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Panagiotis Kampylis

Fostering Creative Thinking

The Role of Primary Teachers

JYVÄSKYLÄN YLIOPISTO

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UNIVERSITY OF JYVÄSKYLÄ

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ABSTRACT

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We are currently witnessing an increasing social demand for creativity in almost every field of human activity. Primary education is striving to keep pace with these new social needs and prepare creative future citizens. It is well accepted that teachers play a key role, positively or negatively, in fostering students' creative thinking, but limited research has been conducted into this topic. Thus, the basic aim of this study was to investigate Greek primary teachers' situated knowledge, experiences, and implicit theories of fostering students' creative thinking, mainly through the use of empirical data. A mixture of methods was employed, including surveys, focus groups, and literature research. The data analysis revealed that teachers' practices are influenced mainly by inconsistent implicit theories and by widespread misconceptions about creativity. In addition, several factors inhibit teachers in fostering students' creative thinking, such as inadequate initial teacher education and in-service training and a lack of time and means. Moreover, an analysis of creativity definitions and collocations found that the emphasis is placed on its positive aspects. However, teachers reported that creativity also has its dark side and that students need to develop particular thinking skills in order to understand the potential consequences of their creative actions. Therefore, the focus of primary education should be not only to foster students' creative thinking but also to encourage complementary types of thinking such as critical, caring, and reflective. Teachers' situated knowledge and experiences of fostering creative thinking in real classrooms and their recommendations for a more creative education offer valuable insights and information for creativity researchers and policymakers. Conclusions drawn from this dissertation include key recommendations for fostering students' creative-thinking skills, a comprehensive definition of creativity in the primary-education context, a reliable framework for e-training teachers in collaborative creativity, and a model for analysing the consequences of human creativity. The study ends with suggestions for further research.

Keywords**:** fostering creative thinking, creativity in primary education, primary teachers' conceptions of creativity, implicit creativity theories, collaborative creativity, manifold thinking, creativity recommendations, teacher training, creativity metascience, Creativity Consequences Analytical Framework.

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DEDICATION

I would like to dedicate this dissertation to the most important people in my life: my beloved wife, Maria Theodorakopoulou, and my adorable daughters, Dimitra and Despoina Kampyli. I am very appreciative of their love, patience, support, and encouragement during my life in general and my Ph.D. studies in particular.

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Approaching my Ithaca after a long and challenging research journey, I would like to express my gratitude to and acknowledge those exceptional people who have helped to make the completion of this journey possible.

I could never have completed this journey without the love and support of my wonderful family. Thus, I would like to express my heartfelt gratitude to my "Penelope", my wife Maria Theodorakopoulou, and to my beloved daughters, Dimitra and Despoina Kampyli, for their love, support, encouragement, and patience, which enabled me to finish my Ph.D. research.

My parents, Giorgos and Dimitra Kampyli, hold a special place in my heart. I wish to give them my love and thanks for always believing in me. Their continual and multifaceted support has been vital throughout my life. I would also like to express my gratitude to my sisters Maria and Evagelia Kampyli, and their families, as well as to my mother-in-law, Ioanna Theodorakopoulou, and my sisters- and brothers-in-law for their support and encouragement.

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It is almost impossible for an individual to complete a substantial body of creative work alone. The original publications that make up the main part of this dissertation were the outcomes of the collaborative creativity of the co-authors and me. Therefore, I would like to express special gratitude to all the co-authors of my publications for our fruitful collaboration and joint efforts to write the best possible manuscripts. Thank you, Eleni Berki, Pertti Saariluoma, Juri Valtanen, Maria Theodorakopoulou, Niki Lambropoulos, Maria Argyriou, Emmanuel Fokides, Sofia Papadimitriou, Marianna Vivitsou, Alexander Gkikas, Nikos Minaoglou, and Dimitris Konetas.

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Being a student in a foreign country has been both challenging and exciting. The four years I have spent in the well-organized and hospitable University of Jyväskylä have provided me with valuable personal and professional experiences. I have had the chance to make new friends who have assisted and supported me. First, I would like to express my endless gratitude to Thomas Chatzitolios for his genuine friendship and varied support. Warm thanks also to Dimitris Papatheocharis, Tele Papatheocharis, Giorgos Skaniakos, and Terhi Skaniakos for their friendship and support. Many thanks to Hanna Parkkola, and her wonderful family, for their support and friendship. Maria Helstola, Anthi Malkopoulou, Christos Pastras, Basilis Sevdalis, and Anna-Maria Tourva, thank you for your company, friendship, and support during my stay in Jyväskylä.

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I have tried to include the names of all the exceptional people who have contributed, directly or indirectly, to my Ph.D. research. However, I want to say "Please forgive me!" to those who I may have forgotten to acknowledge here. Finally, I want to express my gratitude to all those, at any time in my life, who have taught me something, guided and advised me in something, or inspired me with something.

New Philadelphia, April 2010
Panagiotis G. Kampylis

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CAQDAS	Computer-Assisted Qualitative Data Analysis Software
CBLE	Computer-Based Learning Environments
CPS	Creative Problem Solving
CRs	Creativity Recommendations
CTCF	(Greek) Cross-Thematic Curriculum Framework
CTCFM	(Greek) Cross-Thematic Curriculum Framework for Music
DCMS	(British) Department for Culture, Media, and Sport
DfEE	(British) Department for Education and Employment
dPBL	distributed Problem-Based Learning
EACEA	(European) Education Audiovisual and Culture Executive Agency
EU	European Union
GDP	Gross Domestic Product
GPI	Greek Pedagogical Institute
ICT	Information and Communication Technologies
ISCED	International Standard Classification of Education
MCEETYA	(Australian) Ministerial Council on Education Employment Training and Young Affairs
MTCCQ	Music Teachers' Conceptions of Creativity Questionnaire
NACCCE	(British) National Advisory Committee on Creative and Cultural Education
OFSTED	(British) Office for Standards in Education, Children's Services and Skills
PBL	Problem-Based Learning
PMSEIC	(Australian) Prime Minister's Science Engineering and Innovation Council
QCA	(British) Qualifications and Curriculum Authority
SEED	Scottish Executive Education Department
TCCQ	Teachers' Conceptions of Creativity Questionnaire

PREFACE

As a student teacher, I became familiar with the theories of great pedagogues and philosophers such as Dewey and Piaget, and I was inspired by their ideas for education. For instance, I advocate Piaget's point of view that the principal goal of education is to produce future citizens who are creative and critical (Duckworth, 1964, p. 5). However, when I started to work in real schools with students six to twelve years old, I realized that I had not been trained in *how* to achieve this principal goal in practice and that I had few opportunities and means to do so. Nevertheless, gradually, I discovered activities that trigger primary-school students' creative thinking, such as the construction of musical instruments in the classroom, and I decided to study these more systematically and scientifically.

I officially started the odyssey of my Ph.D. research in September 2005 (see the graphical representation of the study on page 18), adopting Guilford's (1967) view that "…*creativity is the key to education in its fullest sense and to the solution of mankind's most serious problems*" (p. 13). Thus, the main objective of this study of creative thinking was, in essence, a practical one: to approach creative thinking in a holistic way in order to understand how we can nurture it through schooling, for not only personal but social progress as well.

At the beginning of my research journey, I aspired to investigate the creative dimensions of classroom-made musical instruments within the context of primary education (Kampylis, 2006; Kampylis & Berki, 2005). However, conducting the initial literature review, I realized that little research had been undertaken on teachers' conceptions and implicit theories of creativity. Consequently, knowledge about what teachers know, want, and believe about creativity has been limited. Furthermore, I was conscious that it would be primary teachers who would ultimately implement everything that I, as a researcher, may discover and propose for the fostering of primary-school students' creative thinking.

However, as a primary teacher, I have been called upon many times to implement, without having the suitable support and training, "educational innovations", "new teaching approaches", and other perfect-in-theory but problematic-in-practice initiatives. My first-hand experiences indicate that the majority of these initiatives remain on paper and that little can change in real classroom settings without teachers' wholehearted participation. That is why I finally decided, in collaboration with my supervisors, to investigate what teachers really believe, know, want, and need with regard to the fostering of creative thinking and performance in the context of primary education.

During my Ph.D. research, I found answers to some of my initial questions on how to foster students' creative thinking. At the same time, though, new questions, more reflective and philosophical, such as "Why do we have to foster students' creative thinking?" and "Who is going to benefit from the fostering of students' creative thinking?" were emerging. Moreover, I realized that the scientific study of human creativity is a paradoxical process: I had to study crea-

tivity in a creative way. In other words, creativity simultaneously characterizes the topic, the process, and the outcome of the study.

Early on, I also realized that the pursuit of creativity was part of my entire life and that this journey had become not only a scientific study but also a challenging process of self-discovery. After five years of challenges and constructive experiences, I am approaching the official end of a research odyssey that has changed not only my mind but also my entire life. The journey has been for me a very fruitful one. I hope that this dissertation will also be fruitful for the scientific study of our key ability to think and act creatively.

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APPENDIX 4 Music Teachers' Conceptions of Creativity Questionnaire (translated into English)
APPENDIX 5 Official permission for the research given by the Greek Pedagogical Institute (original Greek)
APPENDIX 6 Official permission for the research given by the General Assembly of the Faculty of Primary Education, National and Kapodistrian University of Athens (original Greek)

LIST OF ORIGINAL PUBLICATIONS

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II Valtanen, J., Berki, E., Kampylis, P., & Theodorakopoulou, M. (2008). Manifold thinking and distributed problem-based learning: Is there potential for ICT support? In M. B. Nunes & M. McPherson (Eds.), *Proceedings of the IADIS International Conference e-Learning 2008* (Vol. 1, pp. 145-152). Amsterdam: IADIS Press.

III Kampylis, P., & Argyriou, M. (2008). Music teachers' perceptions of creativity and their role in students' creative thinking development. In A. Daubney, E. Longhi, A. Lamont, & D. Hargreaves (Eds.), *Proceedings of the Second European Conference on Developmental Psychology of Music* (pp. 149-154). Hull: GK Publishing.

IV Kampylis, P., Berki, E., & Saariluoma, P. (2009). In-service and prospective teachers' conceptions of creativity. *Thinking Skills and Creativity, 4*(1), 19-29.

V Lambropoulos, N., Kampylis, P., Papadimitriou, S., Gkikas, A., Vivitsou, M., Minaoglou, N., et al. (2008). Hybrid Synergy for virtual knowledge working. In J. Salmons & L. Wilson (Eds.), *Handbook of Research on Electronic Collaboration and Organizational Synergy* (Vol. 1, pp. 83-102). Hershey, PA, USA: IGI Global Publications.

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VII Kampylis, P., Saariluoma, P., & Berki, E. (2010). *Fostering creative thinking - What do primary teachers recommend?* Manuscript submitted for publication.

GRAPHICAL REPRESENTATION OF THE STUDY

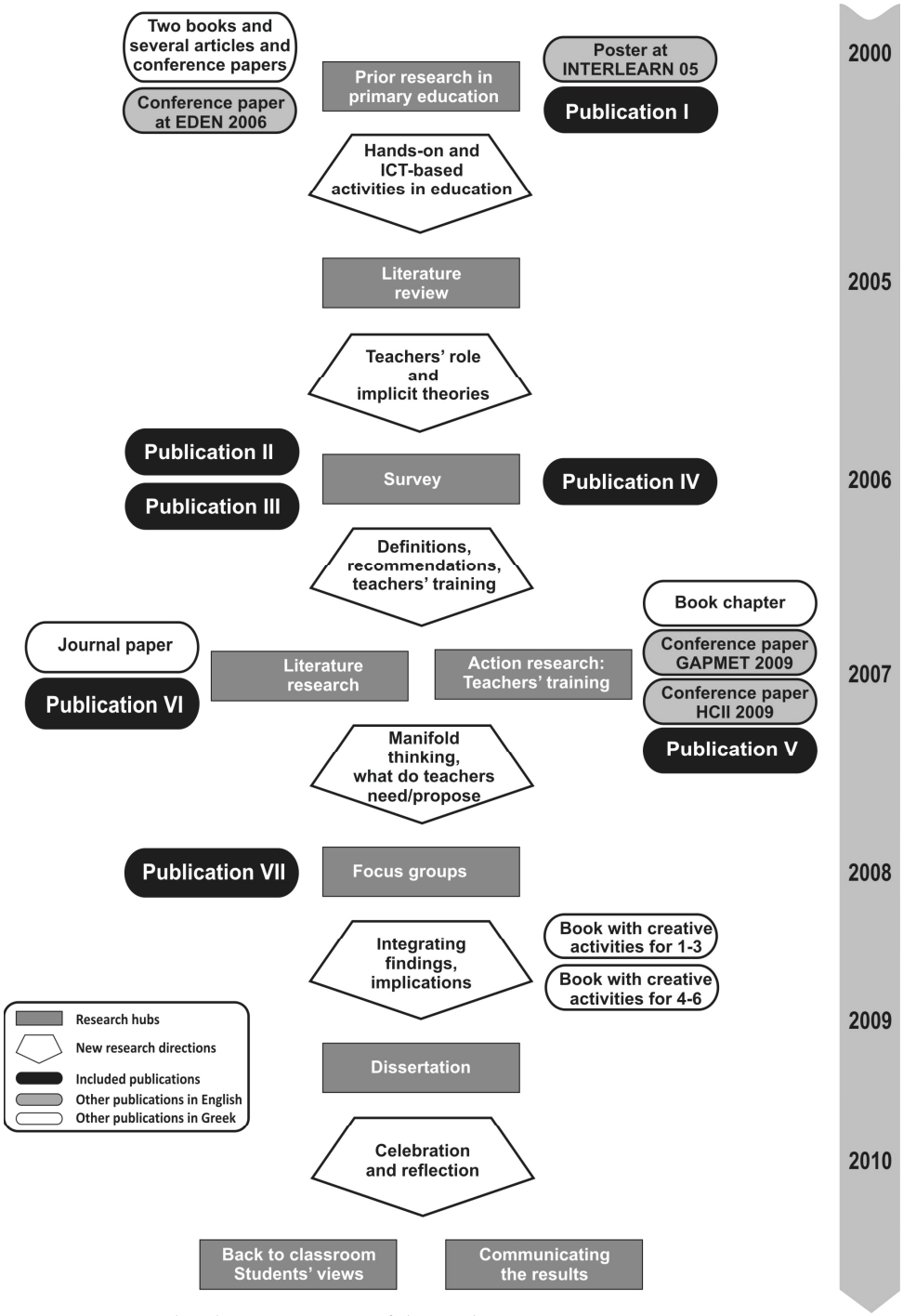


FIGURE 1 Graphical representation of the study

1 INTRODUCTION

Creativity is a unique attribute of humans and distinguishes us from forms of artificial intelligence such as computers and robots (Cropley, 1999; Kim, 2007). In the words of Cropley (1999), "*…creative thinking is a bastion of human dignity in an age where machines, especially computers seem to be taking over routine skilled activities and everyday thinking*" (p. 512).

Human creativity is a complex phenomenon (Bierly, Kolodinsky, & Charette, 2009; Diakidoy & Constantinou, 2001; Esquivel, 1995; Fryer, 1996; Levin, 2008; Mumford, 2003; Ripple, 1999; Runco, 2007b; Runco & Albert, 1990) and has been studied by researchers in a variety of fields such as psychology, anthropology, cognitive science, history, neuroscience, artificial intelligence, and sociology. For scientists from such diverse disciplines, traditions, and paradigms, it can be difficult to find a common language and reach an agreement about what human creativity is and how we can utilize it for the "common good".

These disagreements are evident in the definitions of creativity. Although we have entered the seventh decade[1] of contemporary scientific research on creativity, and hundreds of definitions are available (for a review see Publication VI), the term remains fuzzy and vague (e.g. Negus & Pickering, 2004). In the title and the body of this dissertation, I use mainly the term *creative thinking* rather than *creativity*, in order to place emphasis on the initial thinking process that leads to any creative activity and outcome. In addition, creative thinking is among the key thinking skills that primary-school students need to develop through formal education (Department for Education and Employment /Qualifications and Curriculum Authority [DfEE/QCA], 2004; Greek Pedagogical Institute [GPI], 2003; Law 1566/1985, 2004; Ministerial Council on Education Employment Training and Young Affairs [MCEETYA], 2008; Qualifications and Curriculum Authority [QCA], 2005). Creative thinking can be defined within the framework of primary education as enabling students "*…to generate*

1 I consider as a starting point for the contemporary scientific study of human creativity Guilford's (1950) renowned presidential address to the American Psychological Association.

and extend ideas, to suggest hypotheses, to apply imagination, and to look for alternative innovative outcomes" (DfEE/QCA, 2004, p. 22).

Worldwide, numerous consulting companies, training programmes, seminars, workshops, and advice books[2] claim to enhance creative thinking at a personal and organizational level. These commercialized ventures constitute a *pragmatic approach* to the study of creativity (Sternberg, 2006; Sternberg & Lubart, 1996, 1999) and, in most cases, have no solid scientific basis. Thus, a number of creativity researchers (e.g. Nickerson, 1999) question the effectiveness of such one-off and one-size-fits-all training programmes.

Some critics (e.g. Sternberg & Lubart, 1996, 1999) stress that such training programmes reinforce the aura of mystery and mysticism that has surrounded creativity since antiquity and overshadow the progress of scientific research into it. Others (e.g. Plucker & Beghetto, 2003) assert that, although the programmes claim to foster creative thinking as a whole, in practice they attempt to enhance some components of it, such as fluency, flexibility, and originality, which correlates mainly with divergent thinking. In addition, most of these commercial approaches to enhancing creative thinking assume that it is an individual, domain-general ability. Consequently, as several scholars argue (e.g. Sawyer, 2006a), these programmes do not sufficiently emphasize the importance of general knowledge, hard work, commitment, persistence, and intrinsic motivation, which are prerequisites for creativity.

Some researchers (e.g. Kampylis, 2008a) point out that it is easier for teachers to enter their local bookstore and find a bestselling advice book on creativity than it is to access contemporary research in the field in scientific journals and books. The result is that teachers remain somewhat uninformed about scientific research on creativity. They therefore formulate diverse and inconsistent implicit theories based on widespread common beliefs that have no scientific basis and often lead to misconceptions about creativity (e.g. Aljughaiman & Mowrer-Reynolds, 2005). These widespread misconceptions (see section 2.3.1, p. 51) are usually reinforced by the biographies of eminent creators. According to Kaufman (2009), the vast majority of such biographies are of creators whose behaviour was outlandish or who suffered from various mental illnesses. On the other hand, the biographies of creative persons who were merely diligent and displayed balanced behaviour are rare.

Moreover, although the word *creativity* shares its root with *Creation* and *Creator* and, therefore, has positive collocations (for a review see Publication VI), it refers to a human ability that also has its dark side (Cropley, Kaufman, & Cropley, 2008; Kaufman, 2009; McLaren, 1999; Nebel, 1988; Runco, 2004a, 2007; Runco & Nemiro, 2003; Sternberg, in press). For this reason, students need help in order to judge effectively the value of what they and others have created and to reflect on the consequences of any creative action (QCA, 2005). This is very important because, as Runco (2007) emphasizes, children lack meta-cognitive

2 Some typical titles are the following: "*Creativity Sucks! How to Generate Million Dollar Ideas in 60 Seconds or Less!*", "*Wired for Creativity: How to Develop Your God-Given Potential*", "*Art Heals: How Creativity Cures the Soul*", and "*Creative Cash: How to Profit From Your Special Artistry, Creativity, Hand Skills, and Related Know-How*".

skills and some aspects of self-awareness and self-monitoring, and consequently, they cannot easily distinguish between positive and negative aspects of creative thinking and performance.

1.1 Research rationale

Since the dawn of the 21st century, the social demand for creativity has been steadily increasing in almost every field of human activity (see for instance Baucus, Norton, Baucus, & Human, 2008; Dewett, 2007; Florida, 2002, 2005; Florida & Tinagli, 2004; Halbesleben, Novicevic, Harvey, & Buckley, 2003; Lambropoulos & Kampylis, 2009; Lambropoulos, Kampylis, & Bakharia, 2009; QCA, 2005; Roberts, 2006). Today, creativity is considered to be "…*an essential life skill, which needs to be fostered by the education system*" (Craft, 1999, p. 137) because it has the potential to solve a range of social, political, and economic problems (Burnard & White, 2008). In this framework, Toynbee's (1964) words sound extremely vivid and valid today even after 45 years: "…*to give a fair chance to potential creativity is a matter of life and death for any society*" (p. 4).

Some researchers go a step further by claiming that we live in the *creative age* inasmuch as the *creative industries* represent a leading sector that is developing at a greater pace than other economic sectors (Banaji & Burn, 2006; Florida, 2002, 2005; Florida & Tinagli, 2004; Gertler, Florida, Gates, & Vinodrai, 2002; Hartley, 2005; Hollanders & van Cruysen, 2009; Lambropoulos & Kampylis, 2009; Matheson, 2006; Murakami, 2000; O'Connor, 2007; Prime Minister's Science Engineering and Innovation Council [PMSEIC], 2005; Seltzer & Bentley, 1999). Creative industries encompass economic sectors such as art, design, fashion, architecture, cinema, music, the performing arts, publishing, computer science, mass media, and education. Consequently, creative thinking is regarded today both as a commodity and as a key "employability" skill (Creative Partnerships, 2009; Department for Culture, Media, and Sports [DCMS], 2001b; Florida & Goodnight, 2005; PMSEIC, 2005; Seltzer & Bentley, 1999; The Pedagogy for Employability Group, 2006) as well as a key factor of *human capital* (Florida, 2002, 2005; Florida & Tinagli, 2004; McWilliam & Dawson, 2008; Murakami, 2000; PMSEIC, 2005; Robinson, 2001).

However, the conceptualization of human creativity as a commodity raises many concerns about its use in simply meeting the needs of the modern capitalist economy (Peters, 2009) rather than the *common good* (e.g. Banaji & Burn, 2006). In any case, although contemporary creative industries require creative employees, 21st-century education systems are still based on the requirements of 19th-century industries (Robinson, 2001), in which "*...there was little room for originality on a production line*" (Barnes, Hope, & Scoffham, 2008, p. 130).

Based on these new socioeconomic demands and on learning theories (e.g. Sawyer, 2006c), especially those of Bruner, Dewey, Piaget, and Vygotsky, the

fostering of students' creative thinking is regarded today as a key education target, albeit a challenging one, by a number of education systems such as those in Australia (MCEETYA, 2008), China (Vong, 2008), Finland (Saarilahti, Cramond, & Sieppi, 1999), Greece (GPI, 2003), Hong Kong (Wong, 2008), and United Kingdom (QCA, 2005; Scottish Executive Education Department [SEED], 2006; HM Inspectorate of Education [HMIE], 2006). The main challenge for these education systems is to nurture something as complex and elusive as creative thinking and to assess it alongside other education targets.

Some claim (e.g. Kaufman, 2009) that creative thinking cannot be regarded as an education target because it cannot be measured and therefore is almost impossible to assess; thus, creative thinking is almost absent from education assessments in the context of education (Kaufman, 2009). However, I argue that the real problem with the fostering of creative thinking through formal education is not its assessment; even a complex phenomenon such as creative thinking can be assessed by student-centred and flexible means of assessment such as portfolios (Houtz & Krug, 1995). The real problem is that little emphasis has been placed by education authorities on a number of key issues such as the role of teachers in the fostering of students' creative thinking, how they can play this role effectively, and their willingness to play it.

According to Runco and Nemiro (2003), all creative efforts must be evaluated in terms of their potential effects, their background, and their intentionality. In other words "*...much more than we usually suppose, creating is an intentional endeavor shaped by the person's values*" (Perkins, 1990, p. 422). Thus, the fostering of students' creative thinking within the framework of primary education requires teachers to care about it and show a willingness to do it despite possible obstacles and distractions. Sternberg (2005c) also stressed the important role that intentions play in the expressions of creativity by describing it as "*…as much a decision about and an attitude toward life as it is a matter of ability*" (p. 229). In other words, there are dynamic and reciprocal correlations between creativity and intentionality (TenHouten, 1999).

Therefore, teachers' beliefs and attitudes as well as their intentions need to be taken into account in any attempt at education reform, because these components of teachers' cognition correlate directly with their classroom practices (Park, Lee, Oliver, & Cramond, 2006). Jeffrey (2003) also highlights the explication of teachers' intentions, because these are regarded not only as the best predictors of planned behaviours (Zampetakis & Moystakis, 2006) but also as determinants of actual behaviours (Zampetakis, 2008). Thus, Craft, Gardner, and Claxton (2008) envisage the teacher "*…as a reflective practitioner – one who considers actions and intentions by reflecting both in and on practice*" (p. 11).

Thus, this dissertation aspires to highlight the role that teachers intentionally play (or should play) in the fostering of students' creative thinking within the primary-education framework.

1.2 Research problem

We live in an era in which significant, rapid, and constant changes are taking place at the technological, social, cultural, and economic levels. Education seems to be in a state of constant flux, striving to keep pace with the new conditions (Craft, 2001a, 2003; Dineen & Collins, 2005; Grainger, Barnes, & Scoffham, 2004; Kampylis, 2008a; Levin, 1998; NACCCE, 1999; Starko, 2005). The major challenge for any educational reform remains to bridge the gap between research theories and practices. In other words, any education reform must be able to successfully introduce new theories, techniques, structures, and approaches into mainstream practice.

However, the transformation of schools from centralized organizations that target conformity, sociocultural integration, and tradition to organizations that aim to foster creative thinking, non-conformity, and diversity is not easy. It presupposes a change in the role of teachers, from that of authorities conveying information and knowledge to facilitators enabling students to discover and construct knowledge (e.g. GPI, 2003). Moreover, it presupposes that the vast majority of teachers and education authorities no longer adopt widespread misconceptions about creativity, such as that it relates only to the arts, that it requires absolute freedom, that it causes mess and disruption, and that it takes time away from teaching the "basics" (Saarilahti et al., 1999). Therefore, the question that emerge is "How willing and competent are teachers to play this new role, and under what circumstances?"

Several researchers (e.g. Saarilahti et al., 1999) report that teachers can be divided into two main groups regarding their conceptualizations of creativity. On the one hand, many teachers view creativity as something supplementary (and even unnecessary) in education, something that can be fostered through after-school or extracurricular activities and play. On the other hand, some teachers regard the fostering of students creative thinking as a key part of their profession and have been pursuing the implementation of creative class activities.

A number of creativity scholars (e.g. Mumford & Hunter, 2005; Sternberg, 2005b) also emphasize the *creativity paradox*: while almost all organizations value creativity in theory, they do not always value it in practice. Moreover, according to Baucus et al. (2008), organizations set rules yet encourage employees to break them. This ambiguity lets employees decide on key ethical issues for themselves, considering, among other things, the following: (a) Which rules can be broken? (b) Under what circumstances? (c) How far can we go? (d) Who gets to make or break the rules? (Baucus et al., 2008, p. 103).

The creativity paradox also characterizes education systems and organizations. The case of the 132nd Athens primary school (Karatzia-Stavlioti, Zografou, Lempesi, & Papadimitriou, 2007) revealed that teachers who "break the rules" while implementing successful and innovative programmes for immigrants' integration even face the danger of prosecution (see for instance

www.nowpublic.com/world/athens-school-principal-trial-teaching-other-languages).

