDENTS DIALOGUE; REINFORCE DISABLED STUDENT WORK; DISABLED STUDENT-TEACHER INTERACTION; TEACHER-ADULT (teachers, parent) DIALOGUE; INTERRUPTION: teacher interrupts lesson or stops some activities while students are talking or doing something, by saying or doing something that she/he believes necessary (to talk to students like a father or mother), to rebuke (to speak angrily to someone because they have done something wrong).

Table 4: Demographic Information on Teachers - specialists vs. non-specialists.

<i>Teacher</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
1 (22)	41	F	Degree			20	3	Not competitive	Gymnastic Swimming	10	
2 (24)	42	F	Degree			6	5	Not competitive	Judo	3	
									Volleyball	2	
3	34	M		Graduate (Isef)	yes	7	7	Competitive and Not competitive	Basketball	15	15
4	30	F				4	0	Competitive	Volleyball	6	
									Archery	2	
5	37	F		Graduate (Isef)		14	10	Competitive	Swimming	5	
									Dance	7	
									Athletic	7	
6 (23)	42	F				8	7	Not competitive	Karate	1	
									Tai-chi	3	
									Dance	1	
7	38	M				6	6	Competitive	Soccer Swimming	12	
8	38	F				20	10	Not competitive	Spinning	20	
									Gymnastic	20	
9	33	F	Degree	Graduate (Isef)		8	8	Competitive	Tennis	20	
									Soccer in 5 players	10	10 (competitive level)
10	58	F			yes	34	5				
11	39	F				12	12	Not competitive	Volley	4	
									Swimming	2	
12	41	F				19	never				

<i>Teacher</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
13	32	F				9 on special students	never	Not competitive	Aerobic	2	
14	60	F				38	20	Not competitive	Tennis	4	
15	42	F				21	13	Not competitive	Swimming Gymnastic	Every year	
16	38	F				7	4				
17	46	F	Graduate in Psychology			18	1	Competitive	Running Cycling	Every year	
18	44	F				22	10				
19	37	F				10	5	Not competitive	Dance Artistic Gymnastic	3	
20	48	F				30	1				
21	39	M		Graduate (Iusm)	yes	3	3	Not competitive	Every kind of sport	15	15
25	35	F	Degree			9	9	Not competitive	Gymnastic	10	
26 (59)	31	F				6	3	Not competitive	Gymnastic	2	
27 (60)	32	F	Private qualification to teach students with special needs			11	4		Volley Swimming Athletic	8 5 3	
28 (58)	35	M	Degree and qualification to teach students with special needs			5	1	Competitive	Soccer Rugbuy	8 8	2
29	57	F	Degree		CONI training	37	37				

<i>Teacher</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
30	38	F				15	8				
31	52	F	Degree		IRSAI	30	15	Not competitive	Gymnastic	5	
					training						
32 (48)	52	F				15	6				
33 (47)	46	F				7	5	Competitive	Dance Horseback riding	10	
										10	
34	58	F			CONI	34	34	Not competitive	Fitness	30	
					2 years						
					training and others						
35	45	F				15	15	Not competitive	Gymnastic Swimming	3 5	
36	49	F	Degree			10	5	Not competitive	Gymnastic	10	
37 (55)	40	M	Graduate in Psychology			10	10		Running Tennis Soccer	4	10
										10	
38	36	F	Degree			16	6		Swimming Basket	8	
										2	
39 (57)	49	F	Degree			23	15	Not competitive	Swimming Basket	2	
40 (56)	28	F				2	1	Not competitive	Volley Swimming	10	
										2	
41 (50)	36	F				14	3	Not competitive	Swimming Gymnastic	3 4	
42 (54)	30	F	Degree	Graduate (Iusm)		9	6	Competitive	Floor Gymnastic	15	2
43 (49)	34	F		Graduate (Isef)		14	14	Competitive	Swimming		4

<i>Teacher</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
44 (51)	35	F				5	5	Not competitive	Swimming	7	
45 (52)	40	F	Degree	Graduate (Isef)		18	18	Competitive	Tennis	10	6
46 (53)	37	F	Degree			6	1	Competitive	Volley	6	10
Average	41					14.07	8.05			7.01	7.03

Notes: Numbers for each teacher are used in Table 4 of the Appendix to protect the privacy of all participants.

Table 5: Information concerning the formation of the teachers' classes, first study

N	Specialization in PE	Gender	Video numbers	Total Time	PLACE		AGE OF STUDENTS			STUDENTS NUMBER			
					Outdoor	Indoor	Grade(s)	Year of Primary School	F	M	S with special needs	Tot	
1		F	1	42'		x	9-10	5th	11	4	1 (he didn't work)	16	
2		F	2	45' 32		x	8-9	3rd	7	9	1	17	
3	specialization	F	3*	36	x		9-10	4th	8	11		19	
4		F	4	38'		x	8-9	3rd	8	10		18	
5	specialization	M	5*	19' 20	x		10-11	5th	7	13		20	
6		F	6	55'		x	10-11	5th	5	12	1	18	
7		M	7	47'	x		7-8	2nd	10	14		24	
8		F	8	54'		x	7-8	2nd	12	8	1	21	
9	specialization	F	9*	1h 12'		x	8-9	3rd	8	17		25	
10		F	10	40'		x	8-9	3rd	11	10		21	
11		F	11	1h		x	8-9	3rd	9	13		22	
12	specialization	F	12	56'		x	10-11	5th	7	10	1	18	
13		F	13	1h 38'		x	10-11	5th	7	10	1	18	
14		F	14	42' 17''		x	6-7	1st	11	8	1	20	
15		F	15	51' 40''		x	9-10	4th	9	9	1	19	
16		F	16	54' 13''		x	10-11	5th	7	10	1	18	
17		F	17	59' 22''		x	8-9	3rd	12	9		21	
18		F	18	57' 16''		x	9-10	4th	8	9		17	
19		F	19	45' 51''		x	6-7	1st	11	10		21	
20		F	20	50' 16''		x	8-9	3rd	8	10+2		21	
21	specialization	M	21*	47' 53''		x	9-10	4th	8	6+2		14	
22		F	25	1h		x	10-11	5th	6+1	13		19	
23		F	26	32' 40''		x	8-9	3rd	13+1	6+1		19	

N	Specialization in PE	Gender	Video numbers	Total Time	PLACE		AGE OF STUDENTS			STUDENTS NUMBER			
					Outdoor	Indoor	Grade(s)	Period	F	M	S with special needs	Tot	
24		F	27	49:12''		x	9-10	4th	7	10		17	
25		M	28	51:40''		x	9-10	4th	10	8	1	19	
26		F	29	56:45''		x	10-11	5th	9	8	1	19	
27		F	30	49'		x	9-10	4th	7	6		13	
28		F	31	22:27''		x	6-7	1st	7	12		19	
29		F	32	31'		x	8-9	3rd	8	16		24	
30		F	33	38:50''		x	9-10	4th	8	8		16	
31		F	34	26:20''		x	8-9	3rd	15	7		22	
32		F	35	31:16''		x	10-11	5th	5	15		20	
33		F	36	35:16''		x	7-8	2nd	8	12		20	
34		M	37	51:59''		x	10-11	5th	6	15		21	
35		F	38	53:19''		x	10-11	5th	9	19		19	
36		F	39	42:38''		x	7-8	2nd	10	7		17	
37		F	40	55:29''		x	9-10	4th	14	9		23	
38		F	41	47'		x	8-9	3rd	5	11	1	17	
39	specialization	F	42*	59'		x	10-11	5th	12+1	5		17	
40	specialization	F	43*	45'		x	8-9	3rd	7	11		18	
41		F	44	59:37''		x	10-11	5th	9	9		18	
42		F	45*	57:33''		x	9-10	4th	11	10		21	
43		F	46	36:34''		x	6-7	1st	10	10		20	