The *creativity paradox* seems to characterize not only education organizations but also the practices of primary teachers (Westby & Dawson, 1985). On the one hand, teachers value, at least in theory, creative thinking and performance, but on the other hand, they follow practices that leave almost no room for creativity. For instance, it is well documented (e.g. Davies, 2000) that teachers tend to minimize failure of all types: the fewer mistakes that students make, the more successful the teacher is regarded. In contrast, creativity researchers (Cropley, 2001; Cropley & Urban, 2000; Sternberg, 1996; Sternberg & Williams, 1996; Urban, 2007) assert that failure is part of the creative process and that students should not feel "guilty" about their mistakes. Another example is that teachers have been taught that "good teachers" must strive to keep their class quiet, disciplined, and well adjusted. Thus, they may find it difficult to change their teaching practices automatically and deal with the "noise" and new arrangements that creative teaching and teaching for creativity require (Jeffrey & Woods, 2009; Starko, 2005).

Cropley (1992) emphasized three aspects of teachers' attitudes, behaviours, and practices that could affect students' creative thinking in real classroom settings: (a) the teacher as role model for creativity, (b) the classroom atmosphere that s/he establishes and that may encourage or discourage students' creative thinking and performance, and (c) how the teacher fosters students' creative thinking through appropriate activities in the classroom.

However, even if teachers are willing and sufficiently motivated to change their attitudes and behaviour in order to adopt new practices that enhance students' creative thinking they have to confront several inhibiting factors (Alencar, 2002; Craft, 2003). First, they must ensure that the majority of students will be taught the extensive syllabus specified by the curriculum. Second, creativity is difficult to assess (Fryer, 1996; Kaufman, 2009), and a great deal of time and effort must be spent on its fostering, the results of which, if any, will be long term. Meanwhile, teachers have to encounter parents' anxieties because students are observed to "not learn anything" but "play all day", and in many cases, teachers do not have the appropriate means and infrastructure that creative education requires. As a result, it seems that teachers' first imperative remains to "*keep control of their class*" and "*cover the syllabus*" (Vosniadou & Kollias, 2001, p. 341) instead of facilitating ambiguous and challenging education targets such as the fostering of creative thinking.

What teachers really need in order to confront these inhibiting factors is the self-confidence that comes from well-organized initial education and in-service training (Grainger et al., 2004; Hunsaker, 2005; Kampylis, 2008a). They also need education authorities to provide the appropriate support and means to enable them to feel free and motivated to *teach creatively* and *teach for creativity* (Craft, 2003; Craft, 2005; Cremin, Burnard, & Craft, 2006; Jeffrey & Craft, 2004; NACCCE, 1999). A report by the British National Advisory Committee on Creative and Cultural Education (NACCCE, 1999) made a clear distinction between teaching creatively and teaching for creativity. Teaching creatively is de-

fined by NACCCE (1999) as "*…teachers using imaginative approaches to make learning more interesting, exciting and effective*" (p. 102). Teaching for creativity is defined in the same report as "*…forms of teaching that are intended to develop young people's own creative thinking or behaviour*" (p. 103) and involves teaching creatively. In fact, teaching for creativity requires and incorporates all the qualities of successful teaching such as the ability to communicate with students, to understand, motivate, engage, and inspire them. According to Sternberg and Grigorenko (2004), teaching for creativity also requires teachers who not only encourage and reward creativity but also act as role models for it.

Moreover, the rapid changes that many education systems face worldwide follow a *top-down approach* that does not take into account teachers' needs and expertise (Kampylis, 2008a). Policymakers (European Parliament, 2008) and curriculum designers (GPI, 2003; QCA, 2005) emphasize the need to enhance students' creative thinking from the early stages of schooling, and numerous programmes and initiatives have been designed and implemented to achieve this target (e.g. Creative Partnerships, 2009), but the role of teachers remains unacknowledged.

Nevertheless, in practice, little attention has been given to *bottom-up approaches*, namely teachers' implicit theories and situated knowledge, although it is well accepted (Anderson-Patton, 1998; Burnard & White, 2008; Chan & Chan, 1999; Diakidoy & Kanari, 1999; Diakidoy & Phtiaka, 2001; Fryer, 1996; Fryer & Collings, 1991a,b; Runco, Johnson, & Bear, 1993; Runco & Johnson, 2002) that they play a key role in the development of students' creative potential. Little attention has also been given to teachers' initial education and in-service training, even though creative thinking is regarded as a key competence for teachers' professional development (e.g. Beghetto, 2006a).

Therefore, the present research problem investigates the conceptions and implicit creativity theories of primary teachers and how their mindsets influence their everyday practices in real classroom settings.

1.3 Research questions

The research problem is addressed through three questions. Two questions emerged from the primary research question in the course of the research.

1. What are Greek primary teachers' conceptions and implicit theories of creative thinking? (Publications II, III, and IV)
   a. How do primary teachers' expertise and teaching experiences affect their conceptions and implicit theories of creativity? (Publications III and IV)
   b. In what ways should primary teachers be trained and supported in their key role of fostering students' creative thinking? (Publications II, III, IV, and V)

2. What kind of creativity should teachers promote within the framework of primary education, and why? (Publications I, II, IV, and VI)
3. What do Greek primary teachers recommend for the fostering of students' creative thinking? (Publication VII)

1.4 Research problem significance

During my Ph.D. research, I mainly investigated the role of teachers in fostering students' creative thinking, because similar studies have not been conducted in the framework of the Greek education system and there is a dearth of analogous studies worldwide (Kowalski, 1997). Therefore, the examined research problem is significant both at a national and at an international level.

Furthermore, this study responds directly to the new Cross-Thematic Curriculum Framework (CTCF) for Greek compulsory education (GPI, 2003). The CTCF reflects the international trend (e.g. QCA, 2005) by specifying the fostering of students' creative thinking as one of its central targets. However, the term *creative thinking* and its cognates are used within CTCF in a vague and confusing way (Kampylis, 2008a). Thus, primary teachers need a clear idea about what creative thinking is in order to implement effectively the CTCF provisions for fostering it in real classroom settings. This dissertation therefore offers an explicit definition of creativity in the context of primary education (see section 5.2, p. 91), with the aim of clarifying the term. This conceptual elucidation is a presupposition to any attempt to set the fostering of students' creative thinking as a feasible education target and is the keystone to its achievement.

Moreover, the present study offers a number of insights for teachers' initial education and in-service training on creativity by identifying what teachers believe, know, and want regarding the fostering of students' creative thinking and what they need in order to carry out this important role. Furthermore, policymakers, curriculum designers, educational authorities, and creativity researchers may find valuable situated knowledge and insights into teachers' experiences, implicit theories, and conceptions of creativity.

1.5 Aims and objectives

The basic aims and objectives of this Ph.D. research were:

1. To acquire empirical knowledge about the learning environments that can enhance students' creative thinking in real classroom settings. (Publication I)

2. To explore teachers' conceptions and implicit theories of creativity and their correlations with their everyday practice in classrooms. (Publications II, III, and IV)
3. To propose methods to support teachers in their everyday endeavours to promote students' creative thinking, such as in-service online training. (Publication V)
4. To formulate a comprehensive and functional definition of creativity in the framework of primary education. (Publication VI)
5. To study the consequences of human creativity and propose a holistic way of thinking not only for personal but also for social progress. (Publications II, VI, and VII)
6. To collect, classify, and review Greek primary teachers' recommendations for fostering students' creative thinking. (Publication VII)

1.6 Research context

In the following sections, I discuss in brief the research context of this dissertation, starting from the broader international and European contexts, concentrating on the Greek education system, and finally focusing on Greek primary education from which the research data were derived.

1.6.1 International context

Guilford's presidential address in 1950 (Guilford, 1950) and the launch of the Sputnik satellite in 1957 signalled a strengthening interest in creativity and the mobilization of US education to identify and nurture scientific talent and creativity (Cropley, 1999; Esquivel, 1995; Sawyer, 2006a). The current resurgence of interest in creativity "*…spans numerous cultures including Europe, the Middle East, far East and China, Australasia and North America*" (Craft, Cremin, & Burnard, 2008b, p. xix) and has its roots in early endeavours in these areas. According to Craft (2003, p. 117), today the emphasis is placed (a) on ordinary creativity rather than extraordinary, (b) on understanding creativity rather than measuring it, (c) on the social level of analysis rather than the individual, and (d) on encompassing views of creativity that include creative products but do not see these as necessary.

Relatively recently, Kaufman and Sternberg (2006) edited the *International Handbook of Creativity* in order to "*…explore theories, research, assessment, and programs for the development of creativity in a wide variety of countries around the world*" (p. 2). They claim that creativity research remains a neglected topic globally for the following reasons (pp. 2–3):

1. Governments do not want creativity in practice, despite their theoretical declarations.
2. Creativity is a large, unwieldy, and difficult research topic.

3. In most countries, the system does not encourage creative people to study creativity.
4. Creativity has been associated with widespread commercial programmes that lack a scientific foundation rather than with rigorous science.
5. As a research topic, creativity has failed to become mainstream.

However, an analysis of entries containing *creativity* and related terms in numerous academic and open-access databases (see Table 1), it appears rather to have become a flourishing topic of research. Consequently, contemporary creativity researchers encounter a vast amount of relevant literature from fields such as psychology, sociology, economics, philosophy, neurophysiology, cognitive science, computer science, anthropology, history, and education. Therefore, Feldhusen and Goh's (1995) remark about creativity research is still valid: ''*…those who search for the essence of creativity in current theory and research are apt to be overwhelmed by both the current breadth of conceptions of the field as well as the relative uncertainty of its fundamental components*'' (p. 232).

TABLE 1 Online entries containing *creativity* and related terms

16.3.2010	Creativity	"Creative thinking"	Creative AND education	Creative AND teachers
Academic Search Elite	11,832	1,076	5,880	2,660
Directory of Open Access Journals	323	21	114	50
Emerald	11,046	1,202	9,076	2,533
ERIC	11,535	3,466	19,676	8,359
Google Books	32,600	6,224	24,400	15,600
Google Scholar	1,440,000	90,000	1,530,000	984,000
JSTOR	62,536	3,459	82,534	55,296
ProQuest Dissertations and Abstracts Database	7,903	956	4,552	2,113
PsycINFO	19,338	2,043	4,966	1,636
SAGE Journals Online	25,837	2,378	34,608	22,719
Science Direct	39,111	3,807	36,646	15,981
SpringerLink	21,037	1,704	22,304	12,090
Wiley - InterScience	3,619	218	8,846	1,949

On the other hand, the breadth of contemporary creativity research and the involvement of researchers from various disciplines and sociocultural backgrounds can be seen as an asset since they may shed light on further aspects of the multifaceted phenomenon of human creativity. However, creativity research also seems to resemble the Indian parable of the six blind men and the elephant (Lubart & Sternberg, 1998; Schlesinger, 2009; Starko, 2005; Wehner, Csikszentmihalyi, & Maguari-Beck, 1991; Yamamoto, 1965; see also http://en.wikipedia.org/wiki/Blind_men_and_an_elephant). What is certain is that there is something elusive that we call "creativity" and that, as the blind men of the parable, we have been approaching it from different directions in our attempts to determine its nature.

So far, it seems that creativity researchers have reached an agreement on the following (Kaufman & Sternberg, 2006):

1. Creativity "*…involves thinking that is aimed at producing ideas that are relatively novel and that are, in some respect, compelling*" (p. 2).
2. Creativity has domain-specific as well as domain-general aspects.
3. Creativity is measurable to some degree.
4. Creativity can be developed and fostered to some degree.
5. Creativity is not "*…as highly rewarded in practice as it is supposed to be in theory*" (p. 2).

In addition, researchers agree that creativity is an essential human ability (e.g. Cropley, 1999), that it does not occur in a vacuum (Shi, Qu, & Liu, 2007) and, therefore, that it is affected by various personal, social, cultural, economic, climate, and historic factors. These factors vary widely from country to country and interact in different ways.

1.6.2 European Union context

This Ph.D. research was conducted in and funded by institutions from two European Union (EU) countries, Finland and Greece. The *knowledge triangle* – research, education, and innovation – is a core factor in EU efforts to meet the ambitious Lisbon goal to establish by 2010 "*…the most dynamic and competitive knowledge-based economy in the world*" (European Commission, 2004, p. 6; see also Valtanen, Berki, Georgiadou, Ross, & Staples, 2009). The most recent sign of increased interest in creativity at the European level was the declaration of 2009 as the European Year of Creativity and Innovation (European Parliament, 2008). The main objective behind this decision was "*…to raise awareness of importance of creativity and innovation for personal, social and economic development, to disseminate good practices, stimulate education and research, and promote policy debate and development.*"[3]

However, there is a gap in terms of innovation between the EU and the USA and Japan (European Commission, 2009), and countries such as China and India are becoming leading centres of research and innovation. European Union countries must therefore invest more in research and education in order to achieve the EU target of becoming a competitive "*knowledge-based*" society. Education is being called on to play a fundamental role in this endeavour, and numerous programmes and initiatives are being undertaken at the European (European Parliament, 2008; European Universities Association, 2007; Ferrari, Cahia, & Punie, 2009) and national level (e.g. Jeffrey, 2006, 2008).

3 http://create2009.europa.eu/index_en/goals_of_the_year.html

1.6.3 Greek context

The participants in this Ph.D. research were all Greek primary teachers, and accordingly, the research results deal primarily with the Greek educational and sociocultural framework. Greece strives to keep pace with other EU countries and to contribute to the common effort to achieve the Lisbon goals on creativity and innovation. However, there is no clear-cut national policy on creativity and innovation but disconnected initiatives and programmes, which remain, in many cases, on paper (Kampylis, 2008a). It is emblematic that Greek investments in innovation were recently reduced[4] by almost 25% and that the country's rank in the *Euro-Creativity Index* (Florida & Tinagli, 2004) and in the *European Innovation Scoreboard 2008* (European Commission, 2009) are below average.

In this context, the Greek education system is struggling to meet recent social demands for creativity and innovation (GPI, 2003, 2004; Kampylis, 2008a; Kousoulas, 2003; Koulaides, 2007; Xanthakou, 1998). In the following sections, I present the structure of the Greek education system and its provisions for the fostering of students' creative thinking skills. I consider this information essential for understanding the research design, methods, findings, and discussion that follow.

1.6.3.1 Structure of the Greek education system

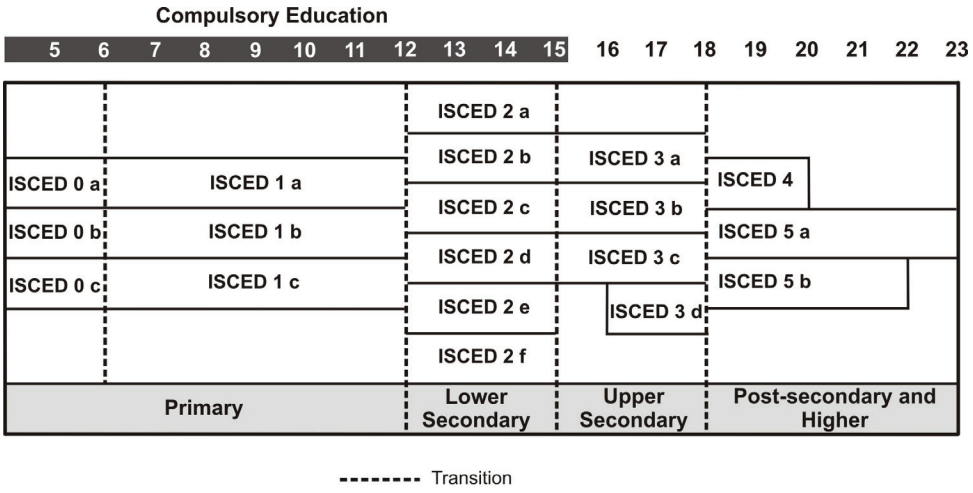
Greek education seems to be in a constant state of flux (Kampylis, 2008a); a new curriculum framework was introduced in 2003 (see GPI, 2003) following a cross-thematic and constructivist approach that requires students' active engagement. Since 2006, new textbooks have also been introduced based on the new Cross-Thematic Curriculum Framework.

Compulsory general education in Greece lasts for 10 years (for the age cohort 5–15). The Greek education system comprises four levels (see Figure 2; source: Education Audiovisual and Culture Executive Agency [EACEA], 2009):

1. Primary education (ISCED 0 & 1):
   (a) Kindergartens, for children between 3 and 6 years old.
   (b) Elementary schools, for children between 6 and 12 years old.
2. Lower and upper secondary education (ISCED 2 & 3):
   (a) High schools, for adolescents between 12 and 15 years old.
   (b) Lyceums, for adolescents between 15 and 18 years old.
   (c) Vocational training schools, for adolescents between 16-18 years old.
3. Post-secondary education (ISCED 4) for students aged 18 and older.
4. Tertiary education (ISCED 5):
   (a) Technological sector (technological education institutions and the School of Pedagogic and Technological Education) for students aged 18 and older.

4 http://www.tovima.gr/default.asp?pid=2&ct=33&artid=254296

(b) University sector (universities, polytechnics, and fine-arts schools) for students aged 18 and older.



ISCED 0: Mainstream (a), all-day (b) and special (c) kindergartens
ISCED 1: Mainstream (a), all-day (b), and special (c) elementary schools
ISCED 2: General (a), artistic (b), music (c), athletic (d), special (e), and ecclesiastical (f) high schools
ISCED 3: General (a), vocational (b), and ecclesiastical (c) lyceums; vocational training schools (d)
ISCED 4: Non-tertiary vocational training institutes
ISCED 5: University (a) and technological (b) sectors

FIGURE 2 Structure of the Greek education system (EACEA, 2009)

1.6.3.2 Creative thinking and Greek primary education

Creativity is a key target of the applied Greek educational law (Law 1566/85) and Cross-Thematic Curriculum Framework (GPI, 2003). The main provisions for the fostering of students' creative thinking in Greek educational laws and curricula are presented in Table 2.

TABLE 2 Main provisions of Greek primary education for creative thinking

Law 1566/85, Structure and function of Primary and Secondary Education, *Official Gazette issue A, nr167/30-09-85.* www.pesea.gr/Documents/Nomothesia/Nomoi/N.1566-85_Domh_&_Leitoyrgia_ths_P._&D._Ekpaideyshs.pdf	"The aim of Primary and Secondary Education is to contribute to the well-rounded and balanced moral, intellectual and physical development of pupils, so that, irrespective of their sex and origin, they will be able to develop into well-rounded individuals with a fulfilling and creative life." (article 1, sec. 1) "In particular, Primary and Secondary education help students… to develop creative and critical thinking… in order to contribute decisively to the social progress and the development of our country." (article 1, sec. 1c)

(continues)

TABLE 2 (continues)

Cross-Thematic Curriculum Framework for Compulsory Education – Introductory note (GPI, 2003) www.pi-schools.gr/download/programs/depps/english/3rd_a.pdf, p. 5	"School education should instead promote student-centred and creative learning, involving all participants in the learning process. Moreover, school should become an institution that promotes joyful and creative living, breaking away from sterile and ineffective teaching practices."
Cross-Thematic Curriculum Framework for Compulsory Education – General Part (GPI, 2003) www.pi-schools.gr/download/programs/depps/english/3rd_b.pdf, p. 23	"Goals therefore are set to assist personal fulfilment through the development of a critical, analytical, synthetic, and creative attitude, which in turn will foster creative action on a personal and collective level."
Cross-Thematic Curriculum Framework for Compulsory Education – The ten highlights of the new Cross-Thematic Curriculum Framework for Compulsory Education (GPI, 2003) www.pi-schools.gr/download/programs/depps/english/3rd_c.pdf, p. 36	"The principles and the activities introduced in the new curriculum aim to develop critical and creative thinking abilities, imagination and positive attitudes towards learning through exploration and discovery. All these are necessary for individuals to become creative and contributing members of our multicultural world in times of dramatic changes."
Cross-Thematic Curriculum Framework for Music (GPI, 2003) www.pi-schools.gr/download/programs/depps/english/13th.pdf, p. 139	"Music education primarily aims to develop and cultivate pupils' aesthetic sensitivity and creative ability when listening, performing and composing music. Therefore, music in the curriculum is promoted as a form of artistic expression and creation. Through active listening, performing and composing activities, music education also aims to give pupils opportunities for self-expression, creativity and personal development."
Educating Students with special intellectual skills and talents - Guide for primary and secondary education teachers (GPI, 2004) www.pi-schools.gr/special_education/harismatika/ harismatika-part-00.pdf, p. 44	"The fostering of creative thinking must be part of any teaching and learning process. We stress that the fostering of creative potential should not be aimed only within the framework of 'special programmes'…Efforts for the nurturing of this important element must be part of any activity inside and outside school."

The reformed Cross-Thematic Curriculum Framework (GPI, 2003) adopted a new approach based on interdisciplinarity and creative learning through the *Flexible Zone*. The Flexible Zone is part of the school programme devoted to cross-thematic projects and collaborative learning with the aim of enhancing exploratory learning as well as creative and critical thinking (GPI, 2003, 2004). The Flexible Zone programme was applied in all kindergartens and primary schools in the country, from the school year 2004–2005 (Ministerial Decision Φ 12.1/545/85812/Γ, 2005). According to the new primary-schools timetable, three hours are devoted to the Flexible Zone in the 1st, 2nd, 3rd, and 4th grades

and 2 hours in the 5th and 6th grades (EACEA, 2009, p. 49). The Flexible Zone can be seen as an attempt to incorporate some of the elements of child-centred and exploratory learning (Jeffrey & Woods, 2009), influenced by constructivist learning theory (e.g. Vygotsky, 1978). Furthermore, it gives teachers a chance to express their own creativity and expertise, teaching whatever they want, in the way they prefer.

Moreover, on 29 October 2003, the Greek Parliament added a new paragraph on Law 2817/2000 for Special Needs Education, stating –for the first time in Greek history– that "…*individuals with special mental abilities and talents are eligible for a special educational treatment*" (Law 3194/2003, p. 4659). In addition, Artistic High Schools were established in the same year (Ministerial Decision 107922/Γ7, 2003), targeted at providing a nurturing educational environment for students who display special skills and talents in the arts.

In the following year, the Greek Pedagogical Institute (GPI, 2004) published the first guide for teachers of primary and secondary education on the education of gifted and talented students. In this guide, an entire chapter is devoted to the concept of creativity (GPI, 2004, pp. 34–44), whereas giftedness is defined as a combination of intelligence and creativity (p. 34). The authors of this guide support a *democratic approach* to creativity (NACCCE, 1999), stating that schooling should aim to foster all students' creativity and not only the gifted ones, based on the creative process and not on an assessment of the resultant creative product. The guide provides teachers with a six-level framework for the enhancement of students' creative thinking and with a list of open-ended questions that reinforce creative thinking.

However, as far as education for gifted and talented students is concerned, Greek primary teachers are inadequately trained (Gari, Kalantzi-Azizi, & Mylonas, 2000; Pigiaki, 1995; Starida, 1995). Moreover, the analysis I conducted (see publications III and IV; see also Kampylis, 2008a) on the Cross-Thematic Curriculum Framework for compulsory education (GPI, 2003) and on Law 1566/85 revealed that the term "creativity" and its various cognates are used in a vague way without even a working definition. As a result, teachers are called upon to foster students' creative thinking without having a clear theoretical framework. Thus, the enhancement of students' creativity remains something abstract and fuzzy within the framework of Greek primary education, "…*a wish rather than a tangible and feasible educational goal*" (Publication IV, p. 19).

Moreover, in many cases, students remain passive recipients of information that teachers convey and are expected to sit in silence despite provisions in the updated CTCF for students' active participation and student–student interaction. Furthermore, students are asked to undertake many mechanical tasks and routines not only in the classroom but also as homework, because, very often, Greek teachers use external, photocopied teaching materials that reinforce conformity, repetition, and memorization.

Based on personal observations on numerous primary-school classrooms across Greece, as well as on discussions with a large number of teachers, I argue that the provisions of CTCF for the fostering of creative thinking are not reflected in everyday classroom practices. On the contrary, conventional and out-

of-date forms of pedagogy still dominate. Even in Arts, which is considered one of the most creative school subjects (e.g. Diakidoy & Kanari, 1999; see also Publication III and Publication IV), very often the emphasis is placed on students' conformity instead of originality, and they are provided with photocopied sketches that they are merely required to colour in. Thus, on the walls of a Greek classroom, identical copies of the same image that primary-school students have "created" during Arts (see Figure 3) are more likely to be seen than a variety of original sketches by the students.

FIGURE 3 Ten-year-old students' identical "creations"

As a result, there is a gap between the intentions and provisions of the Greek CTCF for student-centred, creative education and the reality in Greek schools (Kampylis, 2008a). A possible explanation for this gap is that Greek teachers are not confident and adequately trained to implement the new approaches required for the fostering of students' creative thinking. Thus, they prefer to use the obsolete but familiar didactic approaches rather than the new and unfamiliar ones.

1.7 Basic assumptions

Behind any research endeavour, there are assumptions that determine the researcher's decisions and, consequently, the research outcomes. When these assumptions are explicit, the reader can obtain a better understanding of the research. Therefore, I briefly present the main assumptions that consciously influenced my research from the outset:

1. Our world is undergoing constant changes and faces numerous urgent problems that require creative yet holistic approaches and solutions. Human creativity is a continuum, and therefore by nurturing students' creative potential, we offer them more opportunities to become creative adults who can adapt and contribute to our constantly changing world.
2. Creativity is an ability that all humans have, and their creative potential can be fulfilled or inhibited through education and schooling. Therefore, all students should be provided with the appropriate opportunities and means to express their creative potential to the fullest extent.
3. Teachers are among the "important others" who play a key role in the realization – or not – of students' creative potential. Teachers need appropriate initial education and in-service training as well as support in practical and theoretical issues to carry out their important role of fostering students' creative thinking.
4. Teachers' conceptions and implicit theories of creativity influence, to a great extent, their everyday classroom practices and determine whether, to what extent, and how they attempt to foster students' creative thinking.
5. Human creativity is not positive "by default"; it has positive as well as negative aspects, applications, and consequences. Primary education should target the enhancement of positive and constructive aspects of creativity. Therefore, creative thinking is not enough; it should be accompanied by other types of thinking, such as critical, caring, and reflective thinking.

2 THEORETICAL FOUNDATION

This investigation is based mainly on empirical data, derived from teachers' situated knowledge, implicit theories, and conceptions of creativity. Nevertheless, the investigation also has a solid theoretical foundation that influenced the research design, data gathering procedures, data analysis, and research outcomes. It is therefore appropriate to consider in brief the theoretical basis of this dissertation before presenting and discussing the research findings.

2.1 Explicit theories of creativity

There are numerous explicit theories of creativity based mainly on relevant psychological theories such as *psychoanalytic*, *behaviourist*, *humanist*, *developmental*, *historiometric*, *systems*, and *cognitive* theories. The reader can find various reviews of these theories in the creativity literature (see for example Craft, 2001a; Piirto, 2004; Runco, 2004a; Ryhammar & Brolin, 1999; Starko, 2005; Sternberg, 1988b; Sternberg & Lubart, 1999; Weisberg, 2006).

The study, theories, and definitions of creativity vary according to the emphasis on its four key components, known as the *four Ps of creativity* (Mooney, 1963; Rhodes, 1961; Richards, 1999): person, product, process, and press (environment). However, the role of environment was almost neglected in early attempts to study human creativity even though researchers such as Rhodes (1961) and Mooney (1963) included it in their research endeavours. Gradually, the creative environment was acknowledged as being equally important as the other three components (Csikszentmihalyi, 1988, 1996, 1999; Moran, 2009).

Nevertheless, at the end of the 20th century, creativity research moved in the direction of more comprehensive and integrated models attempting to include in the same framework personality-related, cognitive, social, and cultural factors (Craft, 2001a; Mayer, 1989, 1999; Ryhammar & Brolin, 1999; Simonton, 2000). Today, creativity researchers seem to agree that person, process, product, and environment are mutually dependent and together constitute a whole (e.g.

Moran, 2009). Following this line of thought, Davis (2004) combined the four key components of creativity, stating that "…*creative products are the outcome of creative processes engaged in by creative people, all of which are supported by a creative environment*" (p. 42).

Next, I briefly present the theoretical approach that explains which cognitive processes lead to creativity and how. I consider this approach as the theoretical keystone of my research because it attests that all people have creative potential, which is based on ordinary cognitive processes and, therefore, it can be nurtured through education and training.

2.1.1 Creative-cognition approach

Cognitive scientists investigate how new constructs come into being; and anyone interested in this is, in fact, interested in creativity (Runco & Chand, 1995). Guilford's presidential talk to the American Psychological Association in 1950 is regarded as a landmark for the contemporary study of creativity. The distinction he made (Guilford, 1950) between *convergent* and *divergent thinking* established the importance of the *cognitive approach* for understanding creativity.[5] Moreover, according to Runco (2002), many theories of creativity focus on cognitive processes and describe creative thinking and problem solving in terms of divergent thinking, analogical thinking, associative thinking, meta-cognition, and so forth.

Researchers from the different disciplines that constitute cognitive science (Boden, 2004; Camfield, 2005; Cropley, 1999; Flaherty, 2005; Haier & Jung, 2008; Runco & Chand, 1995; Schank, 1988; Schank & Cleary, 1995; Smith, Ward & Finke, 1995; Ward, Smith, & Finke, 1999) have (a) taken a serious look at the role of creativity in human cognition, (b) studied it in laboratory settings, using the methods of cognitive psychology, and (c) implemented knowledge from existing cognitive theories in order to understand creativity. For instance, cognitive psychology, instead of studying traits and personality differences, as its predecessors such as *behaviourism* and *personality psychology* did, analyses mental processes that are shared by all individuals (Sawyer, 2006a).

The creative-cognition approach (Finke, Ward, & Smith, 1992; Smith et al., 1995; Ward et al., 1999) seeks not only to understand the creative processes by using the methods and concepts of cognitive science but also to raise new questions about cognition in general by examining it in creative contexts. According to Smith et al. (1995), the creative-cognition approach has its roots in *associationism* (Mednick, 1962; Watson, 1958), *Gestalt psychology* (Wertheimer, 1959), and *computational modelling* (Berki, 2001; Berki, Georgiadou, & Holcombe, 2004; Boden, 2004; Newell, Shaw, & Simon, 1962; Smith et al., 1995). Associationism puts emphasis on a work ethic: more work means that more is created. The Gestalt psychologists, in contrast, emphasized special processes of creative thinking such as insight. Finally, computational approaches place the emphasis on

5 However, creativity is not exclusively a cognitive phenomenon, and Guilford himself emphasized the *creative personality* (Guilford, 1950; see also Cropley, 1999).

"*…precisely defined operations that can yield the same sorts of ideas that are produced by creative humans*" (Smith et al., 1995, p. 2).

Creative-cognition researchers investigate the mental representations and processes underlying creative thought through studies that not only involve human subjects but also computer simulations of creative processes. For instance, Johnson-Laird (1988) developed jazz improvisation software, and Cohen (1999) developed AARON, a software package that utilizes artificial intelligence in order to create original paintings.

Finke et al. (1992) stated that human creativity utilizes ordinary cognitive processes, even in its most remarkable forms. Along the same lines, Weisberg (1993, 1999) asserted that creativity involves ordinary cognitive processes yielding extraordinary results, and Perkins (1988) argued that the creative process utilizes ordinary mental processes in extraordinary ways. From this viewpoint, creativity occurs in conjunction with a wide range of activities, beginning with the very ordinary processes of language use and concept development and extending to ideas that represent fundamental shifts in various domains (Starko, 2005). Each time we express ourselves using a new sentence, we have created a new example within our linguistic framework; each time we come to understand another idea, we have created a new cognitive structure (Perner, 1991).

However, the claim that creative cognition utilizes the same ordinary cognitive processes and structures as non-creative cognition does not lead automatically to a deeper understanding of creative cognition, because non-creative cognitive processes remain somewhat mysterious (Smith et al., 1995). Therefore, the study of creative cognition aims to understand better both creativity and cognition. In any case, theories about creative-cognitive processes should be empirically testable, as clearly stated by many of their advocates (Finke et al., 1992; Smith et al., 1995; Ward et al., 1999).

Finke et al. (1992) proposed one of the most comprehensive and comprehensible descriptive frameworks for creative cognition, the *Geneplore model*. According to this model, the development of useful and novel ideas is the interplay between the *generative process*, in which an individual constructs mental representations called *pre-inventive structures*, and the *exploratory process* in which those structures are used to come up with creative ideas.

One of the most controversial issues in creative cognition is the role of prior knowledge and expertise in creative processes (Abinum, 1984; Smith et al., 1995; Weisberg, 2006). Some researchers (e.g. Ericsson, 1999; Gardner, 1993a) emphasize the importance of prior knowledge and expertise in a domain, whereas others (e.g. Frensch & Sternberg, 1989; Schooler & Melcher, 1995) claim that expertise in a domain may be an inhibiting factor in generating truly novel ideas. Runco (2002) proposed a coalescence of views, arguing that information, knowledge, and expertise could be beneficial but that they may sometimes inhibit creative thinking. In addition, a number of researchers (e.g. Csikszentmihalyi, 1988) take the position that creative cognition cannot provide a full explanation of exceptional, "big C" Creativity, because it focuses on everyday cognitive processes that refer rather to ordinary, "little c" creativity (for a review of "big C" Creativity and "little c" creativity, see Publication IV; see also

Banaji & Burn, 2006; Bardzell, 2007; Craft, 2000, 2001b, 2005; Dollinger, Burke, & Gump, 2007; Kaufman, 2004; Makel & Plucker, 2008; Nickerson, 1999; Plucker & Beghetto, 2003; Starko, 2005).

The basic research questions from the cognitive perspective are "Is creative thinking a common aspect of everyday cognition?" and "Which cognitive processes are involved in creative thinking?" By and large, cognitive scientists (e.g. Finke et al., 1992) take the view that creativity emerges from ordinary mental processes that are used in non-creative activities. They also assert that the most important cognitive processes that are involved in creative thinking are conceptual combination, metaphor, and analogy (e.g. Ward et al., 1999).

Creative cognition has influenced the modern approach to creativity as an inherent potential in all people and as a crucial ability to response to problems across all subjects in the school curriculum and to the challenges of everyday life (Craft, 1999; Finke et al., 1992; GPI, 2003; NACCCE, 1999; QCA, 2005; Starko, 2005). However, there are endless individual differences in the way that and the extent to which everyone fulfils her/his own creative potential. Thus, two questions emerge:

1. Can these differences be explained as a function of differences in personality or as a function of differences in cognitive style or capacity (Ryhammar & Brolin, 1999)?
2. How, and to what extent, can we foster creative thinking through formal education?

Learning and creativity both involve central processes of cognitive change, and they are both inherently social (e.g. Candy & Edmonds, 1999). I argue that, if we want to answer the above two questions, we should investigate more deeply the relations between personal, cognitive, social, cultural, and environmental factors that affect our creative potential. A creative-cognition approach does not claim that cognition alone can fully explain human creativity. Nevertheless, it should be an essential part of such an investigation because it conceptualizes creativity as arising from ordinary cognitive processes that are part of the cognitive repertoire of every individual and therefore can be facilitated through education (Finke et al., 1992). In the words of Ward (2001), "*…our understanding of creativity cannot be complete without a detailed and rigorous treatment of the cognitive processes from which novel ideas emerge and through which the creative potential of those ideas is recognized*" (p. 350). The focus on cognitive processes that lead to creativity is important because the better we understand those processes, the more we will be able to improve them through education and training.

In summary, the most important contribution of the creative-cognition approach is the notion that creativity arises from ordinary cognitive processes and, therefore, can be facilitated through education. However, the creative-cognition approach focuses on the individual rather than on the interaction between the individual, others, and the environment. Accordingly, a holistic account of creativity requires a specification of the interaction of cognitive as well as non-cognitive factors. Therefore, additional, more comprehensive, research

approaches are needed for understanding the multifaceted phenomenon of human creativity.

2.1.2 Comprehensive approaches to creativity

Evidently, creativity depends on how people think, but non-cognitive factors such as motivation, personality traits, and cultural, environmental, social, and historical forces play an important role in its expression (Haring-Smith, 2006; Sawyer, 2006a; Ward, 2001). Today, creativity researchers have integrated earlier approaches, such as creative cognition (e.g. Smith et al., 1995), with new ones, such as sociocultural approaches (e.g. Sawyer, 2006a), proposing more comprehensive and integrative theories for the study of human creativity (Csikszentmihalyi, 1988, 1996; Csikszentmihalyi & Wolfe, 2000; Feldman, Csikszentmihalyi, & Gardner, 1994; Gruber & Wallace, 1999; Rubenson & Runco, 1992; Sawyer, 2006a; Sternberg, 1988a, 1998a; Sternberg & Lubart, 1991, 1992, 1996; Weisberg, 1988).

In the limited space of an introduction, it is not feasible to discuss every creativity theory put forward. Therefore, only some comprehensive creativity theories and their key elements are mentioned here.

1. Csikszentmihalyi (1988) proposed one of the most influential systems theories of creativity by asking not "what is creativity?" but "where is creativity?" I consider this shift as very important because it places emphasis on the interactions between the person, the domain, and the field, leading to a more comprehensive investigation of human creativity.
2. Harrington (1990) suggested an ecological model of human creativity, grounded in biological ecosystems, in an attempt to combine the intrapsychic, interpersonal, and social facets of human creativity in a coherent conceptual scheme.
3. Sternberg and Lubart (Lubart & Sternberg, 1995; Sternberg & Lubart, 1991, 1992, 1996) proposed the *Investment Theory* for creativity, arguing that six factors contribute to creative performance: intellectual processes, knowledge, intellectual style, personality, motivation, and environmental context.
4. Feldman (1999) listed the following dimensions that may influence creative processes: (a) cognitive processes, (b) social and emotional processes, (c) family aspects – growing up and current processes, (d) education and preparation – formal and informal, (e) characteristics of the domain and field, (f) sociocultural contextual aspects, and (g) historical forces, events, and trends (pp. 171–172).
5. John-Steiner (2000) asserted that creativity is a collaborative activity. Therefore, creative processes or ideas are not developed within the individual's mind but mainly in interactions that take place between individuals within sociocultural contexts.

These comprehensive approaches do not offer answers to everything, and they cannot cover every aspect of the complex creative activities of human beings across all cultures and domains (Starko, 2005). However, together they constitute the most promising drive towards achieving a better understanding of human creativity, because they take into account many of its aspects, such as its cognitive, affective, social, cultural, political, and economic features (Plucker & Beghetto, 2003).

In conclusion, the following elements appear to characterize contemporary creativity theories, providing consistent reference points for both research and practice:

1. There is increasing interest in collaborative creativity (John-Steiner, 2000; Miell & Littleton, 2004), whereby sociocultural and environmental factors are considered far more important than before.
2. We are witnessing a clear shift from quantitative, large-scale studies aiming to measure creativity (e.g. Torrance, 1972) to qualitative studies aiming to understand rather than measure this complex phenomenon (e.g. Craft, 1998).
3. There is an ever-increasing philosophical interest in the nature of creativity and its potential use for positive/constructive or negative/destructive ends (Annis, 1998; Craft, Gardner, & Claxton, 2008; Cropley et al., 2008).
4. The focus has shifted from the creative performance of exceptional highly creative individuals (e.g. Gardner, 1993a) to the creativity of ordinary people (Richards, Kinney, Bennet, & Mertzel, 1988; Ripple, 1989) and to how we can help the latter to fulfil this potential through education and training (Craft, Jeffrey, & Leibling, 2001; Starko, 2005).

2.1.3 From multiple intelligences to multiple creativities

The focus of this dissertation is the fostering of students creative thinking within the framework of primary education. Gardner's theory of *multiple intelligences* (1983, 1993b, 1999a,b) is a good example of a theory that has its roots in psychology but that has found its basic applications in educational settings. Initially, Gardner (1983) proposed a list of seven intelligences: two intelligences that have been typically valued in schooling (linguistic and logical-mathematical), three "artistic" intelligences (spatial, bodily-kinesthetic, and musical), and two "personal" intelligences (interpersonal and intrapersonal). Later, Gardner (1999a,b) revised his theory, adding naturalistic intelligence, which was accepted as the eighth intelligence. Thereafter, Gardner examined other possible candidate intelligences for inclusion: naturalist, spiritual, existential, and moral intelligences. He concluded that the first of these, naturalistic intelligence, "*…merits addition to the list of the original seven intelligences*" (Gardner, 1999a, p. 52) whereas the other candidate intelligences require further research and empirical data to be gathered.

Gardner (1993a) extended his theory by studying eminent creators (Freud, Einstein, Picasso, Stravinsky, T. S. Eliot, Martha Graham, and Gandhi) who embody the multiple intelligences. Based on his theory of multiple intelligences (1983, 1993b) and on his studies of highly creative individuals (1993a), Gardner argued that people are creative in particular domain(s) according to the intelligence(s) being used. The domain(s) in which a person is creative depends on various factors such as her/his intelligence and personality traits, the social conditions, and the opportunities offered by the domain and the field.

The theory of multiple intelligences (Gardner, l983, 1993b, 1999a,b) has influenced many teachers who strive to foster students' creative thinking in all school subjects (see for instance Armstrong, 2000; Kampylis, 2008b, 2009). However, the intensive Cross-Thematic Curriculum Framework (CTCF), despite references to the integrated nature of learning, places the emphasis mainly on linguistic and logical-mathematical skills, leaving little room for other intelligences and learning styles (Kampylis, 2008a). My long experience as a primary teacher indicates that students express their creativity in many ways and in a variety of domains. Han and Marvin (2002, p. 98) reported that second-grade students exhibit a range of creative abilities across different domains rather than a uniform creative ability in diverse domains. Therefore, even though we tend to refer to creativity in the singular, there are obvious individual differences that allow us to talk of *multiple creativities* (Han & Marvin, 2002; Sternberg, 2005a) or *systems of creativities* (Pope, 2005, p. 68).

2.1.4 Creativity recommendations derived from explicit theories

Effective dissemination of the conclusions of contemporary creativity research and theory is key to successfully fostering creative thinking through schooling. Several creativity researchers (e.g. Sternberg & Williams, 1996) have formulated specific recommendations for fostering creativity through education, such as encouraging intrinsic motivation, developing meta-cognitive skills, appreciating humour, and allowing ambiguity. However, these creativity recommendations (CRs) are scattered mainly in academic texts, and primary teachers are therefore largely unaware of them (Kampylis, 2008a).

Thus, in the literature review conducted for the purposes of this dissertation (see next, section 3.2 p. 64), I also focused on studies that include specific recommendations to teachers wishing to foster students' creative thinking.

First, I collected 59 pertinent studies as candidates for potential inclusion in the final set. I then selected 19 studies (see Table 3) that are the most relevant for primary-education settings and explicitly refer to CRs in the development of students' creative thinking.

The criteria applied in selecting the studies were the following:

1. The study provided, explicitly, CRs that correlate with key characteristics of creativity, such as risk-taking, the allowance of ambiguity, and intrinsic motivation.

2. The provided CRs can be used by primary teachers in real classroom settings.
3. To obtain up-to-date studies that refer to contemporary primary education, publication should be within the last 15 years.

TABLE 3 Studies with creativity recommendations

Code	Author(s)	Year	Title
1	Sternberg & Williams	1996	How to develop student creativity.
2	Antonietti	1997	Unlocking creativity.
3	Cropley	1997	Fostering creativity in the classroom: General principles.
4	Craft	1999	Creativity across the primary curriculum: framing and developing practice.
5	Nickerson	1999	Enhancing creativity.
6	Cropley & Urban	2000	Programs and strategies for nurturing creativity.
7	Csikszentmihalyi & Wolfe	2000	New conceptions and research approaches to creativity: Implications of a system perspective for creativity in education.
8	Rejskind	2000	Teachers: Only the creative need apply.
9	Sternberg	2000	Identifying and developing creative giftedness.
10	Cropley	2001	Creativity in education and learning: a guide for teachers and educators.
11	Lucas	2001	Creative teaching, teaching creativity and creative learning.
12	Fleith	2002	Effects of creativity training programs in the school context: A review of Brazilian research.
13	Alencar	2002	Mastering creativity for education in the 21st century.
14	Piirto	2004	Understanding creativity.
15	Adams	2005	The Sources of innovation and creativity.
16	Beghetto	2005	Does assessment kill student creativity?
17	Dineen, Samuel, & Livesey	2005	The promotion of creativity in learners: theory and practice.
18	Starko	2005	Creativity in the classroom: schools of curious delight.
19	Urban	2007	Assessing creativity: a componential model.

From the 19 selected studies (see Table 3), I extracted all CRs suitable for my investigation. I identified those that overlapped, and created a table with 121 recommendations. Because of the limited space available, I present in this dissertation only the 30 most commonly appearing CRs (see Table 4). In Table 4, I also provide a taxonomy[6] of the proposed CRs found in the literature and place them in three categories, which take into consideration (a) the features of the *creative teaching and learning process* (CP), (b) the common *traits of the creative student* (CS), and (c) the *characteristics of the creative environment* (CE).

In general, we can identify two models about the strategies employed to enhance creative thinking (Ripple, 1999):

6 The taxonomy derives from Publication VII.

1. The *deficit model* that assumes that creative skills and abilities must be learned through specific instruction and training.
2. The *barrier model* that assumes that creative potential is inherent in everyone; there is a need to just increase the individual's awareness of her/his potential and remove the barriers for its fulfilment.

TABLE 4 Thirty classified creativity recommendations

Classification	Recommendations	Researchers (see codes in Table 3, column 1)
CS-CP*	1. Allowing students to have choices and taking their suggestions and questions seriously	3, 4, 5, 6, 13, 17, 18, 19
CP-CE	2. Taking into account individual interests rather than standardized curricula	4, 6, 11, 14, 17, 18, 19
CS	3. Encouraging sensible risk-taking	1, 2, 5, 6, 9, 16, 17
CP	4. Encouraging and facilitating idea generation	1, 7, 10, 13, 18, 19
CS	5. Reinforcing intrinsic motivation	5, 6, 7, 15, 17, 19
CS-CP-CE	6. Establishing a culture of creative collaboration between students	1, 3, 6, 10, 11, 19
CS-CP	7. Tolerating ambiguity and developing the capacity to accept a period of uncertainty or anxiety	1, 2, 3, 6, 9, 17
CS	8. Encouraging and triggering self-initiated questioning and problem-finding	1, 6, 7, 9, 10, 11
CS-CP	9. Encouraging willingness to risk being wrong and cope with frustration and failure	1, 3, 6, 10, 19
CS-CP-CE	10. Demonstrating openness as well as tolerance of variability and non-conformity	3, 4, 6, 14, 19
CP-CE	11. Providing students with manifold and stimulating materials	3, 6, 10, 12, 14
CP-CS	12. Stimulating and promoting the innate curiosity of the children	3, 5, 6, 7, 19
CP	13. Developing and promoting self-management (meta-cognitive) skills	2, 5, 6, 15, 19
CP-CE	14. Providing students with opportunities to explore and investigate objects in a playful and experimental way	3, 6, 15, 17, 19
CE	15. Allowing students time for thinking and acting creatively	1, 9, 18, 19
CP	16. Modelling creativity	1, 8, 10, 14
CP-CE	17. Valuing and rewarding creative ideas and products	1, 4, 8, 14
CP	18. Formulating open-ended questions and ill-structured problems	8, 10, 11, 19
CP	19. Encouraging and rewarding task commitment, persistence, and determination	3, 6, 14, 19
CP	20. Demonstrating constructive criticism	10, 16, 17, 19

(continues)

TABLE 4 (continues)

CS	21. Facilitating students' self-confidence	3, 5, 6, 9
CP-CS	22. Demonstrating and appreciating humour	10, 14, 19
CP-CS	23. Encouraging and rewarding debate and active engagement	11, 17, 18
CP	24. Motivating students to master factual knowledge	3, 6, 9
CP-CE	25. Promoting problem-based and project-based learning	11, 15, 18
CP	26. Delaying judgement of students' ideas until they have been thoroughly worked out and clearly formulated	1, 3, 6
CP-CS	27. Promoting self-evaluation in students	3, 6, 19
CP-CE	28. Engaging many teaching and learning styles, not one	11, 12, 13
CP-CS	29. Stimulating independent thinking	3, 6, 10
CS-CP	30. Reinforcing students' analysing and synthesizing skills	6, 9, 19

* CP: creative teaching and learning process
CS: common traits of the creative student
CE: characteristics of the creative environment

The CRs proposed by creativity researchers seem mainly to follow the deficit model (Ripple, 1999) assuming that students' creative thinking must be fostered through specific instruction such as open-ended questions and ill-structured problems (see Table 4, CR no. 18). More specifically, the majority of these CRs (22 out of 30) refer to the key characteristics of the *creative teaching and learning process*. This includes CRs such as the use of varied teaching and learning styles and the formulation of open-ended questions and ill-structured problems. Fifteen CRs emphasize the characteristics of *creative students*, such as intrinsic motivation and self-confidence, whereas seven CRs refer directly to the *creative environment*, including references to the establishment of a culture of creative collaboration.

Overall, it appears that the majority of the CRs are process- or environment-centred, whereas the *student* seems to be the great "unknown X" in an education environment in which s/he is asked to develop her/his creative potential. Furthermore, few of the CRs are student-oriented or even student-originated, since the students are rarely asked to indicate acceptable ways that would be desirable to them and comfortable and enjoyable for them as well. An approved set of creative activities would undoubtedly encourage students to participate actively and become more interested in the teaching and learning process, facilitating the development of their creative potential.

In conclusion, researchers have proposed a plethora of CRs, which are also quite abstract though they all derive from some particular need(s), having the ambition to lead to some useful and purposeful education target. It is, though, almost unfeasible to expect the "average primary teacher" to be aware of all these CRs, and it is especially difficult to accommodate and implement them all

in real classrooms. Thus, it is very likely that primary teachers will feel confused by the abstraction of the CRs, frustrated about not understanding them, and unwilling to allocate time to try out and test such theoretical directives in practice.

2.2 Learning theories and creative thinking

Today, numerous, sometimes contradictory, learning theories attempt to describe knowledge and skills acquisition (see for instance Sawyer, 2006c). The learning theories applied are one of the main determinants of the learning process and its effectiveness within the context of official education (Fokides, 2005; Kampylis, Fokides, & Theodorakopoulou, 2007). The four factors that interact and affect any learning process and, consequently, any endeavour for the fostering of students' creative-thinking skills are the following:

1. *The theoretical basis*, namely the main principles of the dominant learning theories.
2. *Means of implementation* that includes people (e.g. teachers), infrastructures (e.g. laboratories) and tools (e.g. textbooks).
3. *Students*, who are the target group of every education system.
4. *External factors* such as the school community (schoolmates, friends, parents, relatives, and so forth), the environment (school, geographic region, climate, etc.), and the various sociocultural, political, and financial conditions that prevail during the time of the educational process.

The plethora of interactions and dynamics between the aforementioned four factors, and their numerous variables, render learning a dynamic, complex, ad hoc, unpredictable, and exceptionally delicate process. Kampylis et al. (2007, p. 53) summarized the main findings of contemporary research on how people learn, with the following principles:

1. *Learning is an individual phenomenon* in the sense that everyone learns in his/her own way and at his/her own pace (e.g. Piaget, 1985).
2. *Learning is a social phenomenon* in the sense that everyone is subject to unavoidable external influences and has to learn in order to survive in a complex and competitive world (e.g. Vygotsky, 1978).
3. *Learning is an uncertain phenomenon* in the sense that the aforementioned four broad factors that contribute to any learning process depend on infinite variables, and therefore any learning outcomes are not predetermined or predictable, even for a single individual (Fokides, 2005; Fokides & Tsolakides, 2004).

Banaji and Burn (2007) conducted a thorough literature review of discourses about creativity in relation to learning, and concluded that the meaning of the term is constructed as a series of nine rhetorics emerging from the contexts of academia, research, policy, and practice:

1. *Creative genius*: Derives from romantic and post-romantic ideas and argues for creativity as a special quality of a few charismatic individuals and of a few cultural products.
2. *Democratic and political creativity*: Proceeds from empiricist traditions and can be seen to be opposed to the *creative genius* rhetoric because it conceptualizes creativity as inherent in all humans and in every field of human activity.
3. *Ubiquitous creativity*: Entails the notion that creativity involves a skill in terms of responding to the demands of everyday life. The foundation of this rhetoric lies partly in early-years education and to the notion of providing children with the skills and tools to respond successfully to problems and changes in the modern world and one's personal life.
4. *Creativity as a social good*: Emerges largely from contemporary sociopolitical discourses of inclusion and multiculturalism and emphasizes the relation between individual creativity and social structures.
5. *Creativity as economic imperative*: Has its roots in discourse about "creative industries" and is connected with neo-liberal economic approaches. In this discourse, creativity is regarded as a key factor for a competitive national economy that depends on the creative skills of workers and managers.
6. *Play and creativity*: Is based on the romantic tradition, and especially on Rousseau's work, and focuses on the notion that childhood play is the origin of adult problem-solving and creative thought.
7. *Creativity and cognition*: Derives from the tradition of cognitive science and emphasizes not only the internal production of creativity by the mind but also external contexts and cultures.
8. *The creative affordances of technology:* Reflects constructivist and social-constructivist discourses. Creativity is regarded not only as an individual attribute (in human minds) but also as social and situational. Therefore, technological means have the potential to facilitate and/or improve human creativity.
9. *The creative classroom*: Located in pragmatic accounts of real classrooms and implicit theories rather than in academic theories. It is based on education discourses and focuses explicitly on pedagogy, investigating the interplay between knowledge, skills, creativity, teaching, and learning.

These nine rhetorics are very useful frameworks for the study of creative thinking, which is "… *an integral part of any understanding of human education and psychology*" (Plucker, Beghetto, & Dow, 2004, p. 83). Feldman (1994) argued that constructivist theories provide the best basis for understanding the develop-

ment of creative abilities in the individual, whereas Craft (2005) suggested that a constructivist approach to learning "*...is both necessary to and demanded by promoting pupils' creativity*" (p. 96).

In general, constructivist approaches to learning interpret learning as a creative improvisational process (Sawyer, 2003a, 2004) and emphasize the role of knowledge creation as opposed to knowledge transmission (Plucker et al., 2004). Constructivism has its roots in the pioneering work of the Swiss developmental psychologist and philosopher Jean Piaget. It is characteristic that Piaget (1973) titled one of his monographs "To understand is to invent: the future of education", placing emphasis on the strong connection between learning and creative thinking and implying that true understanding depends on personal constructivism. The influential work of Russian psychologist Lev Vygotsky (1978, 1986) forms the basis for the approach known as *social constructivism*, in which learning is conceived as *co-construction* within the framework of culture and society.

According to Plucker et al. (2004), creativity research contributes to social-constructivist approaches to learning and vice versa. The work of Amabile (1983, 1996) and Csikszentmihalyi (1988, 1996, 1999) are just two of many possible examples within the domain of creativity research that can be viewed as focusing on and informing social-constructivist approaches to learning.

Next, I present the 12 basic principles of learning environments set around the broad framework of social constructivism, as summarized by Vosniadou (2001), along with some brief comments about their correlations with creative thinking.