Table 6: Interview before lesson on 43 teachers, first study

n.	Teachers	spec/ non-spec	1st Goal	2nd Goal	1st Content	2nd Content	3rd Content
1	1	0	Emotional	Social	Team Sport	Competition	
2	2	0	Motor		Team Sport	Double	
3	3	1	Motor		Aerobic Resistance	Breathing	Cool Down
4	4	0	Social		Ball Games		
5	5	1	Motor		Aerobic Resistance		
6	6	0	Social		Warm Up	Games	
7	7	0	Motor	Cognitive	Coordination		
8	8	0	Motor		Warm Up	Lateralization	Games
9	9	1	Motor		Warm Up	Games	Ball's Games
10	10	0	Cognitive	Motor	Games		
11	11	0	Motor		Team Sport	Individual Games	
12	12	0	Motor		Team Sport	Gaits	
13	13	0	Social		Equipment	Team	
14	14	0	/	/	No		
15	15	0	Motor		Warm Up	Games	Team
16	16	0	Motor		Equipment	Strengthening	
17	17	0	Motor	Cognitive	Production of a Narrative Text	Trust building activities	
18	18	0	Motor	Cognitive	Games	Equipment	
19	19	0	Motor		Games	Equipment	
20	20	0	Motor		Warm Up	Exercises	Games
21	21	1	Motor		Exercises	Equipment	
22	25	0	Motor		Team Sport		
23	26	0	Motor		Warm Up	Equipment	Race
24	27	0	Motor		Gaits	Games	Race
25	28	0	Motor		Stretching	Strengthening Physical	Games
26	29	0	Motor		Warm Up	Equipment	Games
27	30	0	Motor	Social	Games		
28	31	0	Motor		Warm Up	Rhythm	Ball's Games
29	32	0	Social		PE	Games	
30	33	0	Motor		Warm Up	Team	Gaits
31	34	0	Emotional		Gaits	Deployment	
32	35	0	Social		Attention	Coordination	Team
33	36	0	Social		Warm Up	Games	Gaits
34	37	0	Motor		Warm Up	Volley	
35	38	0	Motor	Social	Games	Race	
36	39	0	Motor		Coordination	Equipment	Basket
37	40	0	Motor		Warm Up	Race	
38	41	0	Motor		Warm Up	Gaits	
39	42	1	Social		Experiential Exercises	Games	
40	43	1	Motor		Warm Up	Equipment	
41	44	0	Motor		Warm Up	Coordination	Gaits
42	45	1	Motor		Warm Up	Central Sequence of Unit	Games
43	46	0	Social		Fairy Tale		

Interview before lesson on 43 teachers, first study

n.	Teachers	spec/ non-spec	Method		Critical incidents
1	1	0	did not know		Excessive competition between gender
2	2	0	did not know		NO
3	3	1	yes	Command	Someone is walking instead running
4	4	0	yes	Spontaneous	NO
5	5	1	did not know		Demotivation in competition
6	6	0	did not know		NO
7	7	0	yes	Intuition	Rules
8	8	0	yes	Prescriptive	Disable Student
9	9	1	yes	Game Method	NO
10	10	0	yes	Heuristic	NO
11	11	0	yes	Command	NO
12	12	0	did not know		Individual inexperience
13	13	0	did not know		Individual inexperience
14	14	0	did not know		NO
15	15	0	did not know		NO
16	16	0	yes	Prescriptive	NO
17	17	0	yes	Game Method	Disable Student
18	18	0	yes	Identification	Rules
19	19	0	did not know		Motor injuries
20	20	0	did not know		NO
21	21	1	yes	Deductive and Inductive	NO
22	25	0	did not know		NO
23	26	0	yes	Prior Description of the Purpose	NO
24	27	0	did not know		NO
25	28	0	did not know		Students too competitive
26	29	0	yes	Creativity then Prescriptive method	NO
27	30	0	yes	Prescriptive	NO
28	31	0	did not know		Pupils distracted by Video cameras
29	32	0	did not know		NO
30	33	0	did not know		NO
31	34	0	did not know		NO
32	35	0	did not know		NO
33	36	0	did not know		NO
34	37	0	did not know		NO
35	38	0	did not know		NO
36	39	0	yes	More than one	Lack of integration
37	40	0	did not know		NO
38	41	0	yes	Free exploration	NO
39	42	1	did not know		NO
40	43	1	did not know		Students too competitive
41	44	0	did not know		NO
42	45	1	yes	Game Method	NO
43	46	0	yes	Creativity	NO

Notes: Numbers for each teacher are used in Table 6 of the Appendix to protect the privacy of all participants.

Table 7: Information concerning the formation of the teachers' classes, second study

n.	Specialization in PE	Gender	Video numbers	Total Time	PLACE		AGE OF STUDENTS			STUDENTS NUMBER		
					Outdoor	Indoor	Grade(s)	Year of Primary School	F	M	S with special needs	Tot
1		F	22	58' 52''		x	10-11	5th	10	4		14
2		F	23	46' 54''		x	10-11	5th	6	11	1	18
3		F	24	38' 55''		x	8-9	3rd	6	11+1	1	19
4		F	47	42' 40''		x	9-10	4th	7	8		15
5		F	48	33' 15''		x	8-9	3rd	8	17		25
6	specialization	F	49*	47' 25''		x	8-9	3rd	9	10		19
7		F	50	1h 0' 35''		x	8-9	3rd	7	18	1	21
8		F	51	42'		x	10-11	5th	10	10		20
9	specialization	F	52*	44'		x	9-10	4th	11	9	1	21
10		F	53	46' 40''		x	6-7	1st	8	5		13
11	specialization	F	54*	58' 51''		x	10-11	5th	6	10+3	1	20
12		F	55	44' 50''		x	10-12	5th	6	15		21
13		F	62	42' 15''		x	9-10	4th	9	8		17
14		F	63	54' 30''		x	8-9	3rd	9	6		15
15		F	64	50' 15''		x	10-11	5th	11	8		19

Table 8: Average Time of Main Behavior Categories dedicated in PE lessons by specialist and non-specialist Teachers

		Specialists		Non-specialists	
		M	SD	M	SD
LEVEL I					
Presentation		0.31%	0.008	0.03%	0.001
Instructions		1.10%	0.011	0.99%	0.010
Organization		11.00%	0.063	10.43%	0.051
Transition		0.70%	0.006	0.48%	0.004
Direction		44.36%	0.082	44.42%	0.142
Feedback		18.41%	0.073	12.29%	0.062
Observation		17.50%	0.137	21.80%	0.129
Other		6.57%	0.037	9.57%	0.058
LEVEL II					
Instructions	- motor activities	0.93%	0.011	0.86%	0.009
	- expressive activities	0.00%	0.000	0.10%	0.005
	- games	0.17%	0.005	0.08%	0.002
Organization	- student	37.70%	0.237	44.60%	0.296
	- environment	48.01%	0.271	53.02%	0.299
Direction	- verbal	30.97%	0.097	34.89%	0.118
	- verbal tactile	2.46%	0.064	0.78%	0.014
	- verbal auditory	2.84%	0.031	3.94%	0.057
	- audio-visual	0.01%	0.000	0.00%	0.000
	- verbal visual	8.04%	0.081	4.97%	0.048
Feedback	- individual	10.79%	0.051	6.94%	0.045
	- group	0.73%	0.006	0.61%	0.006
	- class	7.23%	0.042	4.74%	0.034
Other	- pause	0.04%	0.001	1.29%	0.017
	- teacher student dialogue	4.39%	0.034	4.64%	0.036
	- reinforce disabled student work	0.00%	0.000	0.23%	0.010
	- disabled student-teacher interaction	0.00%	0.000	0.54%	0.017
	- teacher-adult dialogue	0.73%	0.009	1.65%	0.017
	- interruption	1.40%	0.014	1.25%	0.031

		Specialists		Non-specialists		
		M	SD	M	SD	
LEVEL III						
Students						
Organization	-	single work	37.43%	0.377	42.50%	0.371
	-	couple work	8.12%	0.197	11.36%	0.213
	-	mixed gender couple	0.89%	0.024	0.00%	0.000
	-	groups	17.01%	0.274	10.57%	0.232
	-	two teams	22.26%	0.363	35.66%	0.364
Environment						
Organization	-	without students' help	38.47%	0.325	40.94%	0.345
	-	with students' help	35.53%	0.341	36.42%	0.319
	-	students alone	11.62%	0.143	14.26%	0.231
Direction						
Verbal-visual	-	student demonstration	16.49%	0.373	12.55%	0.255
	-	teacher demonstration	83.51%	0.373	79.11%	0.349
Feedback						
	-	verbal	17.94%	0.077	11.81%	0.060
	-	verbal tactile (touch)	0.36%	0.007	0.26%	0.004
	-	verbal auditory	0.07%	0.002	0.14%	0.004
	-	audio-visual	0.00%	0.000	0.00%	0.000
	-	verbal visual	0.29%	0.005	0.44%	0.008
LEVEL IV						
Environment						
Organization	-	taking and placing tools	75.23%	0.339	72.11%	0.290
	-	taking off tools	10.50%	0.084	19.85%	0.199
Feedback						
	-	skill feedback	13.33%	0.093	6.96%	0.052
	-	behaviour feedback	5.25%	0.041	7.92%	0.132

Table 9: Average Time of Main Behavior Categories dedicated in PE lessons by pre- and post-trained Teachers

		Pre-trained		Post-trained	
		M	SD	M	SD
LEVEL I					
Presentation		0.00%	0.000	0.07%	0.002
Instructions		0.82%	0.010	1.01%	0.009
Organization		9.39%	0.053	8.17%	0.059
Transition		0.49%	0.006	0.54%	0.006
Direction		41.41%	0.088	37.46%	0.1131944
Feedback		14.27%	0.049	9.40%	0.074
Observation		24.00%	0.0854167	32.76%	0.1166667
Other		9.59%	0.063	10.59%	0.0729167
LEVEL II					
Instructions	- motor activities	0.62%	0.007	1.00%	0.014
	- motor expressive activities	0.19%	0.007	0.31%	0.007
	- games. team sport	0.09%	0.002	0.02%	0.001
Organization	- student	37.46%	0.21875	62.88%	0.16875
	- environment	55.40%	0.2333333	36.40%	0.175
Direction	- verbal	30.78%	0.098	27.62%	0.08125
	- verbal tactile	1.50%	0.045	0.91%	0.020
	- verbal auditory	4.54%	0.064	6.69%	0.077
	- audio-visual	0.00%	0.000	0.01%	0.001
	- verbal visual	4.58%	0.065	2.23%	0.031
Feedback	- individual	11.79%	0.0854167	4.76%	0.040
	- group	0.70%	0.007	0.56%	0.009
	- class	5.07%	0.039	4.07%	0.042
Other	- pause	0.92%	0.018	0.79%	0.013
	- teacher student dialogue	4.96%	0.037	3.69%	0.030
	- reinforce disabled student work	0.11%	0.003	0.65%	0.024
	- disabled student-teacher interaction	0.85%	0.024	0.60%	0.022
	- teacher-adult dialogue	0.75%	0.012	4.13%	0.089
	- interruption	2.01%	0.037	0.76%	0.022

		Pre-trained		Post-trained	
		M	SD	M	SD
LEVEL III					
Students Organization	- single work	33.65%	0.2388889	26.70%	0.2409722
	- couple work	16.02%	0.1826389	13.23%	0.1354167
	- mixed gender couple groups	0.00%	0.000	0.71%	0.027
	- two teams	6.10%	0.1229167	24.23%	0.2479167
	-	37.09%	0.2881944	35.12%	0.2916667
-					
Environment Organization	- without students' help	41.54%	0.2888889	46.71%	0.2520833
	- with students' help	39.20%	0.2694444	36.43%	0.2534722
Direction Verbal-visual	- students alone	4.97%	0.081	9.71%	0.1055556
	- student demonstration	3.74%	0.083	2.64%	0.059
	- teacher demonstration	89.12%	0.1868056	68.79%	0.3159722
Feedback	- verbal	13.57%	0.047	15.53%	0.175
	- verbal tactile (touch)	0.39%	0.005	0.26%	0.006
	- verbal auditory	0.18%	0.005	0.06%	0.001
	- audio-visual	0.00%	0.000	0.00%	0.000
	- verbal visual	0.23%	0.004	0.22%	0.005
LEVEL IV					
Environment Organization	- taking and placing tools	65.62%	0.2354167	70.74%	0.2048611
	- taking off tools	20.10%	0.1472222	22.06%	0.1541667
Feedback	- skill feedback	7.10%	0.042	5.12%	0.061
	- behaviour feedback	7.24%	0.046	4.44%	0.025

Table 10: Interview before lesson on 15 teachers, second study

n.	Teachers	1st goal	2nd goal	1st content	2nd content	3th content	Method	Tools	Note
1	22	Motor		Ball's Games	Prisoner Ball	Re-launched ball	did not know	Equipment	
2	23	Motor	Cognitive	Warm Up	Rhythm	Games	did not know	Equipment	
3	24	Motor		Warm Up	Games	Prisoner Ball	yes	Equipment	outside expertise for hockey
4	47	Motor	Social	Volley	Team		did not know	Equipment	
5	48	Motor		Exercises	Games		did not know	NO	
6	49	Motor		Warm Up			yes	Equipment	outside expertise for volley
7	50	Motor		Games	Expressivity		yes	NO	outside expertise for volley
8	51	Motor		Exploration			did not know	Equipment	
9	52	Motor		Race			did not know	Equipment	outside expertise
10	53	M/E/S/C		Warm Up	Games	Dance	yes	Music	Tambourine outside expertise for volley
11	54	Motor		Expressivity	Coordination	Recreation	yes	Equipment	
12	55	Motor		Volley	Exercises		did not know	Equipment	outside expertise for dance
13	62	Social	Motor	Prisoner Ball	Warm up	Team	did not know	Equipment	
14	63	Motor	Social	Creativity	Trust building activities	Harmony Group	yes	Music	Equipment
15	64	Social		Warm Up	Games		yes	Equipment	

Notes: Numbers for each teacher are used in Table 10 of the Appendix to protect the privacy of all participants.

Table 11: Demographic information on 15 teachers, pre- vs. post-trained teachers

<i>n.</i>	<i>n. of videos</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
1	1 and 22	41	F	Degree			20	3	Not competitive	- Gymnastic - Swimming	10	
2	2 and 24	42	F	Degree			6	5	Not competitive	- Judo - Volleyball	3 2	
3	6 and 23	42	F				8	7	Not competitive	- Karate - Tai-chi - Dance	1 3 1	
4	26 and 59	31	F				6	3	Not competitive	- Gymnastic	2	
5	27 and 60	32	F	Private qualification to teach students with special needs			11	4		- Volley - Swimming - Athletic	8 5 3	
6	28 and 58	35	M	Degree and qualification to teach students with special needs			5	1	Competitive	- Soccer - Rugby	8 8	2
7	32 and 48	52	F				15	6		- Dance - Horseback riding	10 10	
8	33 and 47	46	F				7	5	Competitive	- Horseback riding	10	

<i>n.</i>	<i>n. of videos</i>	<i>Age</i>	<i>Gender</i>	<i>Teacher's Instruction Level</i>	<i>Specific Qualification in PE</i>	<i>Public or Private Training Course in PE</i>	<i>Years of Teaching</i>	<i>Years of Teaching in PE</i>	<i>Level of Specialization in Sport or in Clubs</i>	<i>Which kind of sport he/she did</i>	<i>Years of Experience in Doing Sport</i>	<i>Years of Experience in Teaching PE out of school</i>
9	37 and 55	40	M	Graduate in Psychology			10	10		- Running - Tennis - Soccer	4 10	
10	39 and 57	49	F	Degree			23	15	Not competitive	- Swimming - Basket	8 2	
11	42 and 54	30	F	Degree	Graduate (Iusem)		9	6	Competitive	- Gymnastic	15	2
12	43 and 49	34	F		Graduate (Isef)		14	14	Competitive	- Floor - Gymnastic - Swimming	7 3	4
13	44 and 51	35	F				5	5	Not competitive	- Swimming	7	
14	45 and 52	40	F	Degree	Graduate (Isef)		18	18	Competitive	- Tennis	10	6
15	46 and 53	37	F	Degree			6	1	Competitive	- Volley	6	10
Average	40						12	7.09			6.07	4.08

Notes: Numbers for each teacher are used in Table 11 of the Appendix to protect the privacy of all participants.