1. *Active involvement of the learner:* The tendency to explore, understand, and master the unknown is embedded in the human genetic makeup that determines both creative thinking and learning.
2. *Social participation:* Creative thinking and learning do not occur in a vacuum. Humans are social beings and interact with others. Therefore, collaboration and cooperation are essential elements of both learning and creative thinking.
3. *Meaningful activities:* People learn and create to serve a purpose. Therefore, they learn and create better when they take part in meaningful activities that serve (or represent) real-life needs and situations.
4. *Relating new information to prior knowledge:* Prior knowledge is essential for both creative thinking and learning because it forms the basis for the production of new knowledge and creative ideas. In other words, we learn and create based on common knowledge and the creative ideas of our predecessors and on our own prior knowledge and experiences.
5. *Restructuring prior knowledge:* In many cases, prior knowledge has internal inconsistencies and requires restructuring or revision. The learner and creator bases what s/he does on prior knowledge, but s/he restructures it when and as long as it is necessary.
6. *Being strategic:* People use various techniques and strategies in order to learn, solve problems, and produce creative ideas. These strategies can

be viewed as ways of coding effective behaviours, thinking patterns, reasoning, and so on.

7. *Engaging in self-regulation and reflection:* High-order thinking processes such as reflection and meta-cognition constitute key elements of both creative thinking and learning. Creative thinking and learning are not linear processes, and both require self-control, corrections, revisions, the willingness to change direction, and so on.
8. *Aiming towards understanding rather than memorization:* Understanding is a prerequisite for learning and creative thinking. When someone learns or creates s/he must be given the opportunity to think about what s/he is doing, to talk about it, to clarify it, and to suggest how it might apply in other situations.
9. *Helping students to learn to transfer:* Transferring prior knowledge and experiences is essential, not only for learning but also for creative thinking. For instance, creative thinking utilizes analogical thinking for making familiar the unfamiliar and solving real-life problems.
10. *Taking time to practise:* The time that an individual spends in order to learn or create is a very important factor in the quality of learning or creative outcomes and can determine their achievement. Therefore, the investment of time for practice and exploration is an essential part of both learning and creative thinking.
11. *Developmental and individual differences:* Learning and creative thinking are life-long processes that depend on the developmental stage and the respective abilities of each individual. Thus, developmental and individual differences must be taken into consideration in any attempt to foster learning and/or creative thinking.
12. *Creating motivated learners:* Even if an individual has the potential to learn and/or create something, s/he still needs to be motivated for it. Thus, motivation and willingness are probably the most common attributes of both effective learners and creative individuals. Moreover, learning and creative thinking is based mainly on hard work, determination, and persistence. Those individuals who are intrinsically motivated tend to be more willing to spend the required time and energy and, therefore, have more opportunities to become effective learners and creators.

In sum, there is an overlap between learning and creativity theories (see, for instance, Spaulding, 1992, and Amabile, 1983). Therefore, the fostering of students' creative thinking does not require a radical new pedagogy (Hall & Thomson, 2008; Office for Standards in Education, Children's Services and Skills [OFSTED], 2003). On the contrary, it is based on virtually the same pedagogical principles that are the prerequisites of any efficient learning process. Thus, collaboration and communication between scholars, researchers, and practitioners from the fields of learning and creativity would be fruitful for everyone, and especially for primary-school students. What are needed are curricula that follow the social-constructivist approach to learning and offer opportu-

nities for students to construct and co-construct knowledge by asking questions, formulating problems, generating ideas, and drawing conclusions (Craft, 2005).

Creativity research must take advantage of social-constructivist theories in analysing the wide range of influences on the learner during the development of understanding and the role of others such as teachers and peers during the learning process (Plucker et al., 2004).

2.3 Implicit theories of creativity

Apart from the explicit, scientific theories of creativity, individuals' implicit theories started to attract the interest of researchers almost 25 years ago (Runco & Bahleda, 1986; Sternberg, 1985). Runco (1999a) defined implicit theories as "*…opinions and views held by people other than scientists. They are often personal rather than shared, and they may not be in a form that allows testing*" (p. 27). Runco (1999a) also emphasized that implicit theories usually reflect knowledge that is quite common. According to Kercz (1992), implicit theories include "*…beliefs/values, images/metaphors, and biases that practitioners' have developed in the course of their working lives*" (p. 10).

The first studies (Runco & Bahleda, 1986; Sternberg, 1985) on implicit theories revealed that individuals formulate latent but existing implicit creativity theories and that they use them in identifying, describing, and evaluating creativity, both in themselves and in others. Moreover, implicit theories contribute to the formulation of common cultural views on creativity and reveal how people in a given time and place conceptualize creativity (Sternberg, 1985). As a result, a better understanding of implicit theories could facilitate both the planning and evaluation of efforts to foster creativity (Plucker & Renzulli, 1999).

However, implicit theories describe rather than explain behaviours (Sternberg, 1985) and must, therefore, be supplemented with and related to explicit theories. According to Sternberg (1985), implicit theories "*…exist in the minds*" of individuals and "*…need to be discovered rather than invented because they already exist, in some form, in people's heads*" (p. 608). He also emphasized that implicit theories are useful for "*…providing a conceptual framework for the development of explicit theories*" because they emanate, in part, "*…from scientists' implicit theories of the construct under investigation*" (p. 608).

Teachers hold implicit theories about their students, the subjects they teach, and their roles and responsibilities, including how they should act (Clark, 1988). Clark (1988) asserted that teachers' implicit theories were not "*…neat and complete reproductions of the educational psychology found in text books or lecture notes*" but rather "*…eclectic aggregations of cause-effect propositions from many sources, rules of thumb, generalizations from personal experience, beliefs, values, biases, and prejudices*" (p. 6). Teachers' implicit theories are extremely important since they play an important role in the judgements and interpretations that teachers

make every day (Clark, 1988) and in the way in which they plan class activities (Beghetto, 2006b).

According to Runco (1990), implicit theories "*…are subjective views of creativity that govern our expectations and guide certain behaviors*" (p. 234) and can be problematic when teachers are not aware of their subjectivity and inconsistency. Runco et al. (1993) asserted that the idiosyncratic implicit theories of teachers act – intentionally or unintentionally – as prototypes against which students' creative behaviour and performance are judged. In the words of Plucker and Runco (1998), when people engage in creative activity "*…their thoughts and actions are guided by personal definitions of creativity and beliefs about how to foster and evaluate creativity that may be very different from the theories developed by creativity experts*" (p. 37). For example, in many cases primary teachers conceptualize creativity as a "gift" that only few students have (e.g. Diakidoy & Kanari, 1999; see also Publication IV). However, several explicit theories of creativity, such as the aforementioned creative-cognition approach (e.g. Smith et al., 1999), have emphasized that all of us can fulfil our creative potential if we are given the appropriate means and opportunities.

Therefore, teachers' implicit theories can facilitate or inhibit students' creative thinking and should be taken into consideration in any educational programme and initiative that aims to foster students' creativity (Kowalski, 1997). However, because there is little research on teachers' implicit creativity theories (for a review see Publication IV), this hinders attempts to provide effective initial education and in-service training for teachers on how to foster students' creative thinking. Moreover, the comparison of implicit and explicit theories can be very insightful since implicit theories sometimes reveal the misconceptions or stereotypes that influence not only the views of laypersons and practitioners but also those of researchers and policymakers.

2.3.1 Widespread misconceptions about creativity

Creativity researchers utilize terms such as *myth* (Boden, 2004; Montuori & Purser, 1995; Plucker & Beghetto, 2003; Plucker et al., 2004; Sawyer, 2006a; Schlesinger, 2009; Weisberg, 1986, 1993), *mythconceptions* (Schlesinger, 2009), and *misconceptions* (Aljughaiman & Mower-Reynolds, 2005; Best, 1982), to describe inaccurate or misleading common beliefs about creativity and creative thinking. Perkins (1988) and Weisberg (1986) pointed out that the majority of common beliefs about creativity are based on subjective, even false, self-reports of highly creative individuals. A number of researchers have attempted to demystify the creative process by debunking familiar "myths" about highly creative individuals (Montuori & Purser, 1995; Sawyer, 2006a) and by conducting research that ties creativity to ordinary cognitive processes (Smith et al., 1995; Weisberg, 1988, 1999).

Next, I present the most widespread misconceptions, as found in the survey and literature review (see sections 3.1 and 3.2, p. 60 and p. 64 respectively), and the relevant research findings that challenge them.

Misconception 1: Creativity derives from the unconscious as a burst of inspiration.
Research findings: This is one of the most persistent false beliefs about creativity, a misbelief which Heilman (2005) labels the *Archimedes misconception* (p. 163) because of the "*Eureka!*" moment of Archimedes. This misconception relies on the assumption that creativity is unconscious, spontaneous, and not overly planned or organized. However, "…*chance favours only the prepared mind*" (Wikiquote, 2009), and creativity is instead a long, extended process during which many mini-insights occur (Beghetto & Kaufman, 2007; Nickerson, 1999; Perkins, 1990; Sawyer, 2006a). The possible contribution of the unconscious can be understood once we know the complex and intricate process that led up to the moment of insight.

Misconception 2: Creativity correlates directly with intelligence.
Research findings: In contrast to this widespread misconception, contemporary research reveals that creativity is something that we can find in every person, not just in highly intelligent individuals (Michalco, 2001; Naglieri & Kaufman, 2001; Runco, 2003; Starko, 2005). Intelligence and creativity are distinct constructs (Heilman, 2005; Runco, 2007), and according to the *threshold theory* (Sternberg & O'Hara, 2000; see also Runco, 2004a; Starko, 2005), creativity correlates only partially with intelligence. Intelligence is directly related to the application of creativity heuristics and knowledge acquisition (Amabile, 1983); therefore, it is a necessary, but not the sole, contributing factor in creative performance.

Misconception 3: Creativity is a right-brain phenomenon.
Research findings: According to this misconception, the right and left hemispheres of the human brain are devoted to different operations, and the centre of creative thinking lies in the right-hand part. However, contemporary research reveals that creativity is a whole-brain rather than a right-brain phenomenon (e.g. Runco, 2004a). In fact, creative thinking is a complex phenomenon that requires the facilities of both hemispheres because "…*is not always or entirely intuitive, for example, nor even radically original. Creativity instead reflects originality and appropriateness, intuition and logic.*" (Runco, 2004a, p. 664). New brain-imaging techniques such as *functional Magnetic Resonance Imaging* (fMRI), *Magnetoencephalography* (MEG), and *Positron Emission Tomography* (PET) may offer new evidence about brain operation during the creative process (Haier & Jung, 2008; Camfield, 2005).

Misconception 4: The creative product is completely original.
Research findings: This belief has its roots in the religious notion of creation from nothing (*ex nihilo*). However, creativity "…*does not occur in a vacuum*" (Nijstad, Diehl, & Stroebe, 2003, p. 157; see also Hennessey, 2003; Guilford, 1950; Shi et al., 2007), and it is almost impossible to create anything without the shared conventions of a domain (Csikszentmihalyi, 1988, 1990, 1996; Hooker, Nakamura, & Csikszentmihalyi, 2003). Thus, creativity is not entirely unconventional, because given rules and traditions are important aspects in many expressions of it (Runco, 1993). Moreover, the high value of originality is not common in all cul-

tures, and according to the *sociocultural approach* (Sawyer, 2006a), all creative process and products include elements of imitation and tradition. Therefore, contemporary creativity research accepts that a creative process or product may be original only for the creator (e.g. Runco, 2007b). This new approach to originality comprises the basis of the concept of *everyday* or *democratic creativity* (NACCCE, 1999; Richards et al., 1988; Richards, 2007; Runco, 2007b; Ripple, 1989) and has substantial implications for its fostering through schooling.

Misconception 5: Creative expression requires absolute freedom.
Research findings: This misconception has its foundation in artistic concepts such as *automatic writing* and *automatic drawing* (Wikipedia, n.d.). However, creative performance is characterized by the coexistence of opposite or antithetical ideas, concepts, or propositions (Rothenberg, 1999). On the one hand, creative performance requires freedom, improvisation, exploration, and unconventionality; on the other hand, it entails self-discipline, hard work, persistence, and commitment. According to Cropley (1997), creativity requires the capacity to diverge from the norm yet also the ability to function within society's rules. Therefore, even though unconventionality is a key component of creative thinking, mere unconventionality does not always signal the occurrence of real creativity. Moreover, according to Runco (1996), creativity requires both maturity and immaturity because it is a *complex* that relies on a variety of traits, skills, and capacities (p. 3). Particularly within the primary-education context, students need a combination of freedom and control in order to fulfil their creative potential to the fullest possible extent (Beghetto, 2007; NACCCE, 1999).

Misconception 6: You either are or you are not creative.
Research findings: Creativity is often treated as an "all-or-none entity" (Nickerson, 1999): you are born either creative or uncreative (Plucker et al., 2004). This widespread misconception reflects the concept of *Big C Creativity*, namely that only certain charismatic individuals such as Leonardo da Vinci or Einstein could be truly creative (e.g. Gardner, 1993a). However, the majority of creativity researchers assume that creativity is an innate potential in all people although not everyone expresses it to the same degree (e.g. Runco, 2007b). Because of individual differences, each person is able to express her/his creativity in many ways and in a variety of domains (Runco & Sakamoto, 1999).

Misconception 7: Creativity is something inherent that cannot be nurtured.
Research findings: Controversy around the *nature* or *nurture* issue of human creativity is still widespread (e.g. Plucker & Runco, 1999). However, contemporary creativity research places the emphasis on *little-c*, or *everyday*, *creativity* (Craft, 2001b; NACCCE, 1999; Richards, 2007; Runco, 2007b), which assumes that everyone has creative potential that can be nurtured through education and schooling (Kampylis, 2008b, 2009; Starko, 2005). Moreover, a number of researchers (e.g. Feldman, 1999) have reported that family dynamics and genetics also influence the development of children's creative thinking. Consequently, the fostering of students' creativity has become a key target, albeit a challenging one, of many

contemporary education systems (GPI, 2003; HMIE, 2006; MCEETYA, 2008; QCA, 2005; SEED, 2006; Vong, 2008; Wong, 2008), and related education programmes have been implemented in several countries (e.g. OFSTED, 2006).

Misconception 8: Creativity is a characteristic of individuals only.
Research findings: This misconception is also referred to as the *lone genius myth* (Montuori & Purser, 1995) and has its roots in *Romanticism* (Gibson, 2005; Peters, 2009; Sawyer, 2006a). According to creativity researchers (e.g. Harrington, 1990), the most creative accomplishments require the efforts of a number of creative individuals, although specific individuals such as movie directors or singers tend to be credited in collaborative ventures such as a blockbuster movie or a top-10 single, respectively. For instance, the creativity of the numerous professionals who collaborated to produce *E.T.: The Extra-Terrestrial* movie is attributed mainly to the film director Steven Spielberg. However, creativity is not only a characteristic of individuals but also a property of groups of individuals (Daskolia, Lambropoulos, & Kampylis, 2009; Hennessey, 2003; Lambropoulos & Kampylis, 2009; Miell & Littleton, 2004; Paulus & Nijstad, 2003; Sawyer, 2003b, 2006b). Indeed, creative individuals from various fields report that their most significant insights emerge from collaboration and interaction with others (e.g. Sawyer, 2006a). Moreover, contemporary researchers (Chaharbaghi & Cripps, 2007; Sawyer, 2006a) have discovered that explaining creativity requires not only an examination of the individual (*individualist approaches*) but also the study of the culture, society, and historical period in which the individual lives and acts (*sociocultural approaches*).

Misconception 9: Organizational creativity entails only creative employees.
Research findings: According to this misconception, the creativity of a successful organization or company is the sum of the creativity of its employees. In fact, creativity research reveals that organizational creativity depends not only on the employees but also on the structures, culture, and practices that characterize their working environment (Chaharbaghi & Cripps, 2007; see also Publication V). In other words, one cannot make an organization more creative simply by hiring employees that are more creative. An examination of organizational creativity requires the study of the organization as a whole and the investigation of the interactions between employees, organizational structures, atmosphere, and practices (Amabile, 1993, 1996; Amabile, Conti, Coon, Lazenby, & Herron, 1996; Baucus et al., 2008; Birdi, 2007; Björkman, 2004; Cooper & Jayatilaka, 2006; James, Clark, & Cropanzano, 1999; Kampylis & Lambropoulos, 2009; Kletke, Mackay, Barr, & Jones, 2001; Miell & Littleton, 2004; Nemiro, 2002; Runco, 1995; Sawyer, 2003b; Zhou & Shalley, 2008).

Misconception 10: Children are more creative compared to adults.
Research findings: Several artists such as Klee, Kandinsky, Miró, Matisse, and Picasso overemphasized the artistic abilities of children (Soh, 2004), thus contributing to this misconception. For instance, Picasso visited an exhibit of children's art in 1946 and remarked, "*At that age I could draw like Raphael… It took me years to*

learn to draw like these children" (as cited in Soh, 2004, p. 269). Today, researchers seem to agree that creativity is (a) a continuum that characterizes the life span of an individual (Lubart & Sternberg, 1998) and (b) an innate potential in all people even though it is not expressed to the same degree or in the same way by everyone (Runco, 2007b). According to Runco (2007a), there are three broad schools of thought with regard to children's creativity:

1. Children are less creative compared to adults.
2. Children and adults are equally creative; there is no group difference reflecting age.
3. Children are more creative compared to adults.

A number of researchers (e.g. Sawyer, 2006a) claim that children are not as creative as our creativity "myths" suppose and, consequently, that school and society do not squash their creativity; in fact, they assert, it is school and society that make creativity possible by providing children with the appropriate skills and knowledge. However, our primary concern for children must be to nurture their creative potential rather than to measure and assess their creative performance (Runco, 2003).

Misconception 11: Individuals with disabilities and special needs cannot be creative.
Research findings: According to this stereotype, individuals with special needs and disabilities are incapable of being creative. In fact, a person may be highly creative in some domains even though s/he faces special needs or disabilities (Kampylis, Spetsiotis, & Stamatiou, 2009; Kuo, 2007; Tsai, 1992; Whitemore, 1980). Creative scientists such as Einstein demonstrate the relationship between having a learning disability and the expression of creativity (Heilman, 2005), and the world-renowned theoretical physicist Stephen Hawking is one example of a highly creative yet disabled individual.

Misconception 12: You must be psychologically unhealthy in order to be highly creative.
Research findings: The notion of the "mad genius" (Becker, 1978; Durrenberger, 1999) is a widely popular one, but it is based mainly on biographies and self-reports of eminent creators (Eisenman, 1997; Perkins, 1981, 1988). The link between creative thinking and madness has its roots in ancient times (Durrenberger, 1999; Neihart, 1998) and "*…deviant behavior, whether in the form of eccentricity or worse, is not only associated with persons of genius or high-level creativity, but it is frequently expected of them*" (Rothenberg, 1990a, p. 149). Kaufman (2009) points out that biographies of creative persons who were merely diligent and displayed balanced behaviour, such as the US inventor, scientist, and businessman Thomas Edison, are very infrequent compared to those of eminent creators who sometimes acted bizarrely, such as Vincent Van Gogh. Numerous researchers have studied the relationships between creativity and abnormal conditions and behaviour such as mental illness (Eisenman, 1997), alcoholism (Rothenberg, 1990b), sui-

cide (Mraz & Runco, 1994), criminality (Eisenman, 1999, 2008), and schizophrenia (Sass & Schuldberg, 2001). Today, creativity researchers (e.g. Schlesinger, 2009) challenge the "mad genius" stereotype, emphasizing its unsound foundation. Moreover, researchers (e.g. Plucker et al., 2004) have pointed out that this negative stereotype may also affect enhancement efforts, because it predetermines teachers' views of creative students as potential troublemakers (Chan & Chan, 1999; Westby & Dawson, 1995).

Misconception 13: The most highly creative people are not recognized in their own time.
Research findings: This is one of the most persistent common beliefs, even though there are remarkably few examples of creators, such as Van Gogh, who were ignored during their time and only recognized decades, even centuries, after their deaths. Historiometric studies (e.g. Simonton, 1999) explain these cases by emphasizing that interpretations of what is creative, and what is not, change over time. Moreover, several creativity scholars such as Sawyer (2006a) assert that creative individuals are usually successful professionals and gain sufficient satisfaction from their attainments.

Misconception 14: Creativity is a universal concept.
Research findings: It is not only laypersons but also creativity researchers who often refer to creativity as a universal, culturally independent concept. In fact, several comparative studies (Lau, Hui, & Ng, 2004; Lubart & Sternberg, 1998; Niu & Sternberg, 2002; Runco, 2002) reveal that creativity is situated within a cultural framework that "*…influences the definition and expression of creativity, channelling creativity into certain task domains or social groups.*" (Lubart & Sternberg, 1998, p. 59). Several studies (e.g. Li, 1997) provide evidence that a specific cultural framework may favour creative performance in a domain and inhibit it in another, and vice versa, challenging the assumption of the "*cultural universalism*" of creativity (Craft, 2003, p. 123). The acceptance of creativity as a culturally dependent construct has many implications for contemporary education systems that have to educate students with diverse backgrounds. Creative individuals who display a high tolerance for ambiguity, an independence of judgement, an openness to new experiences, and cognitive flexibility (e.g. Barron, 1995) can move beyond their cultural norms and interact successfully with individuals from other cultures (Montuori & Fahim, 2004).

Misconception 15: Creativity is something enjoyable and desirable by all.
Research findings: According to this common belief, creative thinking and performance is something easy, enjoyable, and, therefore, desirable by all; one only has to wait for the great insight, the big idea, or the "Aha!" moment. However, creative activity is rarely easy and effortless; typically, it requires prior knowledge, skills, hard work, expertise, persistence, the investment of time, and commitment (Runco, 1999b, 2004; Sawyer, 2006a; Weisberg 1988, 2006). Consequently, the more diligent and productive an individual is, the more creative s/he is (Sawyer, 2006a). The long process of the development of Darwin's theory of evo-

lution is a typical example of creative yet hard and persistent work (Gruber, 1981; Gruber & Wallace, 2001). Moreover, the same activities that place a creative person in the *flow* state (Csikszentmihalyi, 1996) often seem either deadly boring or incredibly stressful to other people.

Misconception 16: Creativity is something that brings "good for all".
Research findings: Creativity is usually regarded as the production of positive outcomes by novel means and rarely is examined who really wins and who loses by its application. A number of researchers (Craft, 2001a; Craft, Gardner, & Claxton, 2008; McLaren, 1999) have pointed out that human creativity is used not only for constructive/ethical purposes but also for destructive/unethical intentions. It can be used "*…equally by those who have positive and noble goals as well as by dictators or criminals who seek to dominate, destroy, or plunder"* (Shneiderman, 2002, p. 119). For this reason, creative thinking should be integrated with other types of thinking such as critical, caring, and reflective thinking (see publications II, VI, and VII).

Misconception 17: Creativity is something apolitical.
Research findings: Human creativity may challenge or reinforce the given status quo (Craft, 2003), and governments since antiquity have attempted to benefit from highly creative individuals (Florida, 2005). One example is the scientists of the Third Reich who became the "apple of discord" between the USA and USSR following World War II. According to Abra (1993) "*…every creative work in some sense overthrows familiar ideas, perceptions, and the status quo, and as such is in its very essence competitive*" (p. 300). Thus, it was not by coincidence that the US government overemphasized scientific creativity (Cropley, 1997, 1999, 2001; Sawyer, 2006a) immediately after the launch of the *Sputnik I* satellite in 1957 by the USSR. Today, discussions about creativity "*…have become prominent in business, again with an overwhelming emphasis on meeting competition, this time for markets and market shares*" (Cropley, 1999, p. 512).

Misconception 18: The fine arts are more creative than the crafts.
Research findings: This misconception may have its roots in the ancient Greek myth of the Titan Prometheus. Prometheus represented the archetype of the creative individual who envisaged a better future for humankind by using fire and the arts (e.g. Kearney, 1994). According to Sawyer (2006a), western culture idealizes the fine arts, while it regards craftwork as less creative and worthy. However, contemporary "high art" in fact started out as a type of craft. For instance, what we now call *classical music* began as a form of crafted music satisfying the entertainment needs of royal patrons or the functions of the Catholic mass. The shift from craft to art occurs repeatedly through history and is always a sociocultural process.

Misconception 19: There are "creative" and "non-creative" school subjects.
Research findings: This misconception is connected with the domain-general/domain-specific debate that has for decades occupied creativity research

(Kaufman & Boer, 2004; Lubart & Guignard, 2004; Plucker & Beghetto, 2004). The majority of laypersons connect creativity primarily with the arts (e.g. Sawyer, 2006a). Several studies (Aljughaiman & Mowrer-Reynolds, 2005; Craft, 2003; Diakidoy & Kanari, 1999; Fryer, 1996; see also publications III and IV) reveal that teachers also connect creativity with the arts and consider that the most "creative" school subjects are those that are artistic, such as music or drama education. However, students' creative thinking can be fostered in all school subjects and curriculum areas (Craft, 2005; Duffy, 1998; Fisher & Williams, 2004; Jones & Wyse, 2004; Kampylis, 2008b, 2009; Koulaides, 2007; Kousoulas, 2003; Starko, 2005; Wilson, 2009; Xanthakou, 1998).

These misconceptions influence teachers' implicit theories (for a review see Publication IV) and consequently their practices when they try, or do not try, to foster students' creative-thinking skills. The findings from the survey and focus-group discussions that I conducted (see publications II, III, IV, VI, and VII) indicate that there are three main preconditions for revising teachers' implicit theories and, accordingly, their practices in classrooms:

1. Teachers are not well informed about the findings of contemporary creativity research and, consequently, do rarely reflect on their implicit theories and misconceptions.
2. Teachers live and act in specific sociocultural contexts and in given time and space frameworks. For this reason, their implicit creativity theories depend on the contexts within which they are shaped and on necessary changes to the sociocultural framework.
3. Even though implicit theories are based mainly on personal experiences and mentality and, therefore, are idiosyncratic, unexamined, and incomplete, they have been proven to be robust and enduring. Therefore, revisions of these theories require not only the appropriate information (e.g. relevant research findings) but also socio-cognitive conflict (Doise, Mugny, & Perez, 1998) and conceptual change to take place (Vosniadou, 2007; Vosniadou, Baltas, & Vamvakoussi, 2007; Vosniadou, Ioannides, Dimitrakopoulou, & Papadimitriou, 2001).

However, the main aim of this study is to shed light on and discuss the implicit creativity theories of teachers rather than to examine ways of revising them.

3 RESEARCH DESIGN

The research paradigms utilized in this Ph.D. study, both quantitative and qualitative, emerged during the research process and were not predetermined. A four-level mixed-methods research design (Creswell, 2009; Creswell & Plano Clark, 2007; Plano Clark & Creswell, 2008) was ultimately applied for studying the multifaceted phenomenon of creativity within the dynamics of primary-school classrooms (see Figure 4).

FIGURE 4 Four-level mixed-methods research approach

Many terms are used to describe this research approach, such as *qualitative and quantitative methods*, *multimethod*, *multimethodology*, and *synthesis*, but recently *mixed methods* seems to have become the dominant term (Tashakkori & Teddlie, 2003). Tashakkori and Teddlie (2003, p. 577) define mixed methods as

> *…the practice of employing different types, or styles, of data-collecting methods within the same study of research program, for example, measuring variables with both survey and archival data, testing hypotheses with both experimental and non-experimental methods, or employing qualitative fieldwork to develop a theoretical interpretation of a quantitative survey's findings.*

Research approaches that rely on the use of mixed methods have been receiving increased attention (Creswell, 2009; Creswell & Plano Clark, 2007; Denzin & Lincoln, 2005; Tashakkori & Teddlie, 2003; Teddlie & Tashakkori, 2009) and have been recognized as a third methodological movement beyond quantitative and qualitative approaches (e.g. Gorard & Taylor, 2004). Using a mixed-methods research design allowed me to explore a wider spectrum of research questions (see section 1.3, p. 25), offer a more diverse range of viewpoints, and infer stronger conclusions (Tashakkori & Teddlie, 2003; Teddlie & Tashakkori,

2009). Moreover, the mixed-methods research design was the most appropriate choice for this Ph.D. research because it resulted in progressively more complex research findings (Teddlie & Tashakkori, 2009).