Table 6.2-2 Verbal Data - First Study - Dimensions in PE Didactics

**Ranking of Four Most Important Dimensions in PE Didactics
by Specialist Versus Non-specialist Teachers**

dimensions	specialists			
	1 st choice frequency	2 nd choice frequency	3 rd choice frequency	4 th choice frequency
emotional	3	2	1	1
cognitive	1	0	3	3
social	5	2	0	0
motor	1	2	2	2
	42.86	28.57	14.29	14.29
	14.29	0.00	42.86	42.86
	71.43	28.57	0.00	0.00
	14.29	28.57	28.57	28.57

dimensions	non specialists			
	1 st choice frequency	2 nd choice frequency	3 rd choice frequency	4 th choice frequency
emotional	15	7	7	9
cognitive	5	11	11	8
social	24	9	3	10
motor	9	8	10	10
	41.67	19.44	19.44	25
	13.89	30.56	30.56	22.22
	66.67	25.00	8.33	27.78
	25.00	22.22	27.78	27.78

Table 6.2-3 Verbal Data - First Study - Time Spent Pursuing Dimensions in PE Didactics

**Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists			
<i>dimensions</i>	<i>1st choice</i>	<i>2nd choice</i>	<i>3rd choice</i>	<i>4th choice</i>
emotional	21.67%	30%	100%	20%
cognitive	25%	0	17.50%	17.50%
social	47%	25%	0	0
motor	25%	50%	22.50%	27.50%

non specialists

<i>dimensions</i>	<i>1st choice</i>	<i>2nd choice</i>	<i>3rd choice</i>	<i>4th choice</i>
emotional	36%	24%	22%	12%
cognitive	30%	27%	21%	23%
social	41%	26%	29%	15%
motor	27%	28%	19%	13%

Table 6.2- 4 Verbal Data - First Study - Social Dimensions Objectives

**Frequency and Percentage of Social Dimensions Objectives of PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
fairness/fairplay	2	28.57	1	2.78
interaction behaviour/communication	1	14.29	4	11.11
emphaty	1	14.29	1	2.78
cooperative/social behaviour	4	57.14	10	27.78
to come over individuality	1	14.29	0	0.00
to learn to be winner/loser	2	28.57	4	11.11
to learn how to stay in the gym	1	14.29	0	0.00
integration	0	0.00	1	2.78
to stay together/respect others	0	0.00	11	30.56
to help others	1	14.29	1	2.78
cohesion	0	0.00	1	2.78
respect/know/learn social rules	6	85.71	10	27.78
respect notices	0	0.00	1	2.78

Table 6.2-5 Verbal Data - First Study - Time Spent Pursuing Social Dimensions Objectives

**Average Percentage of Time Spent Pursuing the Social Dimensions Objectives in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists	non specialists
fairness/fairplay	28%	30%
interaction behaviour/communication	35%	36%
emphaty	20%	0
cooperative/social behaviour	66%	66%
to come over individuality	25%	0
to learn to be winner/loser	15%	60%
to learn how to stay in the gym	30%	0
integration	0	80%
to stay together/respect others	0	98%
to help others	20%	30%
coesione	0	33%
respect/know/learn social rules	45%	72%
respect notices	0	33%

Table 6.2-6 Verbal Data - First Study - Emotional Dimensions Objectives

**Frequency and Percentage of Emotional Dimensions Objectives of PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
self-esteem / perception / control /acceptance	0	0.00	5	13.89
come over difficulties	1	14.29	1	2.78
to love sport / appreciate motor activities	2	28.57	2	5.56
serenely	0	0.00	1	2.78
to want to move	0	0.00	1	2.78
to express emotions through body	0	0.00	1	2.78
emotional development	1	14.29	0	0.00
to have control on emotions	0	0.00	2	5.56
relax	0	0.00	1	2.78
to enjoy	0	0.00	1	2.78
to know emotions	0	0.00	1	2.78

Table 6.2-7 Verbal Data - First Study - Time Spent Pursuing Emotional Dimensions Objectives

**Average Percentage of Time Spent Pursuing the Emotional Dimensions Objectives in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists	non specialists
self-esteem / perception / control /acceptance	0	90%
come over difficulties	100%	100%
to love sport / appreciate motor activities	100%	70%
serenely	0	60%
to want to move	0	100%
to express emotions through body	0	100%
emotional development	100%	0
to have control on emotions	0	100%
relax	0	100%
to enjoy	0	100%
to know emotions	0	100%

Table 6.2-8 Verbal Data - First Study - Cognitive Dimensions Objectives

**Frequency and Percentage of Cognitive Dimensions Objectives of PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to develop attention	1	14.29	2	5.56
to learn rules tactics	2	28.57	6	16.67
psycho-motor ability	1	14.29	1	2.78
to know verbal instructions	1	14.29	1	2.78
to learn symbolic signs	1	14.29	1	2.78
to learn numbers	1	14.29	1	2.78
to find solution	1	14.29	0	0.00

Table 6.2-9 Verbal Data - First Study - Time Spent Pursuing Cognitive Dimensions Objectives

**Average Percentage of Time Spent Pursuing the Cognitive Dimensions Objectives in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists	non specialists
to develop attention	87%	85%
to learn rules tactics	70%	88%
psycho-motor ability	0	50%
to know verbal instructions	0	100%
to learn symbolic signs	0	100%
to learn numbers	0	100%
to find solution	100%	50%

Table 6.2-10 Verbal Data - First Study - Motor Dimensions Objectives

**Frequency and Percentage of Motor Dimensions Objectives of PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to know motor lang.	2	28.57	9	25.00
base motor abilities	2	28.57	2	5.56
to perform strength and endurance	0	0.00	2	5.56
to check body's movement	1	14.29	0	0.00
psycho-motor ability	1	14.29	3	8.33
posture	0	0.00	1	2.78
hamonic development	0	0.00	1	2.78
body awareness/development	1	14.29	5	13.89
to use space	0	0.00	3	8.33
Spatio-temporal coordination	1	14.29	2	5.56
small co-ordination / co-ordination	0	0.00	15	41.67
to know new language	0	0.00	2	5.56
(to move with music)	0	0.00	0	0.00
health/fitness	0	0.00	1	2.78
To develop body composition	0	0.00	0	0.00
agility/ balance	0	0.00	2	5.56
breath	0	0.00	2	5.56

Table 6.2-11 Verbal Data - First Study - Time Spent Pursuing Motor Dimensions Objectives

**Average Percentage of Time Spent Pursuing the Motor Dimensions Objectives in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists	non specialists
to know motor lang.	100%	59%
base motor abilities	65%	65%
to perform strength and endurance	0	20%
to check body's movement	50%	0
psycho-motor ability	20%	83%
posture	0	100%
hamonic development	0	100%
body awareness/development	50%	64%
to use space	0	80%
spatio-temporal coordination	50%	70%
small co-ordination / co-ordination	0	57%
to know new language	0	35%
(to move with music)	0	0
health/fitness	0	100%
to develop body composition	0	0
agility/ balance	0	40%
breath	0	30%

Table 6.2-12 Verbal Data - First Study - Lessons Contents Linked to Dimensions

<i>Dimensions</i>	Frequency and Percentage of Lessons Contents Linked to Emotional, Social, Motor, Cognitive Dimensions Used During PE Lessons by Specialist Versus Non-specialist Teachers											
	specialists						non specialists					
	<i>Motor activities</i>		<i>Expressive activities</i>		<i>Team sport</i>		<i>Motor activities</i>		<i>Expressive activities</i>		<i>Team sport</i>	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
emotional	1	14.29	4	57.14	1	14.29	7	19.44	11	30.56	8	22.22
social	1	14.29	4	57.14	5	71.43	7	19.44	11	30.56	28	77.78
motor	6	85.71	3	42.86	5	71.43	10	27.78	6	16.67	12	33.33
cognitive	4	57.14	2	28.57	3	42.86	8	22.22	10	27.78	6	16.67

Table 6.2-13 Verbal Data - First Study - Teaching Methods

	Frequency and Percentage of Teaching Methods used in General and in PE Lessons by Specialist Versus Non-specialist Teachers			
	specialists		non specialists	
	General Teaching frequency	PE Teaching frequency	General Teaching frequency	PE Teaching frequency
not method	0	0	9	15
deductive	2	1	11	4
prescriptive	0	2	1	10
analytic	1	1	2	1
inductive	0	0	9	5
heuristic	0	0	0	0
global	2	1	2	1
cooperative	0	0	0	1
more than one	2	2	9	6
	28.57	28.57	25.00	16.66
	0.00	0.00	0.00	0.00
	28.57	14.28	2.77	11.11
	0.00	28.57	2.77	27.77
	14.28	14.28	5.55	2.77
	0.00	0.00	25.00	13.88
	0.00	0.00	0.00	0.00
	28.57	14.28	5.55	2.77
	0.00	0.00	0.00	2.77
	28.57	28.57	25.00	16.66

Table 6.2-14 Verbal Data - First Study - Instruction Channels

Frequency and Percentage of Instruction Channels Used in PE Didactic by Specialist Versus Non-specialist Teachers

<i>Channel</i>	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
verbal	2	28.57	27	75.00
verbal visual	6	85.71	31	86.11
verbal tactile	2	28.57	17	47.22
verbal auditory	4	57.14	22	61.11
audiovisual	0	0.00	3	8.33

Table 6.2-15 Verbal Data - First Study - Feedback Channels

Channel	specialists		non specialists	
	frequency	%	frequency	%
verbal	3	42.86	26	72.22
verbal visual	6	85.71	23	63.89
verbal tactile	3	42.86	21	58.33
verbal auditory	3	42.86	9	25.00
other (music/by situation)	0	0.00	3	8.33

Table 6.2-16 Verbal Data - First Study - Correction Group

	specialists		non specialists	
	frequency	%	frequency	%
on all students	4	57.14	13	36.11
small groups	2	28.57	3	8.33
single	5	71.43	21	58.33
based on situations	6	85.71	23	63.89

Table 6.2-17 Verbal Data - First Study - Didactic Equipment

Frequency and Percentage of Didactic Equipment Used in PE Lessons by Specialist Versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
nothing	3	42.86	21	58.33
blackboard	2	28.57	8	22.22
handouts	0	0.00	5	13.89
cards	1	14.29	6	16.67
films	1	14.29	4	11.11
maps	0	0.00	0	0.00
posters	2	28.57	7	19.44
cd	0	0.00	2	5.56
internet	0	0.00	2	5.56
newspaper	0	0.00	1	2.78
videocassets	0	0.00	1	2.78
symbolic rappresentations of games	0	0.00	1	2.78
self-evaluation	1	14.29	2	5.56
photo	0	0.00	0	0.00

Table 6.2-18 Verbal Data - First Study - Motivation Factors Related to Didactics Equipment Used in PE

Frequency and Percentage of Motivation Factors Related to Didactics Equipment Used in PE by Specialist Versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
content	1	14.29	10	27.78
interaction	0	0.00	4	11.11
method	2	28.57	7	19.44
aim	1	14.29	7	19.44

Table 6.2-19 Verbal Data - First Study - Students Organization

**Frequency and Percentage of Students Organization Used in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
work in groups	6	85.71	31	86.11
work in couples	6	85.71	19	52.78
single work	5	71.43	16	44.44
small groups	0	0.00	8	22.22

Table 6.2-20 Verbal Data - First Study - Class Management

**Frequency and Percentage of Class Management Used in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
rules	4	57.14	10	27.78
rituals	2	28.57	4	11.11
signs	1	14.29	2	5.56
other	6	85.71	25	69.44

Table 6.2-21 Verbal Data - First Study - Specific Class Management

**Frequency and Percentage of Specific Class Management Used in PE Didactics
by Specialist Versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to whistle	0	0.00	4	11.11
to voice	0	0.00	2	5.56
to silence	0	0.00	1	2.78
environ.org.	1	14.29	0	0.00
stud. org	0	0.00	1	2.78
to use self-control	0	0.00	1	2.78
to use eye contact	1	14.29	5	13.89
to control	0	0.00	1	2.78
to work in small group	0	0.00	4	11.11
to threat	0	0.00	4	11.11
to reward	0	0.00	1	2.78
to propose interesting work	1	14.29	2	5.56
no stop during lesson	1	14.29	0	0.00
to give clear orders	0	0.00	1	2.78
to give orders before going to gym	0	0.00	0	0.00
to stop activity	0	0.00	1	2.78
to move in the gym	0	0.00	1	2.78
to get attention	0	0.00	1	2.78
planning lesson	0	0.00	0	0.00
to reflect	0	0.00	0	0.00

Table 6.2-22 Verbal Data - First Study - Teaching Styles

Frequency and Percentage of Methods Used to Manage Lessons by Specialist Versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
command style	1	14.29	1	2.78
authoritative style	4	57.14	10	27.78
severe style	1	14.29	6	16.67
rigid style	0	0.00	1	2.78
inclusive style	0	0.00	0	0.00
friendly style	2	28.57	8	22.22
to be listening	0	0.00	2	5.56
amusing style	2	28.57	4	11.11
sweet style	0	0.00	6	16.67
constructive style	0	0.00	1	2.78
meta-cognitive style	0	0.00	1	2.78
guided discovery style	0	0.00	3	8.33
don't know style	2	28.57	7	19.44
"open" style	0	0.00	4	11.11
emotional style	0	0.00	1	2.78
all styles	0	0.00	0	0.00
cooperative style	0	0.00	1	2.78
charismatic style	1	14.29	1	2.78

Table 6.2-23 Verbal Data - First Study - Group Styles Used to Organize Lessons

Frequency and Percentage of Group Styles Used to Organize Lessons by Specialist Versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
don't know style	2	28.57	12	33.33
reproductive style	5	71.43	13	36.11
productive style	0	0.00	4	11.11
mobility	0	0.00	7	19.44

Table 6.2-24 Verbal Data - First Study - Lessons Effectiveness Assessed

Frequency and Percentage of Lesson Effectiveness Assessed by Specialist versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
student involvement	4	57.14	10	27.78
respect of rules	1	14.29	5	13.89
enthusiasm	0	0.00	8	22.22
attention rate	1	14.29	4	11.11
interesting game or lesson	1	14.29	1	2.78
social interaction	0	0.00	4	11.11
student behaviour	1	14.29	5	13.89
right/ wrong answers	0	0.00	1	2.78
achievement of the aim	0	0.00	6	16.67
reflection on mistakes	0	0.00	2	5.56
reflection on positive and negative things.	0	0.00	1	2.78
improvement of motor abilities	0	0.00	3	8.33
check on motor learning	0	0.00	2	5.56
activity rate	0	0.00	3	8.33

Table 6.2-25 Verbal Data - First Study - Skills Used to Assess Student Performance

Frequency and Percentage of Skills Used to Assess Student Performance in PE Lessons by Specialist versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
practical skill	3	42.86	21	58.33
motor skill	6	85.71	36	100.00
social skill	6	85.71	36	100.00
other	4	57.14	2	5.56

Table 6.2-26 Verbal Data - First Study - Importance given to Skills

Average Percentage of Importance Given to Skills Chosen in PE Lessons by Specialist versus Non-specialist Teachers

	specialists	non specialists
practical skill	21%	25%
motor skill	41%	49%
social skill	49%	42%
other	30%	70%

Table 6.2-27 Verbal Data - First Study - Aspects Used to Assess PE Lessons

Frequency and Percentage of Aspects Used to Assess PE Lessons by Specialist versus Non-specialist Teachers