Moreover, by applying both quantitative and qualitative data in mixed-methods research, the data could be triangulated to provide a more comprehensive understanding of creativity in the framework of primary education. Triangulation techniques were used both in analysing and interpreting the data and in determining the quality of that data (Teddlie & Tashakkori, 2009, p. 27).

I regard each of the seven studies that comprise this dissertation as distinct but complementary steps of the research process and all of them as a totality aimed at understanding how teachers conceptualize the fostering of students' creative thinking and their role in this endeavour. In collecting the research data, I followed a *sequential explanatory strategy* (Creswell, 2009, p. 215; see also Plano Clark & Creswell, 2008; Teddlie & Tashakkori, 2009). In this strategy, quantitative data are collected and analysed first, followed by the collection and analysis of qualitative data (see Figure 4). The reason for employing a sequential explanatory process is to use qualitative data in order to follow up, explain further, and interpret the preliminary quantitative findings (Creswell & Plano Clark, 2007, p. 50).

3.1 Research Level A: Survey

After the initial literature review, it became clear that the perceptions and implicit theories of creativity held by primary teachers was an important and promising, yet neglected, research topic (see Publication IV). A questionnaire-based survey (Bailey, 1987; Czaja & Blair, 2005; Robson, 2002) was adopted as the most suitable method for the first research level of this Ph.D. study because it is descriptive as well as explanatory (Moustairas, 2004). The survey (for an overview, see Figure 5) aimed (a) to collect quantitative and qualitative data on teachers' conceptions and implicit theories of creativity, (b) to explain how these conceptions and implicit theories influence teachers' practices in real classrooms, and (c) to investigate the role of primary teachers in the enhancement of students' creative thinking.

The three subsequent research levels (B, C, and D) of this Ph.D. study arose from this survey with the aim of investigating the emerging issues more deeply.

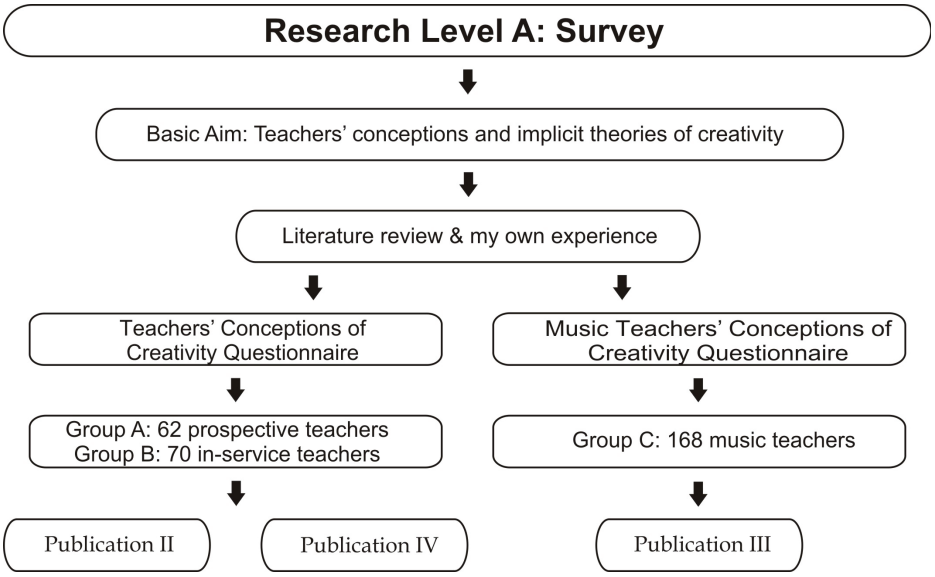


FIGURE 5 Overview of the design of Research Level A

3.1.1 Participants

The convenience sample consisted of three groups:

1. Group A: 62 prospective teachers of the Faculty of Primary Education of the National and Kapodistrian University of Athens, who were enrolled in the final – eighth – semester of their studies and had completed their compulsory training in schools.
2. Group B: 70 in-service teachers who work in Greek primary schools in the Athens region.
3. Group C: 168 music teachers who work in Greek primary schools in various regions of Greece.

The in-service and music teachers participated in the study after official permission was given by the Greek Pedagogical Institute (see Appendix 5). The prospective teachers took part in the study after official permission was given by the assembly of the Faculty of Primary Education of the National and Kapodistrian University of Athens (see Appendix 6).

The majority of the participants (88.7% of the prospective teachers, 62.9% of the in-service teachers, and 82.1% of the music teachers; mean 79.0%) were women. This high percentage is consistent with and representative of the actual percentage of women teachers who work in Greek primary education (Table 5; source: Greek Ministry of Education, Lifelong Learning, and Religious Affairs, 2009, www.ypepth.gr/el_ec_category6638.htm).

TABLE 5 Teachers working in Greek state primary schools

School year 2007–2008	Women		Men		Total	
	#	%	#	%	#	%
General Teachers	30,071	65.5	15,847	34.5	45,918	75.8
Foreign-Language Teachers	6,322	93.9	405	6.1	6,727	11.1
Physical-Education Teachers	2,209	47.6	2,428	52.4	4,637	7.7
Music Education Teachers	1,097	73.9	388	26.1	1,485	2.5
Arts Education Teachers	248	76.1	78	23.9	326	0.5
Miscellaneous	1,008	68.8	457	31.2	1,465	2.4
Total	40,955	67.6	19,603	32.4	60,558	100

Analytical demographic information of the survey participants is presented in Table 6.

TABLE 6 Demographics of the survey participants

		Group A: 62 prospective teachers		Group B: 70 in-service teachers		Group C: 168 music teachers		Total: 300	
		#	%	#	%	#	%	#	%
Gender	Female	55	88.7	44	62.9	138	82.1	237	79.0
	Male	7	11.3	26	37.1	30	17.9	63	21.0
Age	20-30	56	90.3	6	8.6	65	38.7	127	42.3
	31-40	6	9.7	36	51.4	80	47.6	122	40.7
	41-50	-	-	26	37.1	21	12.5	47	15.7
	51-	-	-	2	2.9	2	1.2	4	1.3
Years of experience	0	62	100	-	-	-	-	62	20.7
	1-5	-	-	12	17.4	74	44.0	86	28.7
	6-10	-	-	16	23.2	36	21.3	52	17.3
	11-15	-	-	16	23.2	36	21.3	52	17.3
	16-20	-	-	15	21.7	18	10.7	33	11.0
	21-	-	-	11	14.5	04	2.7	15	05.0

3.1.2 Research instruments

The research instruments were two self-report, anonymous, pencil-and-paper questionnaires: Teachers' Conceptions of Creativity Questionnaire (TCCQ; see Appendix 2) and Music Teachers' Conceptions of Creativity Questionnaire (MTCCQ; see Appendix 4). Each questionnaire contained a cover letter, four sections with attitudinal items, and one section relating to demographics. The majority of the questionnaire items were five-point Likert-type items ranging from "strongly disagree" to "strongly agree". There were also multiple-choice and open-ended items. The open-ended items were considered important in order to solicit responses in the participants' own words.

Some of the questionnaire items were adopted – with modifications – from previous research undertaken by Diakidoy and Kanari (1999); the other items arose from my experience in the field and from the initial literature review that I conducted. The TCCQ was distributed to in-service and prospective teachers

with minor modifications to the demographics section (see Appendix 2). The MTCCQ constituted an adaptation of the TCCQ. The former was shorter and focused on creativity in Music Education. Table 7 presents an overview of the questionnaires.

TABLE 7 TCCQ and MTCCQ format

	TCCQ	MTCCQ
Cover letter	√	√
Demographics	√	√
Sections	4	4
Likert-type items	40	35
Multiple-choice items	6	1
Open-ended items	8	6
Pages	8	4

I constructed the initial TCCQ in English and presented it to my supervisors for their feedback. After the necessary modifications, I translated the TCCQ into Greek and presented it to 10 Greek primary teachers (seven females, and three males) in order to test out the clarity of the items, the requisite time, the suitability of the structure, and the appropriateness of the layout. Minor changes were made according to their comments, and the final version of the TCCQ was printed and distributed to the participants. The same procedure was followed for the MTCCQ.

3.1.3 Data gathering procedures

In-service teachers completed the TCCQ in their workplaces during the spring of 2006. I distributed and collected the questionnaires, and participation in the study was voluntary.

Prospective teachers completed the questionnaire over a period prearranged with their instructor, and I was present to distribute and collect the questionnaires and answer any queries arising. The prospective teachers participated in the study of their own free will.

Music teachers voluntarily completed the MTCCQ, which I distributed and collected during the 2nd pan-Hellenic conference (which had international participation) "Music Education in the 21st century: challenges, problems, prospects"[7] in April 2007.

3.1.4 Data coding and analysis

The completed questionnaires (132 TCCQ and 168 MTCCQ) were individually numbered, and the raw data from the Likert-type and multiple-choice items

7 The conference was organized by the Greek Association of Primary Music Teachers under the auspices of the Greek Ministry of Education, Lifelong Learning, and Religious Affairs in Athens, Greece, on 20–22 April 2007 (www.primarymusic.gr/conference).

were imported into *SPSS Statistics 15.0* statistical analysis software (www.spss.com) for further quantitative analysis. The data from the open-ended items were transcribed and imported into computer-assisted qualitative data analysis software (CAQDAS), *QSR NVivo 5.0* (www.qsrinternational.com), for further qualitative analysis.

3.1.5 Limitations

The main limitations of Research Level A were:

1. TCCQ and MTCCQ, as all self-report questionnaires, provided subjective data; the validity of the collected data needs to be further evaluated by additional research methods.
2. Greek in-service, prospective, and music teachers participated in the study on a voluntary basis and constitute a small, non-representative sample. Therefore, results from this study are limited, and follow-up studies are necessary to verify the consistency and generalizability of the presented data.
3. As all participating in-service and prospective teachers are Greek, the study outcomes are limited to the Greek education system and culture. Further research is therefore needed to broaden knowledge and understanding of the cross-cultural dimension of teachers' conceptions and implicit theories of creativity.

3.2 Research Level B: Literature research

Literature research (Babbie, 2004; Bailey, 1987; Robson, 2002) was selected for Research Level B as the most appropriate methodology for locating and investigating (a) definitions and collocations of creativity, (b) recommendations for the fostering of creative thinking, and (c) the philosophical foundations of the construct. The literature research was conducted using powerful time- and cost-effective ICT (information and communication technology) tools for searching, organizing, storing, editing, and analysing digital data in an interpretive and constructivist way.

The following keywords, as well as various combinations of them through the use of Boolean operators, were used in this literature research as broad search terms in order to gather studies, reports, and other relevant academic texts: creativity, creative thinking, primary, education, educational, school, students, pupils, classroom, learning, teaching, teachers, training, implications, implementation, strategies, techniques, recommendations, enhancement, fostering, development, consequences, definitions, creativity is, creativity is defined, define creativity as, malevolent, benevolent, dark-side, negative, moral, and ethical.

The basic aims of the literature research (for an overview, see Figure 6) were:

1. To collect, classify, and analyse researchers' definitions and collocations of creativity.
2. To collect, classify, and analyse researchers' recommendations for creative education.
3. To investigate the philosophical foundations of the construct and its consequences, negative and/or positive.

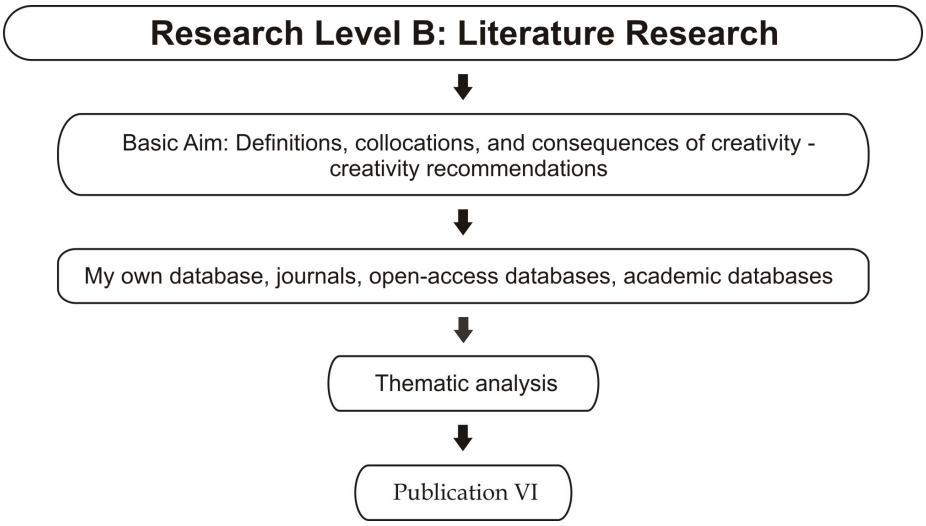


FIGURE 6 Overview of the design of Research Level B

3.2.1 Data gathering procedures

The literature research was conducted in four phases:

Phase A: An investigation of my own database of creativity literature through the *Copernic 3.0* desktop-search software (www.copernic.com). The database consisted of the following documents in electronic, searchable form:

- 1120 journal articles
- 217 official documents such as reports, curricula, and legislations
- 180 conference papers
- 76 books
- 55 dissertations.

Phase B: A search within past issues of journals that regularly publish articles on creativity research, namely *Creativity Research Journal*, *Journal of Creative Behavior*, *Psychology of Aesthetics, Creativity and the Arts*, and *Thinking Skills and Creativity journal*. I also searched special issues of other journals devoted to creativity such

as the *British Educational Research Journal*, Volume 34, Issue 5, 2008, and the *Scandinavian Journal of Educational Research*, Volume 47, Issue 3, 2003.

Phase C: An online research of open-access, online databases through the World Wide Web, such as:

1. Creative Partnerships (www.creative-partnerships.com)
2. Directory of Open Access Journals (www.doaj.org)
3. Education Recourses Information Center (www.eric.ed.gov)
4. Google Books (http://books.google.com)
5. Google Scholar (http://scholar.google.com)
6. (Greek) Pedagogical Institute (www.pi-schools.gr)

Phase D: An online investigation of the following academic databases through the Jyväskylä University Library (https://kirjasto.jyu.fi/ homepage?set_language=en) and the Greek National Documentation Centre (www.ekt.gr/en/index.html) networks:

1. APA PsycNET (http://psycnet.apa.org)
2. EBSCOhost (www.ebscohost.com),
3. Emerald (http://info.emeraldinsight.com)
4. InterScience (www.interscience.wiley.com)
5. InformaWorld (www.informaworld.com)
6. JSTOR (www.jstor.org)
7. ProQuest Digital Dissertations (http://proquest.umi.com/pqdweb?RQT=302&cfc=1)
8. Sage Journals Online (http://online.sagepub.com)
9. Science Direct (www.sciencedirect.com)
10. SpringerLink (www.springerlink.com)

The initial literature research returned numerous publications referring to definitions, collocations, recommendations, and philosophical dimensions of creativity. These publications were downloaded and stored in a reference database; all relevant extracts from these documents were prepared for qualitative data processing and analysis through *NVivo 5.0*. This particular software package was used because it provides powerful tools for searching, organizing, categorizing, annotating, and analysing qualitative data in a variety of ways.

3.2.2 Limitations

The main limitations of the conducted literature research were the following:

1. Although I investigated the most important open-access and academic databases encompassing thousands of digital or digitized documents,[8] it

8 By *digital* and *digitized* documents, I refer to documents that are stored online on servers or locally on computers and other electronic devices. Digital documents were created directly in electronic form (e.g. e-books or .pdf files), whereas digitized

is likely that my research did not locate all related primary studies (e.g. studies that have been stored in databases to which I did not have access).
2. Because I searched mainly digital or digitized documents, I did not have access to as yet unpublished studies or to studies that have been published only in printed form.
3. I investigated only those digital or digitized documents that have been published in English and Greek, and consequently, I did not have access to relevant literature published in other languages.
4. As with any literature research, the present study depends on the researcher's personal presentation and interpretation of the data, used here in a de-contextualized way.

3.3 Research Level C: Action research

The basic aim of Research Level C (for an overview, see Figure 7) was to bridge the gap between research and practice (Cohen, Manion, & Morrison, 2000), implementing "*…a small-scale intervention in the functioning of the real world and a close examination of the effects of such an intervention*" (Cohen & Manion, 1994, p. 186). Action research can contribute to both the practice and the theory of education since it involves not only problem-solving but also problem-posing (Cohen et al., 2000).

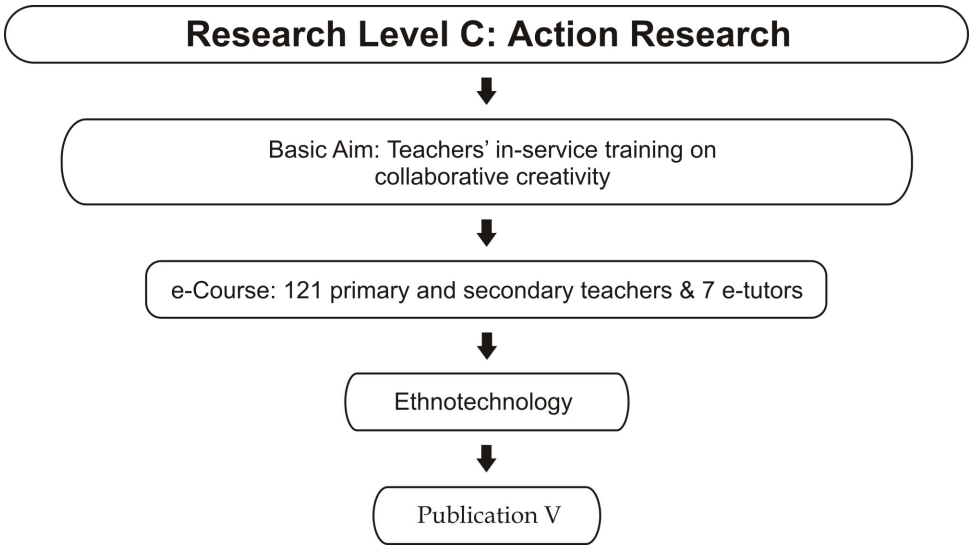


FIGURE 7 Overview of the design of Research Level C

documents were converted into electronic documents by means of document imaging. The digital documents may have been published in both electronic and printed form.

Moreover, action research can be used, among other things, in the continuing professional development of teachers (Cohen et al., 2000; Mertler, 2006) and as a model of "emancipatory" research for organizational change because action research encompasses situated learning about the workplace (Brown, Collins, & Duguid, 1989). In the words of Kemmis and McTaggart (1988), "*…action research is concerned equally with changing individuals, on the one hand, and, on the other, the culture of the groups, institutions and societies in which they belong*" (p. 18).

The main objectives of Research Level C were:

1. To test the opportunities offered by e-learning management systems such as *Moodle* (www.moodle.org) for teacher training in creativity.
2. To investigate the skills that contemporary teachers need in order to carry out their new role as facilitators of students' creative thinking.
3. To study the potential use of ICT tools such as blogs, wikis, and videoconferencing for enhancing teachers' collaborative creativity.

3.3.1 Participants

In total, 121 Greek teachers, from primary and secondary education, and 7 e-tutors (see Publication V; see also Lambropoulos, 2009) took part in the Project Method e-Course constituting the convenience sample of this study (see Table 8; see also Lambropoulos, 2009, and Lambropoulos, Kampylis, Minaoglou, Papadimitriou, Vivitsou et al., 2008).

TABLE 8 Demographics of participants in the action research

		#	%
All participants (121 trainees + 7 e-tutors)		128	100.0
Returned questionnaires with demographics		47	36.7
Gender	Female	12	26.0
	Male	35	74.0
Age	20–30	1	2.0
	31–40	15	32.0
	41+	31	66.0
Years of experience	1–5	4	9.0
	6–10	9	19.0
	11–20	22	46.0
	21+	12	26.0

The main aim of the e-course was to train the participating teachers in how to utilize the collaborative and creative features of blogs, wikis, and videoconferencing for teaching and learning purposes. The e-course was implemented on the e-learning platform of the Greek School Network (www.sch.gr/en), which utilizes the open-source e-learning management system *Moodle* (www.moodle.org).

3.3.2 Limitations

The main limitations of the action research were the following:

1. The Greek teachers from primary and secondary education, and the e-tutors, participated in the study on a voluntary basis and without any economic or other consideration. Therefore, the action research project constitutes a unique case study that is difficult to repeat.
2. The findings are limited to the specific case study, and their validity needs to be further evaluated by follow-up studies and additional research techniques.
3. A significant amount of time and effort was invested in solving technical problems and maintaining the collaborative network of the participants.
4. All participants were Greek in-service teachers. Therefore, the study outcomes are limited to the Greek education system and culture.

3.4 Research Level D: Focus groups

Focus groups were selected as the most appropriate qualitative methodology for validating assumptions and investigating beliefs and implicit creativity theories that guide teachers' thinking and actions in real classroom settings. The use of focus groups is "*…a research technique that collects data through group interaction on a topic determined by the researcher. In essence, it is the researcher's interest that provides the focus, whereas the data themselves come from the group interaction*." (Morgan, 1997, p. 6). According to Robson (2002, p. 284), the main advantages of the use of focus groups are the following:

1. It is a highly efficient technique for qualitative data collection.
2. Participants tend to provide checks and balances on each other.
3. Group dynamics help in focusing on the most important topics.
4. Participants tend to enjoy the experience.
5. The method is relatively inexpensive and flexible and can be set up quickly.
6. Participants are empowered and able to make comments in their own words.
7. Contributions can be encouraged from people who are reluctant to be interviewed on their own.
8. People who have specific difficulties are not discriminated against.
9. Facilitation can help in the discussion of taboo subjects.

One the other hand, focus groups also have disadvantages. The most important are the following:

1. The number of participants in a focus group cannot be large enough to be a representative sample of a population, unlike in surveys.

2. Some participants with strong personalities may dominate the discussion.
3. Some participants may feel uncomfortable in expressing in public their own views, opinions, or experiences.
4. The transcription of data is a fairly difficult and time-consuming task.
5. The transcribed data are complex to analyse because there are no direct answers to the questions posed by the researcher but rather mixed responses, reactions, and comments by the participants.
6. The questions asked and the way they are asked (how they are phrased, how they are posed, when they are posed, by whom, and so forth) may affect the participants' answers.

The focus-group study (see Figure 8) aimed:

a. To investigate more deeply teachers' conceptions, situated knowledge, and implicit theories of creativity.
b. To examine the role of primary teachers in the enhancement of students' creative thinking.
c. To collect, classify, and analyse teachers' recommendations for a primary education that is creative.
d. To investigate the thinking skills that students and teachers need in order to utilize their creative potential for personal and social progress.

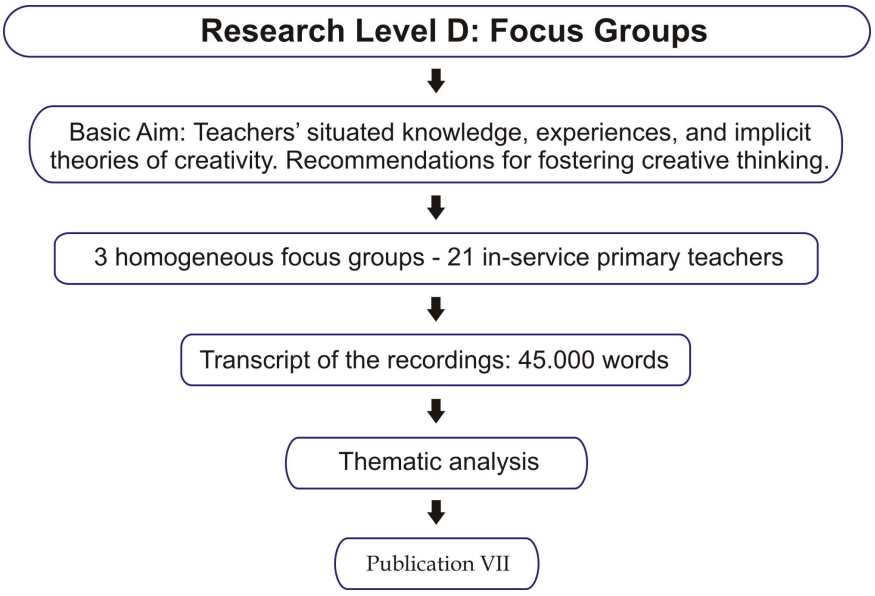


FIGURE 8 Overview of the design of Research Level D

3.4.1 Procedure and participants

Three equivalent and homogeneous focus groups were put together for the purposes of this Ph.D. research following the sampling and ethical principles proposed by Cohen, Manion, and Morrison (2000). I used homogeneous groups because the participants in such groups share a common background or experience that (a) facilitates communication, (b) allows the exchange of ideas and experiences, and (c) establishes a sense of safety in expressing conflicts or concerns (Brown, 1999).

Participation in the focus groups was on a voluntary basis; the only precondition for participation was that the teachers should also have taken part in the survey undertaken at Research Level A. Based on the analysis of the demographic data obtained from the TCCQ and MTCCQ, 30 teachers were selected as candidates for the focus-group study. An invitation to participation in the focus-group study was sent by e-mail to the selected candidates. The invitation included (a) a short curriculum vitae of myself and an outline of my Ph.D. research, (b) an outline of the procedure to be followed and its rationale, (c) an offer to answer any enquiries concerning the procedure, (d) information about the schedule, the place, and the duration, (e) a description of the benefits that could reasonably be expected, (f) an assurance of participants' anonymity and the confidentiality of the information, (g) an affirmation that they would have the opportunity to verify the transcriptions of the discussions, (h) an assurance that they would receive copies of the published results of the study, if they so wished, and (i) official permission for conducting the study, as given by the Greek Pedagogical Institute (see Appendix 5).

Out of the 30 candidate participants, 25 responded by e-mail that they were willing and available to take part in the focus-group study. Selection of the final 21 participants was based on their background and expertise. Seven Greek primary teachers from various disciplines and with a range of expertise constituted each group (see tables 9 and 10).

TABLE 9 Demographics of participants in the focus groups

N=21		#	%
Gender	Female	16	71.4
	Male	5	28.6
Age	20-30	6	28.6
	31-40	7	33.3
	41-50	8	38.1
Years of experience	0-5	5	23.8
	6-10	4	19.0
	11-15	5	23.8
	16-20	5	23.8
	21-	2	9.5
Additional studies	No	9	42.9
	2nd degree	4	19.0
	Refresh training	5	23.8
	Master	9	42.9
	Ph.D.	3	14.3

The three focus-group discussions were conducted in June 2008 in Athens, Greece. To assist teachers based in various locations within the Athens region, an appropriate central location was reserved for the focus-group meetings. The room was 100 metres from a central metro station, comfortable, air-conditioned, and quiet. I acted as the moderator of the three focus-group discussions, which were conducted in Greek, each one lasting approximately two hours. Chairs were arranged in a semicircle, and two video cameras were set up in order to record the focus-group discussions. Each session was videotaped separately. The video recordings allowed me to concentrate on coordinating the discussions without the need to keep notes. Moreover, they were valuable sources not only for transcribing, coding, and analysing the discussions but also for studying the interactions between the participants and the non-verbal communication such as gestures, facial expressions, and body postures. A letter of thanks was sent to each participant by e-mail.