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
don't know	1	14.29	0	0.00
teacher process variables	0	0.00	1	2.78
student process variable	5	71.43	16	44.44
student outcome variables or product variables	0	0.00	7	19.44
mixed variables	1	14.29	12	33.33

Table 6.2-28 Verbal Data - First Study - Instruments Used to Assess Students Performance

**Frequency and Percentage of Instruments Used to Assess Student Performance in PE Lessons
by Specialist versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
tests	2	28.57	5	13.89
measures	1	14.29	0	0
flow charts	0	0	0	0
observation	4	57.14	23	63.89
obsevation with handout cards	0	0	1	2.78
to check aim with result	0	0	1	2.78
lived experience	1	14.29	0	0

Table 6.2-29 Verbal Data - First Study - System Used to Assess Students Performance

**Frequency and Percentage of System Used to Assess Student Performance in PE Lessons
by Specialist versus Non-specialist Teachers**

	specialists		non specialists	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
individual progress	4	57.14	23	63.89
on the classroom level	2	28.57	6	16.67
on group level	0	0	2	5.56
standard tables	1	14.29	4	11.11
on school criterion value	0	0	1	2.78
change social behaviour	0	0	2	5.56
change learning	0	0	2	5.56

Table 6.3-1 Verbal Data - Second Study - PE Goals

Frequency and Percentage of First and Second Choices Regarding PE Goals by Pre Versus Post-Trained Teachers

Goals	Pre		Post	
	1 ^o choice	%	1 ^o choice	%
Formative and educational function in the school	11	73.33	1	6.67
Children favourite matter	1	6.67	0	0.00
To compensate other matters	0	0.00	0	0.00
Curriculum	1	6.67	0	0.00
Healthy lifestyles	0	0.00	1	6.67
Body formative function	0	0.00	0	0.00
Educational function	2	13.33	13	86.67
Motor goal. social goal	0	0.00	0	0.00
Specific motor goals	0	0.00	0	0.00

Table 6.3-2 Verbal Data - Second Study - Dimensions in PE Didactics

Ranking of Four Most Important Dimensions in PE Didactics by Pre Versus Post-Trained Teachers

<i>dimension</i>	Pre							
	<i>1st choice</i>		<i>2nd choice</i>		<i>3rd choice</i>		<i>4th choice</i>	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
emotional	7	46.67	2	13.33	2	13.33	4	26.6667
cognitive	1	6.67	0	0.00	0	0.00	0	0
social	10	66.67	2	13.33	4	26.67	0	0
motor	3	20.00	0	26.40	0	0.00	0	0

<i>dimension</i>	Post							
	<i>1st choice</i>		<i>2nd choice</i>		<i>3rd choice</i>		<i>4th choice</i>	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
emotional	3	20.00	5	33.33	2	13.33	4	26.67
cognitive	2	13.33	1	6.67	3	20.00	8	53.33
social	8	53.33	5	33.33	2	13.33	0	0.00
motor	2	13.33	4	26.67	7	46.67	2	13.33

Table 6.3-3 Verbal Data - Second Study - Time Spent Pursuing Dimensions in PE Didactics

Average Percentage of Time Spent Pursuing the Four Most Important Dimensions in PE Didactics by Pre Versus Post-Trained Teachers

<i>dimension</i>	Pre			
	<i>1st choice</i>	<i>2nd choice</i>	<i>3rd choice</i>	<i>4th choice</i>
emotional	34%	30%	20%	14%
cognitive	25%	28.75	25.75%	26.40%
social	20%	17%	10%	17%
motor	14%	20%	0%	0%

<i>dimension</i>	Post			
	<i>1st choice</i>	<i>2nd choice</i>	<i>3rd choice</i>	<i>4th choice</i>
emotional	40%	25%	43%	28%
cognitive	25%	20%	38%	18%
social	23%	23%	28%	25%
motor	24%	10%	0%	13%

Table 6.3-4 Verbal Data – Second Study - Social Dimensions Objectives

Frequency and Percentage of Social Dimensions Objectives of PE Didactics by Pre and Post-Training Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
fairness/fairplay	0	0.00	2	13.33
interaction behaviour/communication	3	20.00	3	20.00
empathy	0	0.00	1	6.67
cooperative/social behaviour	6	40.00	7	46.67
to overcome individuality	0	0.00	0	0.00
to learn to be a winner/loser	3	20.00	1	6.67
to learn how to stay in the gym	0	0.00	0	0.00
integration	0	0.00	0	0.00
to stay together/respect others	7	46.67	5	33.33
to help others	0	0.00	3	20.00
cohesion	0	0.00	0	0.00
respect/know/learn social rules	5	33.33	8	53.33
to respect notices	0	0.00	0	0.00

Table 6.3-5 Verbal Data - Second Study - Time Spent Pursuing Social Dimensions Objectives

Average Percentage of Time Spent Pursuing the Social Dimensions Objectives in PE Didactics by Pre and Post-Training Teachers

	Pre	Post
fairness/fairplay	0%	39%
interaction behaviour/communication	51%	75%
empathy	0%	16%
cooperative/social behaviour	73%	64%
to overcome individuality	0%	0
to learn to be a winner/loser	46%	55%
to learn how to stay in the gym	0%	0
integration	0%	0
to stay together/respect others	97%	43%
to help others	0%	20%
cohesion	0%	0
respect/know/learn social rules	65%	56%
to respect notices	0%	0

Table 6.3-6 Verbal Data - Second Study - Emotional Dimensions Objectives

**Frequency and Percentage of Emotional Dimension Objectives of PE Didactics by
Pre and Post-Training Teachers**

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
self-esteem / perception / control /acceptance	3	20.00	2	13.33
come over difficulties	1	6.67	0	0.00
to love sport / appreciate motor activities	2	13.33	1	6.67
serenely	1	6.67	0	0.00
to want to move	0	0.00	1	6.67
to express emotions through body	0	0.00	0	0.00
emotional development	0	0.00	0	0.00
to have control on emotions	1	6.67	0	0.00
relax	0	0.00	0	0.00
to enjoy	0	0.00	0	0.00
to know emotions	1	6.67	0	0.00

Table 6.3-7 Verbal Data - Second Study - Time Spent Pursuing Emotional Dimensions Objectives

**Average Percentage of Time Spent Pursuing the Emotional Dimensions Objectives in PE Didactics by
Pre and Post-Training Teachers**

	Pre	Post
self-esteem / perception / control /acceptance	100%	65%
come over difficulties	100%	0
to love sport / appreciate motor activities	70%	50%
serenely	60%	0
to want to move	0	50%
to express emotions through body	0	0
emotional development	0	0
to have control on emotions	100%	0
relax	0	0
to enjoy	0	0
to know emotions	100%	0

Table 6.3-8 Verbal Data - Second Study - Cognitive Dimensions Objectives

Frequency and Percentage of Cognitive Dimension Objectives of PE Didactics by Pre and Post-Training Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to develop attention	1	6.67	0	0.00
to learn rules / tactics	2	13.33	2	13.33
psycho-motor ability	0	0.00	0	0.00
to know verbal instructions	0	0.00	0	0.00
to learn symbolic signs	0	0.00	0	0.00
to learn numbers	0	0.00	0	0.00
to find solution	1	6.67	0	0.00

Table 6.3-9 Verbal Data - Second Study - Time Spent Pursuing Cognitive Dimensions Objectives

Average Percentage of Time Spent Pursuing the Cognitive Dimensions Objectives in PE Didactics by Pre and Post-Trained Teachers

	Pre	Post
to develop attention	100%	0
to learn rules / tactics	100%	100%
psycho-motor ability	0	0
to know verbal instructions	0	0
to learn symbolic signs	0	0
to learn numbers	0	0
to find solution	100%	0

Table 6.3-10 Verbal Data -Second Study - Motor Dimensions Objectives

Frequency and Percentage of Motor Dimensions Objectives of PE Didactics by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to know motor lang.	7	46.67	1	6.67
base motor abilities	0	0.00	0	0.00
to perform strength and endurance	0	0.00	0	0.00
to check body's movement	0	0.00	0	0.00
psycho-motor ability	0	0.00	0	0.00
posture	0	0.00	0	0.00
hamonic development	0	0.00	0	0.00
body awareness/development	0	0.00	0	0.00
to use space	0	0.00	0	0.00
spatio-temporal coordination	2	13.33	0	0.00
small co-ordination / co-ordination	4	26.67	5	33.33
to know new language	0	0.00	0	0.00
(to move with music)	0	0.00	0	0.00
health/fitness	0	0.00	1	6.67
to develop body composition	0	0.00	0	0.00
agility/ balance	0	0.00	1	6.67
breath	0	0.00	0	0.00
game	0	0.00	4	26.67
motor expressivity	0	0.00	1	6.67

Table 6.3-11 Verbal Data - Second Study - Time Spent Pursuing Motor Dimensions Objectives

Average Percentage of Time Spent Pursuing the Motor Dimensions Objectives in PE Didactics by Pre and Post-Training Teachers

	Pre	Post
to know motor lang.	69%	50%
base motor abilities	0	0
to perform strength and endurance	10%	0
to check body's movement	0	0
psycho-motor ability	0	0
posture	100%	0
hamonic development	0	0
body awareness/development	0	83%
to use space	0	0
spatio-temporal coordination	70%	0
small co-ordination / co-ordination	47%	66%
to know new language	0	0
(to move with music)	0	0
health/fitness	0	100%
to develop body composition	0	0
agility/ balance	40%	100%
breath	20%	0
game	0	100%
motor expressivity	0	20%

Table 6.3-12 Verbal Data - Second Study - Lessons Contents Linked to Dimensions

<i>Dimensions</i>	Frequency and Percentage of Lesson Contents Linked to Emotional, Social, Motor, Cognitive Dimensions Used During PE Lessons by Pre Versus PostTrained Teachers											
	Pre				Post							
	<i>Motor activities</i> <i>frequency</i>	<i>%</i>	<i>Expressive activities</i> <i>frequency</i>	<i>%</i>	<i>Team sport</i> <i>frequency</i>	<i>%</i>	<i>Motor activities</i> <i>frequency</i>	<i>%</i>	<i>Expressive activities</i> <i>frequency</i>	<i>%</i>	<i>Team sport</i> <i>frequency</i>	<i>%</i>
emotional	3	20.00	5	33.33	3	20.00	2	13.33	2	13.33	5	33.33
social	2	13.33	6	40.00	13	86.67	5	33.33	9	60.00	8	53.33
motor	3	20.00	3	20.00	7	46.67	3	20.00	2	13.33	4	26.67
cognitive	3	20.00	4	26.67	6	40.00	1	6.67	1	6.67	5	33.33

Table 6.3-13 Verbal Data - Second Study - Teaching Methods

Frequency and Percentage of Teaching Methods used in General and in PE Lessons by Pre Versus PostTrained Teachers

	Pre				Post			
	General Teaching		PE Teaching		General Teaching		PE Teaching	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
not method	2	13.33	4	26.67	1	6.67	1	6.67
deduct	4	26.67	0	0.00	3	20.00	2	13.33
prescriptive	0	0.00	4	26.67	3	20.00	7	46.67
analitic	0	0.00	0	0.00	0	0.00	0	0.00
induct	2	13.33	2	13.33	2	13.33	1	6.67
heuristic	0	0.00	0	0.00	3	20.00	4	26.67
global	1	6.67	0	0.00	0	0.00	0	0.00
cooperative	0	0.00	1	6.67	0	0.00	0	0.00
more than one	6	40.00	4	26.67	3	20.00	0	0.00

Table 6.3-14 Verbal Data - Second Study - Instruction Channels

Channel	Pre Teachers		Post Teachers	
	frequency	%	frequency	%
	verbal	7	46.67	9
verbal visual	11	73.33	10	66.67
verbal tactile	3	20.00	3	20.00
verbal auditory	7	46.67	8	53.33
audiovisual	0	0.00	0	0.00

Table 6.3-15 Verbal Data - Second Study - Feedback Channels

Channel	Pre Teachers		Post Teachers	
	frequency	%	frequency	%
	verbal	11	73.33	12
verbal visual	10	66.67	10	66.67
verbal tactile	6	40.00	5	33.33
verbal auditory	4	26.67	3	20.00
other (music/by situation)	3	20.00	0	0.00

Table 6.3-16 Verbal Data - Second Study - Correction Group

Frequency and Percentage of Correction Group Types Used in PE Didactic by Pre Versus PostTrained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
on all students	5	33.33	7	46.67
small groups	0	0.00	2	13.33
single	9	60.00	9	60.00
based on situations	10	66.67	10	66.67

Table 6.3-17 Verbal Data - Second Study - Didactic Equipment

Frequency and Percentage of Didactic Equipment Used in PE Lessons by Pre Versus PostTrained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
nothing	10	66.67	10	66.67
blackboard	3	20.00	0	0.00
handouts	0	0.00	1	6.67
cards	1	6.67	2	13.33
films	0	0.00	1	6.67
maps	0	0.00	0	0.00
posters	2	13.33	1	6.67
cd	0	0.00	0	0.00
internet	0	0.00	0	0.00
newspaper	0	0.00	1	6.67
video-cassettes	0	0.00	0	0.00
symbolic representations of games	0	0.00	0	0.00
self-evaluation	1	6.67	1	6.67
photo	0	0.00	1	6.67

Table 6.3-18 Verbal Data - Second Study - Motivation Factors Related to Didactics Equipment Used in PE

Frequency and Percentage of Didactic Support of Motivation Factors Related to Didactic Equipment Used in PE Lessons by Pre Versus PostTrained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
content	4	26.67	1	6.67
interaction	0	0.00	0	0.00
method	0	0.00	1	6.67
aim	3	20.00	2	13.33

Table 6.3-19 Verbal Data - Second Study - Students Organization

Frequency and Percentage of Students Organization Used in PE Didactics by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
work in groups	13	86.67	14	93.33
work in couples	10	66.67	11	73.33
single work	8	53.33	8	53.33
small groups	1	6.67	4	26.67

Table 6.3-20 Verbal Data - Second Study - Class Management

Frequency and Percentage of Specific Class Management Used in PE Didactics by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
rules	4	26.67	9	60.00
rituals	3	20.00	0	0.00
signs	2	13.33	2	13.33
other	11	73.33	11	73.33

Table 6.3-21 Verbal Data - Second Study - Specific Class Management

Frequency and Percentage of Specific Class Management Used in PE Didactics by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
to whistle	3	20	1	6.67
to voice	2	13.33	2	13.33
to silence	1	6.67	0	0.00
environ.org.	0	0.00	1	6.67
stud. org	0	0.00	4	26.67
to use self-control	0	0.00	1	6.67
to use eye contact	1	6.67	1	6.67
to control	0	0.00	1	6.67
to work in small group	1	6.67	0	0.00
to threat	0	0.00	0	0.00
to reward	0	0.00	0	0.00
to propose interesting work	2	13.33	0	0.00
no stop during lesson	1	6.67	0	0.00
to give clear orders	0	0.00	1	6.67
to give orders before going to gym	0	0.00	0	0.00
to stop activity	0	0.00	0	0.00
to move in the gym	0	0.00	2	13.33
to get attention	1	6.67	0	0.00
planning lesson	0	0.00	1	6.67
to reflect	0	0.00	1	6.67

Table 6.3-22 Verbal Data - Second Study - Teaching Styles

Frequency and Percentage of Methods Used to Manage Lessons by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
command style	1	6.67	2	13.33
authoritative style	3	20.00	5	33.33
severe style	1	6.67	0	0.00
rigid style	0	0.00	0	0.00
inclusive style	0	0.00	0	0.00
friendly style	1	6.67	1	6.67
to be listening	1	6.67	2	13.33
amusing style	1	6.67	0	0.00
sweet style	2	13.33	2	13.33
constructive style	0	0.00	2	13.33
meta-cognitive	0	0.00	0	0.00
guided discovery style	0	0.00	1	6.67
don't know	5	33.33	2	13.33
"open" style	1	6.67	5	33.33
emotional style	1	6.67	0	0.00
all styles	0	0.00	1	6.67
cooperative style	0	0.00	0	0.00
charismatic style	1	6.67	0	0.00