TABLE 10 Expertise and distribution of participants in the focus groups

N=21	FG A*	FG B	FG C	Women	Men	Total
General Teachers (Experienced)	2	3	2	5	2	7
Music Education Teachers	1	1	1	1	2	3
General Teachers (Novice)	1	1	1	3		3
Project-coordinator Teachers	1	1	1	2	1	3
Drama Education Teachers	1				1	1
Foreign-Language Teachers	1			1		1
Physical-Education Teachers			1	1		1
Special Education Teachers			1	1		1
All-Day School Teachers		1		1		1
Total	7	7	7	15	6	21

* FG A: 1st focus group, FG B: 2nd focus group, FG C: 3rd focus group

3.4.2 Focus-groups protocol

The following table (Table 11) presents the research themes of the focus-group study and the relevant questions that were posed to the participants.

TABLE 11 Focus-groups protocol

Main research themes	Focus questions for the focus-group interviews
Teachers' evaluation of creative thinking and performance	How do you value the contribution of creative thinking to personal and social progress? According to some scholars, we live in an *era of creativity*. What is your opinion on this? Several scholars argue that teachers belong to the *creative workers* sector and act as role models and/or mentors for students' creativity. What is your opinion on this?

(continues)

TABLE 11 (continues)

Training in creativity	How confident do you feel about fostering students' creative thinking and performance in the classroom? Have you received initial education or in-service training on how to foster students' creative thinking and performance? What are your experiences of initial education and/or in-service training in creativity? What are, in your opinion, the most effective ways of in-service training in creativity? When, where, how, and by whom should such training be organized?
The fostering of creative thinking in real classroom settings	The fostering of students' creative thinking is regarded as a key education target by the applied Cross Thematic Curriculum Framework (CTCF) for compulsory education. How much do you know about this? To what extent do you believe, and why, that Greek primary education achieves the CTCF education targets related to creativity? What are the main factors that favour or inhibit the enhancement of students' creativity in real education settings? In which school subjects do you believe that students' creative thinking and performance can be manifested? What is the role of the body in students' expression of creativity?
Top-down and bottom-up approaches to creativity	How aware do you feel about the conclusions of contemporary research on creative thinking in general and its implications in education in particular? To what extent and how do you implement and utilize these conclusions in real classroom settings? To what extent do you feel that your experience and situated knowledge regarding students' creative thinking are taken into consideration by the education authorities and policy-makers? What are your recommendations for a more creative primary education? What are the most urgent and important of these recommendations?
Philosophical dimensions of creativity	Why should we (or not) foster students' creative thinking? Some scholars stress that human creativity not only has a *bright side* but a *dark side* as well. What is your opinion on this? Do you encounter in the classroom negative manifestations of students' creativity? If yes, can you give one or more examples? What other types of thinking, apart from creative thinking, do you think students should become skilled in through education?

3.4.3 Coding

The recordings were transcribed immediately after all discussions were completed, resulting in an electronic document of approximately 45,000 words, which was prepared for coding and analysis through the *NVivo 5.0* software package.

Transcribing the data from the video recording was a fairly demanding and time-consuming task. On the other hand, during the transcription, I became familiar with the raw data and kept useful notes for the initial coding. *NVivo 5.0* provided powerful tools for searching, editing, coding, and analysing the tran-

scribed discussions. The transcriptions were sent to the participants by e-mail in order to verify them, thus enforcing the validity and reliability of the data.

Qualitative data gathered through transcription of the three focus-group discussions were coded using *NVivo 5.0* in relation to the abovementioned focus-group protocol and were examined using *thematic analysis* (Boyatzis, 1998).

3.4.4 Thematic analysis

Braun and Clarke (2006) define thematic analysis as "…*a method for identifying, analysing and reporting patterns (themes) within data*" (p. 79) and advocate it as a useful, accessible, and theoretically flexible method for qualitative research that is rarely acknowledged yet widely used.

More analytically, according to Boyatzis (1998, p. 161):

1. *Thematic analysis* is a process for encoding qualitative information. This encoding requires an explicit "code".
2. A *code* may be a list of themes; a complex model with themes, indicators, and qualifications that are causally related; or something in between these two forms.
3. A *theme* is a pattern found in the information that at the minimum describes and organizes the possible observations or at the maximum interprets aspects of the phenomenon.
4. A *codebook* is the compilation or integration of a number of codes in a study.

In the present study, thematic analysis was used based on the six phases proposed by Braun and Clarke (2006, p. 87):

1. Transcribing data
2. Generating initial codes
3. Searching for themes
4. Reviewing themes
5. Defining and naming themes
6. Producing the report.

The criteria that guided the thematic analysis to ensure trustworthiness of the data were (Leininger, 1994):

1. Credibility
2. Confirmability
3. Meaning-in-context
4. Recurrent patterning
5. Saturation
6. Transferability.

3.4.5 Limitations

The main limitations of Research Level D were:

1. The research results cannot be generalized because the participants constituted a small sample of Greek teachers that was not completely representative (see tables 5 and 9).
2. The study outcomes are limited to the Greek education system and Greek cultural context because all participants were Greek primary teachers.
3. The focus-group discussions were conducted in Greek, whereas the results are presented in English. For this reason, some misinterpretation of the collected data may have occurred.
4. The number of issues discussed during each focus-group session was limited by the available time.

4 MAIN RESEARCH FINDINGS

The mixed-methods research design selected for this Ph.D. research resulted in a mixture of data (see Figure 9) and research findings. Each of the seven original publications that constitute the main body of this dissertation presents a part of the main research findings. The following pages give an overview of the original publications, which should be viewed as complementary pieces of a puzzle rather than distinct studies.

FIGURE 9 Overview of the data resources

4.1 Publication I

Today, more and more students have the opportunity to be engaged in creative activities by using ICT, mainly outside school, externalizing, sharing, developing, and refining their thoughts, ideas, and insights in ways that cannot be accomplished with traditional tools. In Publication I, we conducted a theoretical investigation into the types of computer-based learning environments (CBLEs) that may promote the development of primary-school students' creative thinking inside and outside school. In addition to undertaking a theoretical investigation, we analysed empirical data derived from a survey conducted in January

2010 among 542 Greek primary-school students from the 4th, 5th, and 6th grades.

4.1.1 Main findings of Publication I

The theoretical investigation of the CBLE generations and their correlations with learning theories revealed that constructivist CBLEs, which are based on *Virtual Reality*, have the potential to promote students' creative thinking and enhance the accessibility and availability of learning resources because (a) they are compatible with the everyday life of an "average" primary student who is already an intensive ICT user, (b) they offer students learning environments that demand problem-solving and decision-making schemata, and (c) computers can be seen as both a tool and a medium for higher-order engagement of students in creative processes.

The empirical investigation drew attention to the growing gap between computer usage inside and outside primary school. Our analysis revealed that this gap has two dimensions, a quantitative and a qualitative one. On the one hand, it is quantitative because (a) students have more access to computers in their homes than in their classrooms, and (b) the use of computers in their homes is growing faster. On the other hand, it is qualitative because students have access to more powerful and state-of-the-art computers outside school. Furthermore, the gap between the use of computers inside and outside school is characterized not only by the frequency of use and by the type of software and hardware, but also by the style of interaction. Primary-school students reported that they learn creatively how to use computers mainly outside school, through exploratory learning by *trial and error* and *learning by doing*.

Based on the empirical and the theoretical investigation, we specified the following criteria for the evaluation and development of CBLEs that could foster students' creative thinking within the framework of primary education:

1. An open design with non-predetermined, dynamic human–computer interactions.
2. The support of synchronous and asynchronous, non-predetermined interaction between users.
3. Joyful, motivational, and transformational learning experiences.
4. Real-world, meaningful, open-ended, and challenging tasks and problems.
5. Constructive assessments.
6. An emphasis on collaboration and teamwork.
7. More opportunities for feedback, reflection, and critical thinking.
8. The utilization of multimodal representations.
9. The absence of symbols and an almost invisible interface environment.

The study concluded that, today, primary-school students of 4th, 5th, and 6th grades are intensive computer users and that primary education could utilize selected CBLEs that meet the aforementioned criteria in order to promote stu-

dents' creative thinking through meaningful, open-ended, and motivational activities.

4.2 Publication II

ICT has transformed the way we think. This has created excitement about the prospects of enhanced thinking, as well as scepticism and confusion about the role of ICT in education. In Publication II, (a) we presented selected findings of a survey on the beliefs of teachers regarding creativity, problem solving, and ICT, (b) we examined various types of thinking needed in problem-based learning (PBL) as well as in online or distributed problem-based learning (dPBL), and (c) we identified ICT-supported and non-supported stages of thinking for learning.

Naturally, any effort to foster students' thinking skills, with or without ICT as a facilitator, should consider the role of teachers. How suitably educated, trained, and informed are teachers for teaching thinking? How well can teachers demonstrate thinking skills, habits, and dispositions? We investigated these questions based on data collected from a survey that posed questions on, among other things, creativity, ICT, teamwork, and problem solving to 62 prospective and 70 in-service Greek primary teachers (N=132). The research instrument used was the Teachers' Conceptions of Creativity Questionnaire (TCCQ; see Appendix 2).

4.2.1 Main findings of Publication II

The majority of participating teachers reported that ICT could liberate students' creative potential. Two out of three participating Greek in-service and prospective teachers supported the view that problem-finding is a more creative process than problem-solving and that a creative person tends to be a very questioning person. Almost all the participants said that teamwork and collaborative learning facilitate collaborative creativity, which, according to them, is more important than individual creativity.

Based on these findings, we presented facts and critiques on educational ICT-facilitated PBL tools. We pointed out that the creative and critical aspects of ICT-based PBL that lead to reflective thinking are under-researched issues within contemporary pedagogy. There are limited research results regarding the consequences of creative – or otherwise innovative – programmes, and there are few reports on curricula constructed according to PBL principles.

The new term *manifold thinking* was introduced for the first time in this conference paper (Publication II) in order to capture the combination of four fundamental types of thinking (creative, critical, caring, and reflective) required and acquired in problem-focused education and learning. The authors illustrated the role of ICT and educators in this type of learning, discussed the inter-

actions, and outlined desirable features for future ICT tools to support the teaching of manifold thinking and the development of manifold-thinking skills.

4.3 Publication III

Creativity is a key education target of the Greek Cross-Thematic Curriculum Framework for Music (CTCFM). More specifically, CTCFM proposes a spiral model for music education that consists of three musical–educational constructs: creativity, performance, and evaluation. Within this cross-thematic framework, students are regarded not only as learners and performers but also as creators of music. Accordingly, specialized music teachers are regarded not as transmitters of knowledge but principally as facilitators of creativity in students.

However, the literature review conducted for the purposes of this conference paper (Publication III) revealed that the majority of music teachers struggle to cope with their dual identity as artists and educators, and, in general, they lack pedagogical skills because they have been trained mainly as artists rather than educators. Music teachers constitute a special category of Greek primary teachers because they teach only one school subject, in which creativity is considered to be a key target, compared with "general" teachers who are required to teach several school subjects.

The basic aim of the study that led to Publication III was to answer the following research questions: "*What are music teachers' perceptions and implicit theories of creativity?*" and "*How do music teachers feel regarding their training as facilitators of creativity in students?*" In this study, 168 Greek primary music education teachers were surveyed using the MTCCQ (see Appendix 4), which provided qualitative and quantitative data.

4.3.1 Main findings of Publication III

The data analysis revealed that the participants interpret creativity in personal terms, formulating a variety of implicit theories. More analytically, with regard to the first research question, the majority of the participants reported that creativity is a key factor for personal and social progress, that it can be developed in everyone, and that it is not a rare phenomenon in school settings. However, according to the participants, Greek primary schools do not offer enough opportunities, infrastructures, and time for the expression and enhancement of students' creative thinking.

With regard to the second research question, the data analysis showed that the participating music teachers do not feel confident enough and adequately trained to act as facilitators for students' creativity. As a result, they face stress and frustration when they strive to implement the CTCFM and facilitate students' creativity without the appropriate training and means. However, two out of three music teachers reported that they feel confident in assessing the

creative products and performance of students, and one out of two feel that they are able to serve as a role model for creativity.

We also investigated music teachers' perceptions of school subjects in which primary-school students are likely to manifest their creativity. The data analysis revealed that the participants hold the narrow view that creativity is manifested principally in "artistic" school subjects. In contrast, creativity research concludes that "*…although creativity is often associated with the creative and performing arts, opportunities for developing learner creativity exist across the curriculum*" (Craft, 2003, p. 119).

4.4 Publication IV

In this journal paper, the main objective was to highlight primary teachers' conceptions and implicit theories of creativity. We utilized the methodology of a survey attempting to answer the following research questions:

1. What are the conceptions and implicit theories of creativity of the in-service and prospective teachers in general?
2. What are their conceptions and implicit theories of creativity in the context of primary education?
3. How adequately trained and equipped do the participant teachers feel to undertake a constructive role in the fostering of students' creative-thinking skills?

The instrument used was the Teachers' Conceptions of Creativity Questionnaire (TCCQ; see Appendix 2), which consisted of Likert-type, multiple-choice, and open-ended items that provided qualitative as well as quantitative data. The sample was made up of 62 prospective and 70 in-service Greek primary teachers (N=132).

4.4.1 Main findings of Publication IV

The data analysis revealed that teachers hold contradictory views of creativity and formulate various implicit theories around it. In general, participating teachers (a) showed positive attitudes and views about creativity, (b) reported a desire to foster students' creative thinking, (c) expressed a lack of confidence about their training in the fostering of creative thinking, and (d) emphasized the numerous inhibiting factors they face when they try to foster students' creative thinking in real classrooms, such as extensive and inflexible curricula and a lack of time, resources, and suitable infrastructures.

More analytically, with regard to the first research question the analysis showed that the participants consider creativity to be a key factor for personal and social progress that can be developed in every person. However, the par-

ticipants reported a discrepancy between theory (education policy, curricula, textbooks, and so on) and practice in real classrooms. In theory, students could express their creative potential in many domains and in many ways. In practice, however, they have the opportunity to fulfil their creative potential only on limited occasions and in artistic school subjects such as Music Education.

With regard to the second research question, the majority of the participants reported that Greek state primary schools do not offer sufficient opportunities and means for students to express and develop their creative thinking. Furthermore, it was emphasized that current curricula and textbooks do not allow students to express their creativity mainly because these do not leave enough time for creative activities. In addition, there was a noticeable agreement of views regarding the need for more hands-on activities in fulfilling students' creative potential.

Through this survey, we also attempted to investigate prospective and in-service teachers' perceptions of "creative school subjects". As in the previous study (see Publication III), our data analysis revealed that the vast majority of prospective and in-service teachers share the narrow view that creativity is manifested only through the Flexible Zone (see section 1.6.3.2, p. 31) and artistic school subjects that constitute *Aesthetic Education* (Music, Drama, and Arts Education). This linking of creativity to artistic school subjects offers two explanations for the observed failings of Greek teachers in fostering students' creative thinking: (a) these school subjects are taught in Greek primary schools mainly by specialized teachers (e.g. musicians), and (b) less than 10% of school time is devoted to these "creative" school subjects.

With regard to the third research question, the data analysis revealed that the vast majority of teachers who participated in the survey believe that within the teacher's role lies the responsibility to foster students' creative thinking. Yet, the majority of the participants reported that they do not feel adequately trained or equipped to help students to fulfil their creative potential. As a result, teachers reported that they often experience stress, frustration, and dissatisfaction. These negative feelings must be addressed immediately and in a direct and systematic way by policymakers and education authorities, because such concerns not only influence teachers' job satisfaction but are also related to the successful fostering of student's creative thinking.

4.5 Publication V

The previous studies (publications II, III, and IV) indicated clearly that primary teachers do not feel adequately trained to act as facilitators of students' creativity, owing to incomplete initial education and in-service training. In the open-ended items of the Teachers' Conceptions of Creativity Questionnaire and Music Teachers' Conceptions of Creativity Questionnaire (see appendices 2 and 4), prospective, in-service, and music primary teachers proposed e-learning as one

of the most promising techniques for in-service teacher training, and they emphasized the need for substantial collaboration between primary teachers. However, such collaboration requires skills, understanding, and commitment (Mardell, Otami, & Turner, 2008, p. 121).

Based on the assumption that the appropriate e-learning environments can be used for updated and flexible in-service training on collaboration and creativity, we conducted an action-research study in order to investigate the following research question: "*What tools, methodologies, techniques, and practices can support the collaborative creativity of multidisciplinary teams for virtual-knowledge working?*"

Ethnotechnology was found to be the most suitable approach to study *human–human* and *human–computer interactions,* collecting and analysing quantitative and qualitative data through an online teacher-training programme entitled the *Project Method e-Course.* This e-course was implemented on the e-learning platform of the Greek School Network (www.sch.gr/en) through the *Moodle* learning management system (www.moodle.org), utilizing online collaborative tools such as blogs, wikis, and videoconferencing. In all, 121 Greek primary and secondary teachers and 7 e-tutors participated voluntarily in this action-research study.

4.5.1 Main findings of Publication V

Based on two pre-existing frameworks, *Collaborative e-Learning* (Lambropoulos, 2009) and *Six Thinking Hats* (de Bono, 1986), we developed the *Hybrid Synergy* analytical framework in order to facilitate meta-cognitive awareness and collaborative creativity in e-learning environments. Hybrid Synergy comprises a multilevel analytical framework for cost- and time-effective *virtual-knowledge working*.

The first level of Hybrid Synergy refers to mere information provision; the second level denotes the social aspect of collaboration such as emotions and social cues. The third level refers to creative ideas, and the fourth indicates the evaluation and assessment of creative ideas. Lastly, the fifth level refers to the meta-cognitive aspects of creative collaboration, such as overviews, summaries, and task allocations. These five levels are not predetermined, and each e-team of knowledge workers can use the Hybrid Synergy levels in many different sequences depending on the issue at hand.

The data analysis indicated that the proposed Hybrid Synergy analytical framework facilitated collaboration between the e-learning participants and provided opportunities for the active expression of key components of creativity, such as intrinsic motivation, imagination, originality, productivity, and evaluation. However, the utilization of the Hybrid Synergy analytical framework requires, among other things, mutual respect and trust between members of the e-team.

4.6 Publication VI

Recent years have seen an increase in the global interest surrounding several aspects of human creativity. In this journal paper, we took a critical stance in attempting to answer the key question: How holistic do we investigate and understand human creativity and its consequences? For instance, the *bright side* of creativity appears to dominate relevant scientific research, although creativity also has its *dark side*, where the creator intends to harm, hinder, harass, destroy, or achieve unfair advantages.

The serious problems that humankind faces, such as global warming, have triggered an increasing interest in the consequences of human creativity and have led creativity research down new paths. We followed these new research paths by conducting literature research into 36 explicit definitions and 120 collocations of creativity in order to determine whether they place equivalent emphasis on the positive/negative aspects of the concept itself.

4.6.1 Main findings of Publication VI

According to the thematic analysis of our data, the following key components of human creativity lie at the intersection of the examined definitions:

1. Creativity is the ability of one or more *individuals*.
2. Creativity presumes an *intentional activity* (process).
3. The creative process occurs *in a specific context* (environment).
4. The creative process entails the generation of *product(s)* (tangible or intangible).
5. The creative product(s) must be *novel* (original, unconventional) and *appropriate* (valuable, useful) to some extent, at least for the creator(s).

The data analysis also revealed that the negative aspects of creativity are emphasized neither in its numerous definitions nor in its abundant collocations. However, creative outcomes may range from the most positive (e.g. the invention of new medicines) to the most negative ones (e.g. the development of weapons of mass destruction). Even when some definitions explicitly link creativity with value (see for instance the definitions provided by the NACCCE, 1999, or by Selzer & Bentley, 1999), any discussion of what is of value is limited or absent. Therefore, we argue that ethical dimensions of creativity should be explicitly stated in its definitions and that the relevant epistemological issues should be discussed (see also Craft, 2001, 2003; Gibson, 2005). Moreover, we propose such a definition of human creativity within the framework of education (see section 5.2, p. 91).

We also discuss the need to answer key questions about human creativity and its consequences, such as “Who should benefit from creativity and innovation?”, “How can we avoid using creativity for destructive purposes?”, and

"How can we encourage the ethical expressions of human creativity?" To analyse and reflect on the consequences of human creativity, we propose a three-dimensional analytical framework based on the principles of *manifold thinking* (see Publication II). The three axes of this framework represent (a) the intentions of the creator, (b) the effects of the creative process and outcomes for the creator, and (c) the consequences of the creative process and outcomes for others.

Finally, we point out the need to move to a new era of *conscientious creativity* in which it is considered that all humans have the ability and wisdom to *create something ethical* and useful for everyone.

4.7 Publication VII

In this journal paper we presented results from a qualitative study in which we collected, classified, and critically discussed Greek primary teachers' recommendations for a more creative-aware and creative-in-practice primary education. Our basic aims were not only to provide a comprehensive and comprehensible list of recommendations but also to establish an improved understanding and new communication channels between creativity researchers/theorists and teachers/practitioners.

4.7.1 Main findings of Publication VII

Teachers' recommendations for creativity were classified into three broad categories: the features of the *creative teaching and learning process*, the common *traits of the creative student,* and the *characteristics of the creative environment*. The thematic analysis of participating teachers' recommendations revealed that they place emphasis mainly on the factors of the school environment that inhibit the fostering of creative thinking, such as an absence of appropriate infrastructures and a lack of time for creative activities. In other words, the participants mainly seem to advocate the *barrier model* (Ripple, 1999), namely that creative potential is inherent in everyone and, therefore, that formal education needs only to remove the barriers to its fulfilment. On the other hand, the literature review I conducted (see section 3.2 p. 64) revealed that creativity researchers put emphasis mainly on the *deficit model* (Ripple, 1999), which assumes that students' creative thinking must be fostered through appropriate instruction and training.

Although creativity researchers and primary teachers have provided numerous recommendations for the fostering of creative thinking through education, only a small number of these recommendations are student-centred, and even less are student-oriented or student-originated. Thus, we argue that creativity recommendations for primary education should be derived through interaction and collaboration between researchers, teachers, *and* students.

The data analysis also revealed that creative thinking could not be fostered effectively through formal education without a clear-cut theoretical framework

and guidelines that can be easily followed by all teachers, taking into considerations the constraints of the primary-school environment.

Finally, we propose five fundamental but so far unheeded creativity recommendations and suggest further research on this promising research topic.

4.8 Contribution to collaborative publications

The seven original publications that constitute this dissertation were co-authored with other researchers and were products of intensive and multidimensional collaboration. This was a conscious decision because I strongly believe in the power of collaboration and the role of others in any creative endeavour.

Publication I is a journal paper based on a published conference paper (Kampylis, Fokides, & Theodorakopoulou, 2007) that I presented to the British Computer Society International Conference – INSPIRE XII in Tampere, Finland. The journal paper consists of a theoretical investigation, conducted by all the co-authors, and an analysis of empirical data collected on January 2010 through questionnaires. I coded and analysed the data through *SPSS Statistics 15.0* and wrote primarily the "Introduction", "Empirical investigation", and "Discussion" sections. Emmanuel Fokides contributed further to the article by writing the sections entitled "Learning principles and human–computer interaction" and "CBLE comparison and evaluation". Maria Theodorakopoulou contributed further to the paper by adding text to the section entitled "Learning principles and human–computer interaction". The "Conclusions and further research" section was written after close collaboration with all the co-authors. Moreover, all the co-authors commented and reflected on each other's compositions.

Publication II was the outcome of long discussions, reflections, thought exchanges, and strong collaborations between all the co-authors. The main contribution of this conference paper was the proposed *manifold-thinking* framework, namely an integration of creative, critical, caring, and reflective thinking. The final paper was written so that each author is responsible for two of the thinking types that constitute manifold thinking: Valtanen dealt with critical and caring thinking, Berki with critical and reflecting thinking, Theodorakopoulou with caring and reflective thinking, and I with creative and reflective thinking. I also wrote the main text of the second section of the paper ("On creativity and ICT influence"). Each author also commented and reflected on one another's texts and on the paper as a whole. Juri Valtanen and I co-presented the paper to the IADIS International Conference e-Learning 2008 in Amsterdam.

Publication III was based on empirical data that I collected (through the MTCCQ; see Appendix 4), then coded and analysed using *SPSS Statistics 15.0*. The co-author, Maria Argyriou, contributed mainly in the collection of the questionnaires and to the introductory part of the paper. In addition, she commented on the paper as a whole and with me co-presented the paper to the Sec-

ond European Conference on Developmental Psychology of Music at Roehampton University, London, UK.

Publication IV was based on empirical data that I collected (through the TCCQ; see Appendix 2), then coded and analysed through *SPSS Statistics 15.0*. I wrote the main text of the "Introduction and background", "Method", and "Research findings" sections of the paper as well as parts of the "Discussion" and "Further research and conclusive remarks" sections. Nevertheless, the final appearance of the paper was the result of a productive collaboration between all co-authors. The co-authors contributed to the paper by reflecting upon and discussing the development of the questionnaire, the data coding and analysis, and the paper structure. Eleni Berki contributed further by writing part of the "Discussion" and "Further research and conclusive remarks" sections. Pertti Saariluoma contributed further to the "Discussion" section.

Publication V was based on empirical data collected through a teachers' e-training project on collaborative creativity. The proposed *Hybrid Synergy* analytical framework was developed by Lambropoulos and me, after close collaboration and an exchange of thoughts. In fact, the framework was a synthesis of collaborative learning (Lambropoulos' Ph.D. research topic – see Lambropoulos, 2009) and creative thinking (the topic of my Ph.D. research). The framework was further developed and tested through the e-training project with the contribution of the other co-authors. The co-authors contributed mainly to the development of the e-course and to the collection and analysis of qualitative and quantitative data. However, the specific book chapter (Publication V) was written in the main by Lambropoulos and me; the other co-authors also commented and reflected on the book chapter as a whole.

Publication VI was based (a) on an unpublished essay about the philosophical dimensions of creativity, which Juri Valtanen and I had co-authored, and (b) on data I collected through the literature research and analysed through *NVivo 5.0*. The proposed three-dimensional *Creativity Consequences Analytical Framework* was developed and conceived primarily by me. The "Discussion" and "Conclusions" sections were the outcome of extensive collaboration between Juri Valtanen and me. In this particular journal paper, although they did not participate as co-authors, Eleni Berki and Maria Theodorakopoulou offered valuable feedback and insights.

Publication VII was written in collaboration with Pertti Saariluoma and Eleni Berki and indicated the closing of this Ph.D. research circle. This journal paper was based on qualitative data that I collected (from focus-group discussions), transcribed, coded, and analysed (through *NVivo 5.0*). The final classification of Greek primary teachers' recommendations was the result of many discussions among the three of us. The co-authors also contributed by writing part of the "Discussion" and "Conclusions and future work" sections and reflecting and commenting on each other's contributions. Therefore, the final text was the outcome of the collaborative efforts of all the co-authors.

5 DISCUSSION

The primary teachers who voluntarily and actively participated in this mixed-methods research pointed out that the fostering of students' creative thinking should be a salient part of education in general and schooling in particular. Throughout research levels A (survey), C (action research), and D (focus groups), they openly expressed their situated knowledge, feelings, anxieties, frustration, needs, and hopes about the fostering of students' creative thinking. Their viewpoints are extremely valuable because they interact daily as professionals with students and, accordingly, have first-hand experiences of what really happens in primary-school classrooms. In the following sections, I present the combined research outcomes in reference to the three research questions of this study.

5.1 Research question 1

The basic aim of this study was to answer the question "What are Greek primary teachers' conceptions and implicit theories of creative thinking?" The literature review I conducted (see Publication IV) revealed that there is a shortage of studies regarding teachers' conceptions and implicit theories of creativity and called for further research into this promising research topic. Moreover, numerous programmes and initiatives aim to foster students' creative thinking but, very often, do not take into account either teachers' situated knowledge, competences, and expertise or their weaknesses and needs. As a result, many such programmes and initiatives fail to achieve their targets and remain solely on paper (Kampylis, 2008a).

Greek primary teachers' conceptions and implicit theories of creativity are discussed analytically in publications III and IV and partially in publications II and VII. In general, teachers hold diverse and inconsistent implicit theories that are influenced by widespread misconceptions about creativity (see section 2.3.1, p. 51). As a result, in many cases, teachers do not attempt to foster students'

creativity, or they try to do so partially or in a wrong way. Thus, one of the main targets of this Ph.D. research has been to highlight the relationship between teachers' implicit theories and conceptions of creativity and everyday practice in classrooms. The Greek primary teachers who participated in research levels A (survey) and D (focus groups) reported that, although they regard creativity as a key factor in personal and social progress, they do not feel adequately trained and sufficiently confident to foster students' creative thinking in real classroom settings. Furthermore, a number of them commented that their participation in this research was a rare opportunity for reflecting on their implicit theories of creativity and on the respective practices in classrooms.

Teachers concede that, in many cases, they do not implement the official Cross-Thematic Curriculum Framework and its provisions for enhancing students' creative thinking. In contrast, they often use external, photocopied educational materials as well as drill and practice routines. A typical example is the "creative" activity in which students are required simply to colour in a photocopied sketch (see Figure 3, p. 34). Teachers justify these practices by stating that they do not have the appropriate means, infrastructure, support, and training necessary to implement the official curriculum and its provisions for enhancing students' creative thinking. However, although the vast majority of the participants believe that the responsibility for these inhibiting factors lies mainly with the Greek education system, they report that very often they feel frustration, anxiety, and other negative emotions because they cannot adequately foster students' creative thinking.

On the other hand, the updated Greek Cross-Thematic Curriculum Framework (GPI, 2003) offers the opportunity to primary teachers to instruct the 10% of the syllabus in their own way, using their own teaching materials. Therefore, teachers have the power to incorporate extra creative activities, acting as facilitators of students' creative thinking and action. To draw an analogy, we can say that a teacher is like a bus driver: if s/he always follows the same route, the journey will be dull and the passengers will be bored. However, when s/he follows different routes and stops at interesting places, each of the passengers may find one is his/her favourite; the journey is thus characterized by interest and expectation. Nowadays, Greek teachers have the right to select at least one part of the "route"; they simply have to feel confident and daring enough to explore new routes, taking the risk that sometimes they may lose their way.

The participants in the survey and focus-group discussions reported that they do not have appropriate initial education and in-service training in creativity. Even prospective teachers who completed their university studies in 2006 reported that they did not attend relevant courses, although the fostering of creative thinking is regarded as a key education target in the applied Cross-Thematic Curriculum Framework (GPI, 2003). Moreover, in-service, prospective, and music teachers reported that they do not have easy access to updated research findings and reference books. As a result, their conceptions and implicit theories of creativity are shaped mainly by (a) personal experiences and interests, (b) their situated knowledge, (c) non-academic sources such as commercial

books and magazine articles, (d) the attendance of disconnected and sporadic seminars, (e) widespread misconceptions of creativity, and (f) interaction with colleagues.

Almost all the participants in the research levels A and D reported that their role as teachers embraces the promotion of students' creative thinking, which is regarded as a key factor in social and personal progress. On the other hand, only one out of two of the survey participants asserted that s/he was able to serve as a role model for creativity; this low figure may be due to inappropriate training. These findings highlight the need to distinguish between *teaching creatively*, *teaching for creativity* (see also section 1.2, p. 23), and *creative learning*. Craft (2005) considers *creative learning* as the middle ground between *creative teaching* and *teaching for creativity*. Jeffrey and Craft (2004) proposed a distinction between *teaching creatively* and *creative learning*, as the emphasis on the latter is placed on student behaviour rather than on the actions of teachers. Craft, Grainger, Burnard, and Chappell (2006) define creative learning as "*…significant imaginative achievement as evidenced in the creation of new knowledge as determined by the imaginative insight of the person or persons responsible and judged by appropriate observers to be both original and of value as situated in different domain contexts*" (p. 77).

Moreover, primary teachers reported that they face a contradictory theoretical framework that leaves them feeling confused: during their initial training, the emphasis is on *social constructivism* (e.g. Vygotsky, 1978), the applied Cross-Thematic Curriculum Framework is based on *interdisciplinarity* (Kousoulas, 2003), whereas *behaviourism* (e.g. Watson, 1958) and *instructionism* (e.g. Papert, 1993) remain the dominant paradigm in school practice. Last but not least, teachers identify inappropriate school spaces and infrastructures and a lack of sufficient funding as the main inhibiting factors in implementing creative initiatives in school.

5.1.1 Research sub-question 1a

Greek primary teachers can be classed into two broad categories: general teachers, who can teach all school subjects except foreign languages; and specialized teachers, who can teach only a specific school subject such as music or English. Besides their expertise, primary teachers can be sorted into two other broad categories regarding their teaching experience: novices, prospective or beginner teachers with less than two years of teaching experience; and experienced in-service teachers with more than three years' experience in primary-school classrooms. To investigate how the expertise and teaching experience of Greek primary teachers affect their conceptions and implicit theories of creativity, I collected data from prospective and in-service general teachers as well as from specialized music teachers.

This Ph.D. study confirmed previous research findings (Aljughaiman & Mowrer-Reynolds, 2005; Diakidoy & Kanari, 1999; Fryer, 1996) that teachers connect creativity mainly with the arts. Not only prospective and in-service teachers but music teachers as well (see publications III and IV) have reported

that the most "creative" school subjects are the artistic ones, namely Music, Drama, and Art. Moreover, in the open-ended items of the questionnaires as well as in the focus-group discussions, teachers expressed their frustration at the overemphasis on literacy and numeracy, since this leaves little room for the more "creative" school subjects, and they suggest that more hours per week should be devoted to Music, Drama, and Art.

However, my 15 years of experience as a general teacher and music teacher, as well as the literature review I conducted for this Ph.D. research, demonstrate that we can foster students' creative-thinking skills in all school subjects in every moment spent in class. The above misconception therefore requires caution because it connects the fostering of students' creativity solely to the neglected, yet important, artistic school subjects that constitute only a small percentage of school time.

Although I have separately analysed and reported the responses of in-service and prospective teachers (see publications II and IV) and those of music teachers (see Publication III), I have not yet conducted a comprehensive comparison of how their background and expertise (e.g. non-artists/artists) influence their implicit theories of creativity. I consider such a comparison to be a promising topic for further research (see section 6.3, p. 105).

5.1.2 Research sub-question 1b

The participants at research levels A (survey) and D (focus groups) reported that, although they encounter various barriers (e.g. ambiguous curriculum, lack of appropriate means, shortage of time), they try to engage students in creative activities such as role-playing, creative writing, musical improvisation, and teamwork in interdisciplinary projects. However, they consider that these creative activities do not take place as often as they would like and without specific planning. In other words, the fostering of creative thinking is not a clear education target that all teachers intentionally try to implement but rather is a superfluous and supplementary part of schooling.

The words of a teacher who participated in the survey (Research Level A) are quite enlightening:

> *I do not think that personally I have contributed to the fostering and developing of my students' creative thinking, even though I had to do! On the contrary, my target was always the measured cognitive outcome, the healthy emotional atmosphere in my class, and the development of students' self-esteem. If these three factors are preconditions for the fostering of creativity, then I have contributed, as far as possible, but I have not consciously used specific techniques for the development of my students' creativity.*

Taking into account the responses of in-service, prospective, and music teachers to the questionnaires (N=300, see Research Level A) and the relevant discussions in the focus groups (N=21, see Research Level D), I argue that those teachers who do not intentionally try to foster students' creativity do so mainly because they lack the appropriate training. It is characteristic that only one out of four participants in the survey (28.5%) reported that they feel adequately

trained to promote students' creative thinking, while almost the same percentage (26.9%) did not know or did not want to answer this specific questionnaire item. Around half of the participants (44.6%) stated that they do not feel adequately trained to foster students' creative thinking. Thus, another emergent research sub-question was the following: "In what ways should primary teachers be trained and supported in their key role in fostering students' creative thinking?"

The teachers who participated in this research frequently stated that they would like effective and updated initial education and in-service training on how to foster students' creative thinking. However, as I have already mentioned repeatedly, teachers hold various and, in many cases, inconsistent implicit creativity theories, and they adopt, unintentionally, many widespread misconceptions about it. The problem is that "*…false beliefs are in essence even worse than ignorance. If we are ignorant we normally can do nothing but doing nothing is often better than making serious errors as a consequence of false beliefs and presuppositions*" (Saariluoma, 1997, p. 24). Therefore, my thesis is that informing primary teachers about the conclusions of contemporary creativity research and requiring them to attend a number of intensive courses and training is insufficient. They also need to revise their inconsistent implicit theories through conceptual change (Vosniadou, 2007; Saariluoma, 2005) within the framework of continuous retraining and reflection on their practices.

Runco (2004a) pointed out that "*…creativity may contribute to the effectiveness of a teacher. In this case, it is not teachers as influence on creativity but creativity as influence on teaching*." (p. 671). The participants in this study (research levels A, C, and D) reported that creativity is not only a key education target but also a key competence for a professional teacher. A number of them went further by proposing that creative thinking should be a key employability prerequisite for primary teachers.

Moreover, the participants proposed a variety of training models, such as e-training, communities of practice, focus groups, peer-training, workshops, seminars, conferences, internet portals, and model-teaching by school advisors. The common element in all teachers' proposals for up-to-date initial education and in-service training is the need for reliable, feasible, and practical training based on theory although derived from practice.

5.2 Research question 2

According to Runco (2007a), creativity is not synonymous with intelligence, originality, innovation, or invention, even though it plays a key role in each. Distinguishing between what is and what is not creativity is necessary because, as Runco (2007a) underlined, "*…we can fulfil creative potentials if we are specific about what is involved*" (p. 410) and try intentionally to reinforce them. Thus, the second research question was: "What kind of creativity should teachers promote within the framework of primary education, and why?"

As Weiner (2000, p. 9) pointed out "… *there is an operating definition of creativity in our culture that rarely seems to require elaboration. In the writings on creativity and in everyday speech, the dominant view seems to express the following salient features:*

1. *It involves bringing something new into being.*
2. *It is possible in virtually any domain of human activity.*
3. *It is potentially achievable by anyone, anywhere.*

Furthermore, this definition implies an evaluation:

4. *Creativity is good.*
5. *Individuals, who are creative, are open, flexible, willing to take risks.*

Freedom, democracy, and tolerance encourage greater creativity, and creativity strengthens society."

There is a near-consensus among researchers (e.g. Plucker et al., 2004) that the two characteristics that lie at the intersection of the definitions of creativity are novelty and usefulness. Therefore, creativity is most frequently defined as "*…the ability or the process of producing something new and useful*" (Aleinikov, 1999, p. 840). However, research in the field of Artificial Intelligence (Cohen, 1999; Schank, 1988; Schank & Cleary, 1995) has shown that originality and productivity are not the sole elements of creativity. It also requires appropriateness and values at the personal and/or social level (Dollinger, Burke, & Gump, 2007; see also Publication VI). Therefore, this general definition does not fit everything; it simply provides the basis for more specific and context-related definitions. In addition, the general definition of creativity as the production of something new and valuable applies mainly to adult creativity, because children are more likely to produce something original simply for their families or peers rather than something really innovative and of value to a wider audience (Cohen & Ambrose, 1999). Thus, this general definition is not functional for those concerned with creativity in the classroom, nor does it apply to *everyday* or *little-c creativity* (e.g. Craft, 2001b), which is expressed by adults as well as children.

Thus, I propose the following comprehensive definition of human *creativity* within the context of primary education, based on the definitions provided by teachers in the questionnaires (see publications II, III, and IV and appendices 2 and 4) and on the conducted literature research (see Publication VI):

> *Creativity* is the general term we use to describe an individual's attitude to, ability for, and styles of *creative thinking* that leads to a *structured*, *intentional*, *meaningful,* and *open-ended activity*, mental and/or physical. This activity may be personal and/or collective, occurs in a specific space–time, political, economic, social, and cultural *context*, and interacts with it. The creative activity aims to realize the *creative potential of the creator(s)*, leading to tangible or intangible *product(s)* that is (are) *original*, *useful*, and *desirable*,

at least for the creator(s). The creative product(s) should be used for ethical and constructive purposes.

This definition emphasizes several important aspects of human creativity. For instance, it declares that creative activity might be personal and/or collective. *Collective creativity* is the term I use to describe the common efforts of two or more individuals to achieve a creative outcome(s) that cannot be achieved by a single individual alone. There are remarkable differences between personal and collective creativity (Mamykina, Candy, & Edmonds, 2002) that should be taken into account, such as the role of each individual, the sociocultural contexts, and the team dynamics. Collective creativity might be:

1. *Collaborative*, when the individuals work together during the creative process.
2. *Cooperative*, when the individuals work separately on different parts of the creative process.
3. *Mixed*, when the individuals work together on some part(s) and autonomously on some other part(s) of the creative process.

Moreover, the proposed definition emphasizes the ethical and constructive dimension that should characterize creative thinking and action, at least within educational settings. I strongly agree with Barnes et al. (2008, p. 133) that we should ensure that the creative potential of today's students and tomorrow's citizens is used for the common good and for solving the major problems of humankind:

> *Creative teaching and learning must be set in a wider context of shared values. It can be put to good or bad purposes. Before embarking upon any creative journey in schools we need first to discuss, agree and document what we believe is good, and right, and true, and beautiful. This is not as difficult as it sounds in a school setting, but ensuring that creativity is used for the good of all is a major challenge for the future of our world.*

A number of participating teachers in the focus-group study (see Research Level D) reported that they very often encounter negative dimensions to students' creative thinking and performance. According to the teachers, the most common ways that primary-school students utilize their creative abilities for negative ends are the following:

1. Creative ways to avoid tasks in the classroom.
2. Imaginative excuses for incomplete homework.
3. Inventive ways to cheat in tests and exams.
4. False stories that they concoct in order to attract the attention of teachers or parents.
5. Ingenious ways of manipulating classmates, parents, and grandparents.
6. Innovative ways to mock classmates and teachers.

Recently, several researchers have looked at the negative aspects of creativity (for a review of the relevant literature, see Publication VI) and have called attention to the role that teachers should play to orientate students' creativity to ethical and constructive ends.

The participants also stressed the need to take seriously students' perceptions and needs before attempting to foster their creative-thinking skills. They seem to agree instinctively with the view of Dewey (1897, p. 79), who more than a century ago declared the following:

> *…[E]ducation, therefore, is a process of living and not a preparation for future living… I believe that much of present education fails because it neglects this fundamental principle of the school as a form of community life. It conceives the school as a place where certain information is to be given, where certain lessons are to be learned, or where certain habits are to be formed. The value of these is conceived as lying largely in the remote future; the child must do the things for the sake of something else he is to do; they are mere preparation. As a result, they do not become a part of the experience of the child and so are not truly educative.*

Nowadays, Greek students have to deal not only with schooling but also with extensive out-of-school activities such as music lessons, dance lessons, foreign-language lessons, and sports activities. As can be seen in Publication I, students use largely different learning styles inside school, where their aim is to succeed in various exams mainly through memorization, and outside school, where they learn mainly by doing. Runco (2004a) has stressed that the expectations placed on young children to conform in the classroom (e.g. sitting quietly for many hours at their desks or thinking about topics chosen by the teacher and irrelevant to their own experiences) lead to the *fourth-grade slump* in creative thinking (Amabile, 1983; Runco, 1999a, 2004a; Torrance, 1968, 1981). This drop in creative thinking may reflect the surveillance, evaluation, reward, conformity, and competition that characterize many educational settings.

Therefore, students need an arsenal of thinking skills besides the creative ones. Participants in the focus-group discussions proposed the following 15 types of thinking, as well as various combinations of them, as being complementary to creative thinking: *critical*, *reflective*, *caring*, *divergent*, *analytical*, *convergent*, *practical*, *synthetic*, *aesthetic*, *emotional*, *ethical*, *exploratory*, *inductive*, *logic-mathematical*, and *systematic thinking*.

Creativity scholars (e.g. Sternberg, 2001) have pointed out the need for balance between change and continuity in all spheres of human activity. The present research concludes that the key aim of primary education should not simply be to foster creative thinking but holistic *manifold thinking* (see Publication II), a combination of creative, critical, caring, and reflective thinking, targeting personal and social progress. Therefore, we should stop overemphasizing the fostering of individual creativity without concern for its consequences to others and the environment and aim instead to foster a *conscientious creativity* (see Publication VI) that is guided by a sense of right and wrong.

5.3 Research question 3

Creativity researchers have put forward numerous recommendations for fostering creative thinking through schooling (see section 2.1.4, p. 42). However, these recommendations number more than 100, are fairly abstract and general, and lack empirical testing. Moreover, they are presented sporadically, mainly in scientific texts such as journal articles. Therefore, it is almost impossible for teachers (a) to be aware of all these recommendations, (b) to select the most appropriate for her/his needs, (c) to adapt them according to the reality in the classroom, and (d) to implement them in the framework of intensive curricula, demanding syllabuses, and strict timetables. I argue that researchers should collaborate with teachers in order to reach integrative, practical, reliable, testable, and concrete recommendations that can be implemented by "average" teachers in "real" classrooms.

It is well accepted (e.g. Fryer & Collings, 1991b) that teachers have valuable situated knowledge and experiences of fostering students' creative thinking in real classroom settings. Thus, the third research question asks what Greek primary teachers recommend for fostering students' creative thinking.

The teachers who participated in the survey and focus groups offered various recommendations (see Publication VII, especially Table 2) for the fostering of creative thinking within the framework of primary education. In general, their recommendations mainly fit with the *barrier model* (Ripple, 1999; see also Publication VII), which assumes that creative potential is inherent in everyone. Thus, primary education simply needs to increase students' awareness of their potential and remove the barriers to realizing that potential. Moreover, teachers' recommendations emphasize the inhibiting factors of the school environment, such as an absence of appropriate infrastructures, an extensive syllabus that leaves insufficient time for students' creative expression and a need for effective initial teacher education and in-service training in creativity.

My thesis is that teachers' recommendations deserve our attention because they derive from real classroom settings. However, they must be compared, contrasted, and merged with those proposed by creativity researchers, in order to determine similarities and dissimilarities and to reach a set of key recommendations that are practical, testable, and reliable for implementation in real classrooms.

6 IMPLICATIONS, SUGGESTIONS, AND CONCLUSIONS

6.1 Implications for school practice and policy

My Ph.D. research aims to connect creativity theory with educational practice and is based mainly on empirical data derived from the context of primary education. Consequently, the study implications concern school practices and policies. Creative thinking is considered essential for social and personal progress by the participants in this study as well as by creativity researchers (e.g. Guilford, 1967), policymakers (e.g. European Parliament, 2008), and organizations (e.g. QCA, 2005). However, many steps must be taken before truly creative and student-centred schools can flourish.

6.1.1 Implications for primary-school students

Almost all the great pedagogues and philosophers of education emphasize the importance of creative thinking in children's development. For instance, Piaget (1973; see also Cohen & Ambrose, 1999) claims that early childhood is the most creative period in life because this is when young children form understandings of the world. Primary schools strive to incorporate and put the theories into practice, "*…attempting to become more student-centred than teacher-centred, to connect the school to real-life situations, and to focus on understanding and thinking rather than on memorization, drill and practice*" (Vosniadou, 2001, p. 6).

However, several researchers (e.g. Alexander, 2004) raise questions about the substantial implementation of student-centred, constructivist approaches in real classrooms, arguing that student–teacher interaction is still dominated by *"...closed questions, brief answers which teachers do not build upon, phatic praise rather than diagnostic feedback, and an emphasis on recalling information rather than on speculating and problem-solving*" (Alexander, 2004, p. 21).

The Greek primary teachers who participated in my study seem to support this view, reporting a gap between the theory (e.g. Piaget's constructivist

and creative approach to learning) and the reality in primary-school classrooms. In addition, the constructivist and creative ways that students use for informal learning outside school (see Publication I) are rarely used within primary-school classrooms.

However, the participants at research levels A (survey) and D (focus groups) suggested several principles that they consider important in fostering students' creative thinking (see Publication VII), such as respecting students' individual differences and taking their suggestions and questions seriously. These principles correlate directly with those that are regarded as being essential to any learning process (e.g. Vosniadou, 2001) and therefore must be taken into account in any attempt to foster students' creative thinking.

6.1.2 Implications for primary teachers

The participants in the focus-group study expressed the view that "good teaching" and "teaching for creativity" are almost identical because they rely on the same fundamental learning principles (Publication I; see also Vosniadou, 2001). Participants also stressed that teaching is a highly creative occupation, and they consider themselves to be creative workers. Therefore, teachers should possess the key skills and dispositions that characterize a creative person (Chan & Chan, 1999; Diakidoy & Kanari, 1999), such as imagination, flexibility, curiosity, self-confidence, a willingness to take risks, meta-cognitive awareness, interpersonal intelligence, and divergent thinking. They also reported that they gain higher job satisfaction when their work environments complement the creative requirements of their profession (see also Shalley, Gilson, & Blum, 2000).

On the other hand, a number of participants in the survey and in the focus-group discussions reported that they rarely have the opportunity to reflect on their implicit theories and practices with regard to creativity. I hope that this dissertation will offer to a wider audience within education the opportunity to reflect on how and why we should foster students' creative-thinking skills. Teachers in particular should reflect on their professional responsibility to contribute to the enhancement of students' creative thinking. The most important thing for teachers is to understand that the fostering of creative thinking is not a new school subject that must be added to the syllabus, but something that requires a radical new approach to the way we treat and educate young people. The main concern for teachers must be to answer fundamental questions such as "What do I want my pupils to learn, and what is the best way for them to learn it?" and not just attempt to cover creativity superficially when planning lessons (Turner-Bisset, 2007). Therefore, I strongly agree with Saarilahti et al. (1999, p. 331) that

> *…whatever the challenges, creative thinking can and should be nurtured in every classroom. It is less a question of cultural differences than of individual teacher differences and priorities. It is less a question of time and knowledge than of values. Teachers who value creativity will find ways to identify and support it.*

In particular, teachers who value creative thinking and wish to foster it should attempt the following:

1. Establish *communities of practice*, exchanging thoughts, materials, good practices, and ideas for the fostering of creative thinking and action within classrooms (see Publication V).
2. Actively take part in life-long learning projects that enhance their professional expertise (see Publication V).
3. Implement a number of the recommendations for the fostering of students' creative thinking (see Publication VII).
4. Collaborate with colleagues, principals, education authorities, and creativity researchers, exchanging experiences, ideas, and good practices.
5. Utilize and create opportunities for creative, meaningful, and fun activities that engage all students (see, for instance, Kampylis, Berki, & Saariluoma, 2006).
6. Regard creativity as a key feature of all areas of the curriculum and of all school subjects (see Publication IV).
7. Demonstrate a willingness to take risks, test new approaches and techniques, and make mistakes.
8. Relinquish some aspects of "classroom control", leaving room for students to be actively involved and establishing a truly creative classroom atmosphere.
9. Express their own creativity, acting as role models for students' creative thinking and performance (see Publication IV).

6.1.3 Implications for primary schools

Any research on creative thinking within the framework of education should take into account classroom realities and techniques for coping with and transforming those realities (Perkins, 1990, p. 439). Through this dissertation, I have attempted to shed light on the classroom realities, based mainly on teachers' experiences and views. A major challenge for contemporary primary schools is to find innovative ways to utilize teachers' situated knowledge and experiences of and expertise in fostering creative thinking, such as establishing in-school training programmes. Moreover, schools should take initiatives for the dissemination of good practices in the fostering of students' creativity. The prerequisite for such initiatives is the establishment of a new school culture based on trust (Berki, Isomäki, & Salminen, 2007), respect, collaboration, and shared responsibility.

Very often, teachers, researchers, and other professionals involved in primary education draw attention to the increasing proportions of unmotivated students who display boredom and a lack of interest. All these lead, in many cases, to underachievement. Although several factors contribute to the problem of underachievement (Gari et al., 2000; Kim, 2008), engagement in creative and meaningful activities should be seen as part of the solution (Barnes et al., 2008; Kampylis, Berki, & Saariluoma, 2006).

Today, globalization has caused radical changes in almost every field of human activity, including education (e.g. Hartley, 2003). Societies such as Greece and Finland, which used to be characterized by broad homogeneity, have been evolving and becoming more multicultural. According to Burnard (2006) "*...to recognize the sociocultural and situated dimensions of creative activity strengthens the position of creativity in education*" (p. 317). Therefore, inclusive learning environments are required that respect not only individual differences with regard to creativity but also sociocultural distinctions.

Finally, schools must find ways to link the syllabus with meaningful, real-life activities that recognize students' emotions (Goleman, 1995; Spendlove, 2007), multiple intelligences (Gardner, 1983, 1993b), and their ability to use multimodal representations (Jewitt, 2008; Perner, 1991). The primary-school syllabus should leave room for hands-on, spontaneous, and less rigid learning experiences (Learning and Teaching Scotland, 2004).

6.1.4 Implications for policymakers and education authorities

Education in general, and schooling in particular, is political in the sense that it takes place in a particular sociocultural, historical, and economic context that reflects and satisfies specific political needs and intentions (McLaren, 2002). Policymakers recognize that creativity in education has been increasing in significance in the last 20 years (e.g. Craft & Jeffrey, 2008). It is therefore essential to investigate how the fostering of creativity could become part of public discourse. Such discourse is first of all political. Kaufman and Sternberg (2006) affirm that many governments value creativity in theory but that their actions belie their words because, in practice, even democratic governments seem to fear critical and creative thinkers. I argue that the recent interest of politicians in creativity stems from the needs of the modern capitalist economy (see also Banaji & Burn, 2006; Peters, 2009) and does not question substantial issues such as the consequences of human creativity on the environment (Gibson, 2005; see also Publication VI). The words of former UK prime minister Tony Blair (DCMS, 2001a) are fairly typical of how politicians conceptualize creativity as a commodity: "*…creative talent will be crucial to our individual and national economic success in the economy of the future*" (p. 3).

The vast majority of the Greek teachers who took part in this Ph.D. research reported such a discrepancy between the fostering of creative thinking in theory and practice and stressed its political dimension: "*Who has the responsibility for the fostering of students' creative thinking? For me, it is a political issue*" (quote from Focus Group A discussion). Some participants highlighted the fact that, today, when the global competition for talented and creative people has peaked (e.g. Florida, 2005), Greece does not seem to take advantage of its pool of creative people. The following quote from a Focus Group B discussion is characteristic: "*I believe that the wealth of a country is not its capital; the contemporary financial system does not depend on this but on creative people*".

Other participants emphasized that the policies related to creativity are incoherent and lack appropriate funding. In other words, the fostering of creativ-

ity in real classrooms has numerous financial implications and requires large investments. However, Greece still allocates 3% of its Gross Domestic Product (GDP) to education (Eurostat, 2008) despite many political announcements that this will be increased to 5%. In fact, education funding fell steadily from 3.9% of GDP in 2004 to 3% in 2009. At the same time, the EU average was 5.1% (Eurostat, 2008).

My thesis is that Greek policymakers and education authorities, such as curriculum designers, need to apply a completely new approach. They should first establish an open and comprehensive dialogue about why, when, and how we must foster creative thinking through formal education. Then, they should define creativity in the framework of primary education and provide examples of how to foster it in all curricular areas, formulating specific education targets. Lastly, they should design and implement appropriate programmes and initiatives in order to achieve these targets. In such a process, all members of the educational community should be involved, and the appropriate funding must be assured.