Table 6.3-23 Verbal Data - Second Study - Group Types Used to Organize Lessons

Frequency and Percentage of Group Types Used to Organize Lessons by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
don't know style	8	53.33	3	20.00
reproductive style	5	33.33	3	20.00
productive style	1	6.67	4	26.67
mobility	1	6.67	5	33.33

Table 6.3-24 Verbal Data -Second Study - Lessons Effectiveness Assessed

Frequency and Percentage of Lesson Effectiveness Assessed by Pre versus PostTrained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
student involvement	6	40.00	6	40.00
respect of rules	1	6.67	0	0.00
enthusiasm	1	6.67	5	33.33
attention rate	1	6.67	2	13.33
interesting game or lesson	1	6.67	0	0.00
social interaction	1	6.67	0	0.00
student behaviour	3	20.00	3	20.00
right/ wrong answers	0	0.00	0	0.00
achievement of the aim	2	13.33	0	0.00
reflection on mistakes	1	6.67	1	6.67
reflection on positive and negative things	0	0.00	0	0.00
improvement of motor abilities	0	0.00	0	0.00
check on motor learning	1	6.67	2	13.33
activity rate	1	6.67	0	0.00
group management	0	0.00	1	6.67

Table 6.3-25 Verbal Data - Second Study - Skills Used to Assess Student Performance

Frequency and Percentage of Skills Used to Assess Student Performance in PE Lessons by Pre versus PostTrained Teachers

	pre		post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
practical skill	5	33.33	2	13.33
motor skill	14	93.33	14	93.33
social skill	12	80.00	15	100
other	2	13.33	0	0

Table 6.3-26 Verbal Data - Second Study - Importance given to Skills

Average Percentage of Importance Given to Skills chosen in PE Lessons by Pre Versus Post-Training Teachers

	pre	post
practical skill	27%	20%
motor skill	50%	34%
social skill	46%	51%
other	70%	0

Table 6.3-27 Verbal Data - Second Study - Aspects Used to Assess PE Lessons Performance

Frequency and Percentage of Aspects Used to Assess PE Lessons by Pre Versus Post-Trained Teachers

	pre		post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
don't know	0	0	1	6.67
teacher process variables	1	6.67	1	6.67
student process variable	8	53.33	8	53.33
student outcome variables or product variables	3	20.00	4	26.67
mixed variables	3	20.00	1	6.67

Table 6.3-28 Verbal Data - First Study - Instruments Used to Assess Students Performance

Frequency and Percentage of Instruments Used to Assess Student Performance in PE Lessons by Pre Versus Post-Trained Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
tests	2	13.33	2	13.33
measures	0	0	1	6.67
flow charts	0	0	1	6.67
observation	10	66.67	7	46.67
obsevation with handout cards	0	0	0	0
to check aim with result	0	0	0	0
lived experience	1	6.67	0	0

Table 6.3-29 Verbal Data - Second Study - Instruments Used to Assess Students Performance

Frequency and Percentage of System Used to Assess Student Performance in PE Lessons by Pre Versus Post-Training Teachers

	Pre		Post	
	<i>frequency</i>	<i>%</i>	<i>frequency</i>	<i>%</i>
individual progress	13	86.67	11	73.33
on the calssroom level	1	6.67	1	6.67
on group level	1	6.67	0	0
standard tables	0	0	0	0
on school criterion value	0	0	0	0
change social behavioural	0	0	0	0
change learning	1	6.67	0	0

Versicherung

Ich versichere, dass ich die eingereichte Dissertation “Subjective theories and behaviours in physical education of Italian primary school teachers. Applying a superstructure model to study specialist-generalist teachers differences and the effects of a physical education professional development programme“ selbständig und ohne unerlaubte Hilfsmittel verfasst habe. Anderer als der von mir angegebenen Hilfsmittel und Schriften habe ich mich nicht bedient. Alle wörtlich oder sinngemäß den Schriften anderer Autoren entnommene Stellen habe ich kenntlich gemacht.

Rom, 24/03/2010

Rita Casella

Abbreviated Curriculum Vitae: **Rita Casella**

March 2010

GENERAL INFORMATION

Born in Rome, the 17th February 1971, Italian citizen

CURRENT POSITION

Physical Education teacher in low secondary school

DEGREES and PROFESSIONAL QUALIFICATIONS

2008 European Training School in Body and Functional Psychotherapy (SIF) in Naples, Italy, **Professional Counselor Psychotherapist**

2003 Università degli Studi “Roma3”, Specialization for Secondary School Education, **State examination for Teaching Secondary School Physical Education**, Final result 80/80

2001 Istituto Universitario di Scienze Motorie (ex IUSM, Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy), **BSc in Sport and movement Sciences**, Final thesis entitled - “Psychological Factors related to Gender Differences”, Final result 110/110 cum laude

2000 Università degli Studi “La Sapienza” in Roma, **MSc in Psychology**, Final thesis entitled - “Gender Differences in Communication and Adolescence”, Final result 105/110

1992 Istituto Superiore Statale di Educazione Fisica di Roma (ex ISEF, Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy), **BA in Physical Education**, Final thesis entitled –“Evaluation of Leg strength in Adolescence”, Final result 110/110 cum laude

EMPLOYMENT HISTORY (University)

January 2009 to September 2009 Researcher fellowship in scientific area Historical, Philosophic, Pedagogic and Psychological Sciences. Theory and Methodology of physical education: “ Effect of Chronic Exercise on Visual Attention in adolescence”, in Rome

University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy.

January 2007 to December 2008 Researcher fellowship in scientific area Historical, Philosophic, Pedagogic and Psychological Sciences. Theory and Methodology of physical education: “Effect of Acute and Chronic Exercise on Visual Attention in elderly: the role of aerobic fitness and motor-coordinative training”, in Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy.

February 2008 Responsible for postgraduate Teaching of the module “Unplugged / Moved Unplugged”, Project “EU-DAP 2 – Implementation of UE-Dap at a population level” for state secondary school physical education teachers, funded by the European Commission (2005) and by the Italian National Fund for the Fight against Drug. Università degli Studi dell’Aquila, Italy.

September 2006 to May 2008 Postgraduate Teaching in cooperation with the Centre for Lifelong Learning and Continuing Education and Local Vocational Development Office, Istituto Universitario di Scienze Motorie (IUSM) Rome, Italy. Project title: “Promotion of motor exercise and food education for a healthy lifestyle”. Funded by Regional Council for Teaching, School and Vocational Education.

September 2004 to February 2008 Undergraduate module teaching for the 2nd year BA in Sport students “Physical activities for Children” (from 3 to 14 years) in Methodology and Theory of Physical Activity (M-EDF/01), Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy.

December 2004 Cooperation within the research project: “Subjective theories of primary school teachers on motor activity in childhood” (funded by CRUI and DAAD, International Organization), Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy and Universität Landau, Institut für Sportwissenschaft, Germany.

September 2002 to June 2003 Cooperation with research projects: (1) “Psychological factors related to gender differences in sport”; (2) “Visual attention under physical and emotional load in high-level volleyball players”. Rome University “Foro Italico”, Department of Education in Sport and Human Motion, Rome, Italy.

January to December 2001 Cooperation within the research project: “A national Campaign against doping through education”, Research Department Sports School of the Italian National Olympic Committee. Funded by the Italian Ministry for Education and Rome Town Council.

PUBLICATIONS

Refereed International Journals:

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- Casella, R.**, Pesce, C., Hanke, U., & Schmitt, K. (forthcoming). Subjective theories and behaviours of specialist and non-specialist physical education teachers in the Italian primary context.
- Casella, R.** (forthcoming). Training and non-training PE teachers in primary schools – a cross-cultural comparison between Germany and Italy based on subjective theories.

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