A similar process was followed by the UK policymakers and education authorities (NACCCE, 1999; QCA, 2005) and can be seen as an example of good practice. According to Craft, Cremin, Burnard, and Chappell (2008), a report by the British National Advisory Committee for Creative and Cultural Education (NACCCE, 1999) influenced all subsequent policies in England. For instance, the report formed the basis for the development of the policy framework for creativity by the Qualifications and Curriculum Authority (QCA, 2005). In addition, a range of organizations were funded through a variety of UK government departments in order to design and implement programmes for the fostering of creativity. For instance, the Creative Partnerships initiative (www.creativepartnerships.com) has released more than £150 million in the UK (Spendlove & Wyse, 2008; Wyse & Spendlove, 2007) to support creative learning in over 6,483 schools and other creative organizations, working with 940,479 young people, 90,536 teachers, and 54,023 parents on 8,520 projects (see Creative Partnerships, 2009, p. 7).

Several researchers (e.g. Perkins, 1990) have pointed out that the fostering of students' creativity correlates with the pre-service and in-service education of teachers because, among other things, it requires new styles of interaction between teacher and student. This dissertation reveals that teachers demand continuous, up-to-date, and comprehensive initial education and in-service training on how they should foster students' creative thinking. Recognizing the tremendous range of individual differences such as age, expertise, and experience, the teachers who participated in my research proposed various and innovative ways for initial teacher instruction and in-service training in creativity. They emphasized the need for reliable and practical training that based on concrete and unambiguous theoretical frameworks. Furthermore, findings from the e-training project (see Research Level C and Publication V) revealed that teachers could self-organize and self-regulate their training, utilizing ICT tools such as blogs, wikis, and videoconferencing. In conclusion, teachers call for multiple

training models and approaches, online as well as on-site, that integrate theory and practice.

Policymakers and education authorities must design and implement training programmes based not only on the conclusions of contemporary creativity research but also on teachers' needs and proposals. Furthermore, they should employ as trainers not only researchers and scholars but also teachers who have successfully implemented in classrooms programmes for fostering students' creative thinking. Finally, they should establish communication channels, such as internet portals, multidisciplinary journals, and advisory committees, between professionals from various fields involved in fostering students' creative-thinking skills.

In conclusion, despite the best intentions, as articulated in curricula and other formal documents (e.g. GPI, 2003), Greek primary education has a long way to go if the aspirations in fostering students' creative thinking are to be realized (Kampylis, 2008a). The participants in this study emphasized the urgent need for reforming curricula, syllabuses, textbooks, assessment procedures, and school timetables. Any initiative in this direction should seriously take into account the suggestions made by teachers and researchers and must be the outcome of direct, honest, and extensive dialogue. Policymakers and education authorities who acknowledge and address teachers' needs and proposals about fostering students' creative thinking may positively influence not only teachers' job satisfaction but also students' social and academic outcomes.

6.2 Implications for creativity research

The comparison between teachers' and researchers' recommendations for a more creative education revealed similarities as well as dissimilarities (see Publication VII). My thesis is that creativity researchers should seriously and systematically take into account teachers' implicit theories of creativity and their valuable situated knowledge and experiences. Moreover, researchers should test their theories in practice, establishing communication channels and collaborative projects between teachers and researchers.

I believe that interaction and collaboration between teachers and creativity researchers is an important branch of the creativity metascience, which I discuss analytically in the following section.

6.2.1 Towards a creativity metascience

> *[A]fter the distribution of particular arts and sciences, men have abandoned universality, or "philosophia prima;" which cannot but cease and stop all progression. For no perfect discovery can be made upon a flat or level, neither it is possible to discover the more remote and deeper parts of any science, if you stand but upon the level of the same science, and ascend not to a higher science.*
>
> Bacon & Montagu, 1852, p. 173

There is a consensus among researchers that human creativity is a complex, multifaceted phenomenon (Albert & Runco, 1999; Mumford & Gustafson, 1988; Runco, 2007a; Unsworth, 2001). However, it is studied mainly through unidimensional approaches that tend to consider a part of creativity as the complete phenomenon (Publication VI; see also Sternberg, 2005a; Sternberg & Lubart, 1996). Moreover, the analysis of the research data revealed that teachers consider the fostering of students' creative thinking as a complex process with cognitive, personal, social, cultural, economic, political, philosophical, and technological dimensions. Teachers stressed that they act within the framework of a specific sociocultural system and called for a holistic approach to creativity that will take into account all its parameters. For instance, teachers stated that lifelong training and educational reforms are key issues with apparent economic and political dimensions.

There appears to be a degree of agreement in the views of teachers and creativity researchers (Feldman, 1999; Floistad, 1993; Isaksen & Murdock, 1993; Isaksen, Murdock, Firestien, & Treffinger, 1993; Magyari-Beck, 1993, 1999) regarding the urgent need to integrate the findings of contemporary multidisciplinary research into a comprehensive framework. This framework may lead to a new multidisciplinary science that will study creativity in a holistic way, taking advantage of the findings of various research approaches and disciplines.

I strongly agree with Csikszentmihalyi (1988, p. 338), who stressed almost two decades ago that

> *…perhaps even more than new research, what we need now is an effort to synthesize the various approaches of the past into an integrated theory. … The systems approach demands that we become versed in the skills of more than one discipline. The returns in knowledge, however, are well worth the effort.*

Magyari-Beck (1993, 1999) has proposed, albeit without success, the term *creatology* for such an integrative and multidisciplinary science of creativity. However, I believe that today the conditions are mature enough for an integrative framework, which I call *creativity metascience*. Before addressing the basic features of the proposed framework, I would first like to explain the meaning of the term *metascience*. According to the *American Heritage Dictionary of the English Language*, the prefix *meta-* derives from the Greek prefix *μετα-* and assigns a compound, among other meanings, the sense of something *beyond*, *transcending*, *more comprehensive*. Moreover, the prefix *meta-* also gives the meaning of *transition*, the *passing to something new*, corresponding to the Latin prefix *trans-* (Berki, 2001; Mpampiniotis, 2002; Perner, 1991). In this sense, I define the term *creativity metascience* as a comprehensive new research framework that will integrate the findings offered by a number of existing independent disciplines (see Figure 10) for studying holistically the complex phenomenon of human creativity and for identifying ways to nurture it successfully with the aim of furthering personal and social progress.

The creativity metascience (Figure 10) incorporates antithetic features, as the construct itself does (Rothenberg, 1999), because (a) on the one hand, the creativity metascience depends on, acknowledges, and encourages independent

disciplines that comprehensively study specific aspects of creativity (analytical level) and (b) on the other hand, it is aimed at integrating the research outcomes of these disciplines, offering concrete, practicable, and reliable frameworks for understanding and nurturing it (synthetic level).

As can be seen in Figure 10, creativity metascience incorporates independent disciplines such as psychology and philosophy as well as composite sciences such as cognitive science and systems science. Creativity metascience may also be seen as a meta-model (Berki, 2001; Berki, Isomäki & Jäkälä, 2003; Berki et al., 2004) that integrates the various models offered from each science.

Creativity metascience is aimed at formulating, and answering holistically, key questions with regard to human creative thinking and activity, such as "Why do we want to foster students' creative thinking?", "How can we foster creative thinking?", "What other types of thinking are necessary for creative thinkers?", "How viable is the model of continuous creativity and innovation demanded by the global economy?", "Who should benefit from creativity and innovation?", "How can we use creativity to solve the current major problems of humankind?", "How can we avoid the use of creativity for destructive purposes?", "Why is ethics virtually absent from creativity and innovation discourses?", and "How can we educate people to use their creative thinking within an ethical framework?"

Teachers could contribute to this creativity metascience by offering valuable insights into and empirical data on their situated knowledge and experiences. On the other hand, creativity metascience could offer teachers comprehensive, reliable, and practical models for the fostering of creative-thinking skills.

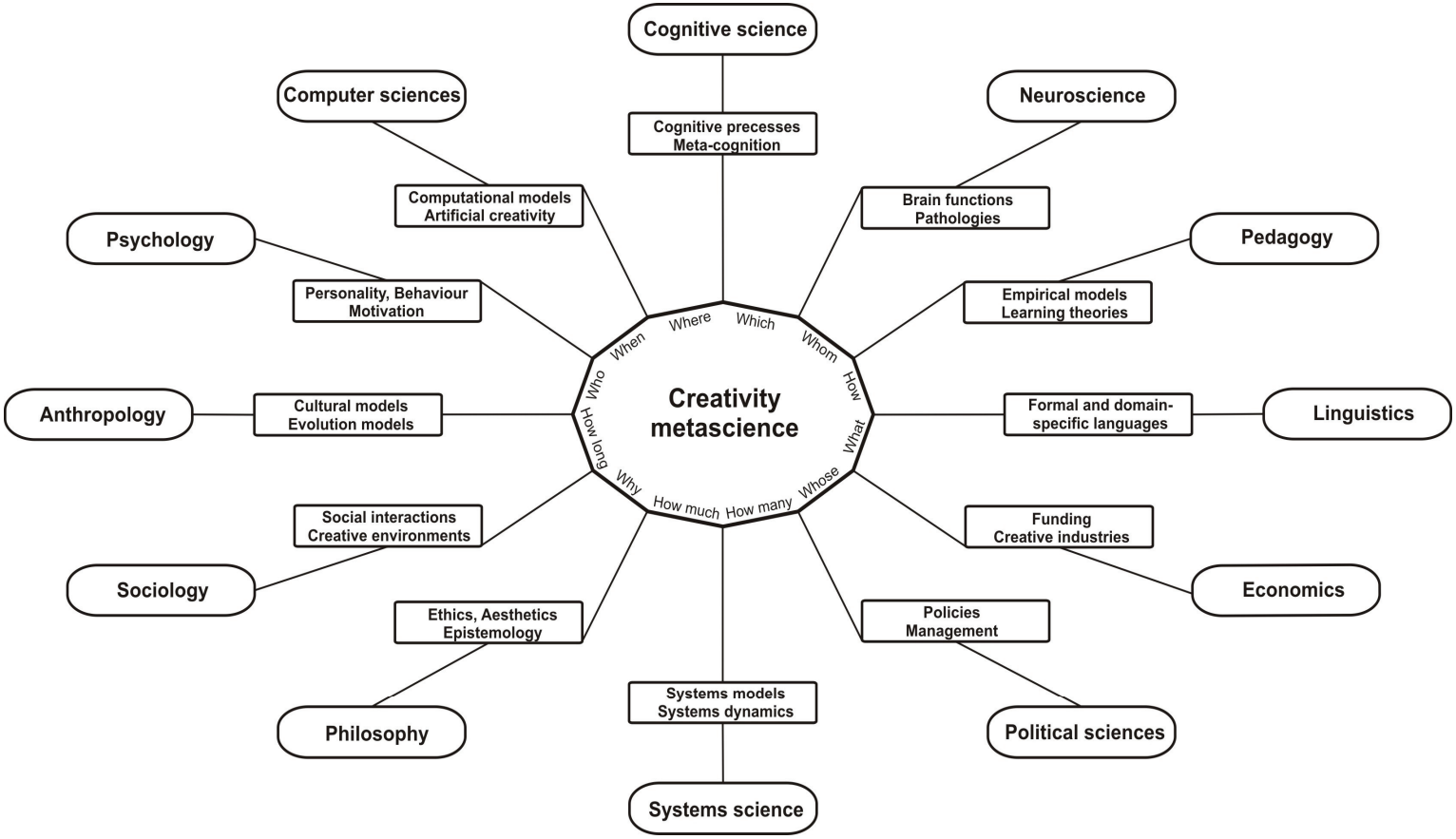


FIGURE 10 Creativity metascience and its disciplines

6.3 Suggestions for further research

Approaching the end of this research journey, I feel that as I spent more effort answering key questions regarding human creativity, more questions requiring answers emerged. In other words, I feel that this study has produced as many more questions as it may has answered. I hope that these questions will trigger prospective researchers to investigate further the political, theoretical, and practical dimensions of the fostering of students' creative thinking in real classroom settings.

Analytically, I believe that the following themes deserve further research:

1. Follow-up studies in the same framework, namely Greek primary education, but with larger, more representative samples, in order to verify and extend the research findings.
2. I investigated primary teachers' conceptions and implicit theories of creativity in a specific time framework. However, a longitudinal study of their conceptions may offer more data and concrete conclusions on how their thoughts on creativity change over time.
3. The participants in my study were in-service and prospective general teachers as well as music education teachers. Further research is needed in order to investigate and compare the implicit theories of primary teachers with different expertise (e.g. foreign-language teachers, physical-education teachers) and from different backgrounds (e.g. novice/experienced, urban/rural areas, basic studies/advanced studies).
4. Further research in other sociocultural and educational environments is needed for an investigation of the cross-cultural dimensions of teachers' conceptions and implicit theories of creativity.
5. This Ph.D. study examined primary teachers' conceptions of creativity and their contribution to the fostering of students' creative thinking. Since teachers interact within the framework of primary education with other groups such as parents, principals, school advisors, and education authorities, these groups' conceptions and implicit theories of creativity should also be investigated.
6. Primary-school students' conceptions and naïve theories of creativity should also be investigated.
7. Because I investigated the fostering of creative thinking only within the framework of primary education, the research outcomes are limited to this framework. However, creative thinking is not characterized by a specific period of our life but is a life-long process. Therefore, further research is needed in the frameworks of pre-school, secondary, and tertiary education.
8. Further research is also needed on the social and collaborative aspects of creative thinking, with the emphasis on the creative environment.

9. Another direction for future research is the examination of factors such as class size and school infrastructures on teachers' conceptions of creativity.
10. The skills and dispositions that teachers need in order to foster effectively students' creative thinking is another promising research topic.

6.4 Concluding remarks

My background as a Greek musician and experienced primary teacher certainly affected my perceptions, interests, and foci during the research process: what I chose finally to investigate, the methods I used, the analysis I conducted, the findings I highlighted, and the conclusions I formulated. Contemporary social sciences dispute the idea of a completely neutral researcher and acknowledge the effect of his/her background (e.g. Flyvbjerg, 2006).

According to Bowers (1995), creativity is "*…one of the most over used words in the educator's vocabulary*" (p. 41) and, as a metaphor, expresses what is regarded as the ultimate goal of education. However, the current ideal of creativity emphasizes the individual's needs and values, and this conceptualization of creativity should be "*…radically reconstituted in a way that decentres the individual as the primary creative agent of change*" (Bowers, 1995, p. 42).

A number of researchers (e.g. Craft, Cremin, & Burnard, 2008a) have also stressed that we tend to assume that creativity is "something good for all" even though it has also a dark side. Several models have been proposed for fostering creativity wisely, paying attention to the ends and not only the means (see Publication VI for a relevant review; see also Craft, 2006; Sternberg, 2001, 2003b). The creativity metascience I have proposed in this dissertation may contribute to this multidisciplinary effort because it is aimed at answering not only *how* can we foster creative thinking but also *why* we need to nurture it in the first place.

I believe that it is time to place the emphasis on a part–whole relationship between individuals and communities, with the ultimate goal of achieving an ecologically sustainable culture. The new ideal of creativity as a vehicle for renewing and sustaining communities heralds a new level of responsibility for teachers (Starko, 2005), who must help students to fulfil their creative potential for the sake not only of personal progress but social progress as well.

EPILOGUE

As a Ph.D. researcher, I had the freedom to choose what to include in and what to exclude from my study. I chose to investigate more deeply two issues I consider fundamental: the important role that primary teachers play (or should play) in the fostering of students' creative thinking, and philosophical arguments about the consequences of human creativity.

Without a doubt, teachers are responsible for many of the experiences that influence students' creative thinking and expressions of creativity, and, therefore, they as professionals possess the most valuable experience and situated knowledge of what really happens in classrooms. Through this study, primary teachers expressed not only their experiences and situated knowledge but also their anxieties and needs. They proposed insightful and practical ways to achieve a more creative primary education and emphasized the need for initial and in-service training in creativity for teachers. Primary teachers also stressed that, although educational discourse pays considerable theoretical attention to creative thinking, in practice it is not nourished or extended effectively enough. I strongly believe that primary teachers' experiences, situated knowledge, suggestions, and needs should be taken into account by policymakers, curriculum developers, and educational authorities in any attempt to foster creative thinking in students.

Even though it was not an initial goal of this study, many teachers reported that their participation in the survey and/or in the focus groups provided the stimulus to reflect on their own practices with regard to the fostering of students' creative thinking. I believe that this was a very important, albeit unplanned, outcome of this study because only aware and motivated teachers can achieve the ambitious targets specified in the curricula for the fostering of students' creative thinking.

Conducting the initial literature review, I realized that creativity research focuses mainly on *how* to foster creative thinking and not on *why* we have to foster it. I strongly believe that we must first answer why we want to foster students' creative thinking before identifying ways to do so effectively. In other words, it is important to reflect first on the philosophical dimensions of human creativity, analysing not only the positive but also the negative consequences that it might have.

Even after six decades of scientific research into human creativity, many key questions still require answers, and many new questions are still to emerge. In the social sciences, we do not set out to discover recipes or formulas that are "one size fits all". Humans are not predictable, and, therefore, we cannot investigate multifaceted phenomena such as creative thinking without reference to the contexts in which they occur. I hope that this study will inspire other researchers to investigate more deeply the role played by teachers in the fostering of students' creative thinking and in diverse cultural and educational contexts, within the framework of a creativity metascience. Finally, I hope that students, teachers, parents, researchers, school authorities, and policymakers will take advantage of the analytical framework of manifold thinking as a thinking tool for personal and social progress.

YHTEENVETO (FINNISH SUMMARY)

Luovaa ajattelua kehittämässä - Alakoulun opettajien rooli

Luovuudelle on viime aikoina ollut kasvavaa kysyntää lähes kaikilla ihmisen toimintaan liittyvillä alueilla. Alakouluopetus ponnistelee pysyäkseen näiden uusien sosioekonomisten tarpeiden tahdissa ja valmistellakseen luovia tulevaisuuden kansalaisia. Alakoulujen opettajilla on avainrooli oppilaiden luovan ajattelun kehittämisessä, joko positiivisella tai negatiivisella tavalla, mutta tähän liittyvää keskustelua on tutkittu rajoitetusti.

Kreikkalaisten alakoulujen opettajien tiedot ja kokemukset luovan ajattelun edistämisestä oikeissa luokissa voivat tarjota arvokkaita näkemyksiä ja informaatiota heidän kollegoilleen, opetusviranomaisille, luovuuden tutkijoille ja päättäjille. Näin ollen päämäärä tässä väitöskirjassa, joka koostuu seitsemästä alkuperäisestä julkaisusta sekä johdannosta, on ollut vastata kolmeen tutkimuskysymykseen:

1. Millaisia kreikkalaisten alakoulujen opettajien käsitykset ja implisiittiset teoriat luovasta ajattelusta ovat?
   a. Miten alakoulujen opettajien asiantuntemus ja opetuskokemukset vaikuttavat heidän käsityksiinsä ja implisiittisiin teorioihinsa luovuudesta?
   b. Millä tavoin alakoulujen opettajia pitäisi kouluttaa ja tukea oppilaiden luovan ajattelun kehittämiseksi?
2. Millaista luovuutta opettajien pitäisi edistää alakoulun opetuksen puitteissa ja miksi?
3. Mitä kreikkalaiset alakoulujen opettajat suosittelevat oppilaiden luovan ajattelun kehittämiseen?

Joitakin tutkimuksen ja aineiston analyysimenetelmiä kuten haastattelu-, kirjallisuus-, kohderyhmä- ja toimintatutkimusta käytettiin empiirisen tiedon keräämiseen ja analysointiin sekä vastaamaan tutkimuskysymyksiin. Kolmesataa kreikkalaista tulevaa ja työssä olevaa alakoulun opettajaa erilaisilla taustoilla ja asiantuntemuksella osallistui haastattelututkimukseen ja kohderyhmiin kun taas 128 ala- ja yläkoulun opettajaa muodosti toimintatutkimusryhmän.

Aineiston analysointi paljasti, että alakoulun opettajien toimintaan vaikuttavat pääasiassa epäjohdonmukaiset implisiittiset teoriat ja yleiset harhaluulot luovuudesta. Lisäksi useat muut tekijät, kuten puutteellinen alkuperäinen koulutus ja työhön kouluttaminen sekä ajan ja apuvälineiden puute ovat muutamia niistä esteistä, joita opettajat kohtaavat yrittäessään herättää ja kehittää oppilaiden luovaa ajattelua. Lisäksi luovuuden määritelmien ja kollokaatioiden analysoinnista ilmeni, että etupäässä ihmisen luovuuden positiivisia puolia painotetaan. Kuitenkin monet osallistuneet opettajat raportoivat että ihmisen luovuudella on myös pimeät puolensa, ja oppilaiden

pitää kehittää tiettyjä ajattelutaitoja ymmärtääksen mahdolliset seuraukset luovista teoistaan. Siksi keskipisteenä alakouluopetuksessa ei pitäisi olla vain oppilaiden luovan ajattelun kannustaminen, vaan myös täydentävien ajattelutapojen, kuten kriittisen ajattelun, tunneajattelun (caring thinking) ja reflektiivisen ajattelun, kehittäminen.

Seuraten edellisiä löydöksiä, tämän väitöskirjan tutkimustulokset vastaavat kolmeen tärkeimpään tutkimuskysymykseen ja sisältävät seuraavat parannusehdotukset: (a) joitakin keskeisiä suosituksia oppilaiden luovan ajattelutaidon kehittämiseen; (b) kokonaisvaltaisen määritelmän luovuudesta alakouluopetuksen kontekstissa; (c) varman rungon opettajien e-koulutukseen yhteisöllisestä luovuudesta, ja (d) käytännöllisen mallin, joka toimii oppaana ihmisen luovuuden tuloksien analysointiin ja ymmärtämiseen. Nämä tulokset muodostavat alakoulun opettajia tukevat raamit. Paitsi kouluttajat, myös muut asiantuntijat voivat löytää reflektiivisiä ja kokonaisvaltaisia näkökantoja moniin luovuuden puoliin tämän tutkimuksen käsittelystä ja tuloksista. Lopuksi, tämä tutkimus sisältää ehdotuksia tuleville tutkimushankkeille.

ΣΥΝΟΨΗ (GREEK SUMMARY)

Καλλιεργώντας τη δημιουργική σκέψη - Ο ρόλος των εκπαιδευτικών της πρωτοβάθμιας εκπαίδευσης

Τα τελευταία χρόνια παρατηρείται μια αυξανόμενη απαίτηση για δημιουργικότητα σε όλους τους τομείς της ανθρώπινης δραστηριότητας. Η πρωτοβάθμια εκπαίδευση πασχίζει να συμβαδίσει με τις νέες κοινωνικοοικονομικές ανάγκες και να προετοιμάσει τους δημιουργικούς πολίτες του μέλλοντος. Αν και οι εκπαιδευτικοί της πρωτοβάθμιας εκπαίδευσης παίζουν καθοριστικό ρόλο, άλλοτε θετικό και άλλοτε αρνητικό, στην καλλιέργεια της δημιουργικότητας των μαθητών, λίγες έρευνες έχουν διεξαχθεί σχετικά με τη συμβολή τους στην καλλιέργεια της δημιουργικής σκέψης των μαθητών και τις απόψεις τους για το θέμα αυτό.

Η θεμελιωμένη γνώση (situated knowledge) των Ελλήνων εκπαιδευτικών πρωτοβάθμιας εκπαίδευσης και η εμπειρία τους από την προώθηση της δημιουργικής σκέψης στις σχολικές τάξεις, μπορούν να προσφέρουν χρήσιμες πληροφορίες και οπτικές στους συναδέλφους τους, σε επιστήμονες ερευνητές αλλά και στις εκπαιδευτικές αρχές όπως και στους σχεδιαστές της εκπαιδευτικής πολιτικής. Για το λόγο αυτό, ο βασικός σκοπός της διατριβής αυτής, που συναπαρτίζεται από επτά πρωτότυπες δημοσιεύσεις και μια εκτενή εισαγωγή, είναι να δώσει απαντήσεις στα εξής ερευνητικά ερωτήματα:

1. Ποιες είναι οι αντιλήψεις και οι προσωπικές θεωρίες (implicit theories) των εκπαιδευτικών της πρωτοβάθμιας εκπαίδευσης για την καλλιέργεια της δημιουργικής σκέψης;
   α. Πώς επηρεάζει η διδακτική εμπειρία και η ειδικότητα των εκπαιδευτικών τις αντιλήψεις και τις προσωπικές θεωρίες τους για τη δημιουργική σκέψη;
   β. Με ποιους τρόπους θα πρέπει να εκπαιδεύονται και να υποστηρίζονται στο έργο τους οι εκπαιδευτικοί της πρωτοβάθμιας εκπαίδευσης ώστε να μπορούν να καλλιεργούν τη δημιουργική σκέψη των μαθητών;
2. Ποιον τύπο δημιουργικότητας θα πρέπει να προωθούν οι εκπαιδευτικοί στο πλαίσιο της πρωτοβάθμιας εκπαίδευσης και γιατί;
3. Τι προτείνουν οι Έλληνες εκπαιδευτικοί της πρωτοβάθμιας εκπαίδευσης για την καλλιέργεια της δημιουργικής σκέψης των μαθητών;

Η έρευνα αξιοποίησε τέσσερις διαφορετικές ερευνητικές μεθόδους για να συλλέξει και να αναλύσει πολύπλευρα εμπειρικά δεδομένα ώστε να διερευνηθούν σε βάθος τα ερευνητικά ερωτήματα: επισκόπηση με ερωτηματολόγια (survey), βιβλιογραφική έρευνα (literature research), ομάδες εστιασμένης συζήτησης (focus groups) και έρευνα δράσης (action research). Τριακόσιοι (300) Έλληνες εκπαιδευτικοί της πρωτοβάθμιας εκπαίδευσης –με ποικίλα χαρακτηριστικά ως προς την ειδικότητα, την εργασιακή σχέση, τη

μόρφωση και τη διδακτική εμπειρία–, πήραν μέρος στην πρώτη φάση της έρευνας που διεξήχθη με ερωτηματολόγια. Είκοσι ένας (21) από αυτούς πήραν μέρος και στην τελευταία φάση συμμετέχοντας στις ομάδες εστιασμένης συζήτησης. Εκατόν είκοσι οκτώ (128) εκπαιδευτικοί της πρωτοβάθμιας και δευτεροβάθμιας εκπαίδευσης έλαβαν μέρος στην έρευνα δράσης που αποτέλεσε την τρίτη φάση της έρευνας.

Η ανάλυση των ερευνητικών δεδομένων αποκαλύπτει ότι οι εκπαιδευτικοί της πρωτοβάθμιας εκπαίδευσης επηρεάζονται σε σημαντικό βαθμό από αντιφατικές, προσωπικές θεωρίες τις οποίες διαμορφώνουν επηρεαζόμενοι, περισσότερο, από διαδεδομένες παρανοήσεις για τη φύση της ανθρώπινης δημιουργικότητας παρά βασιζόμενοι στα πορίσματα της σύγχρονης έρευνας και τις σχετικές επιστημονικές θεωρίες. Οι ανεπαρκείς αρχική εκπαίδευση και ενδοσχολική επιμόρφωση, καθώς επίσης και η έλλειψη, μέσων, υποδομών και προσωπικού χρόνου είναι μερικοί ακόμα από τους ανασταλτικούς παράγοντες που αντιμετωπίζουν οι εκπαιδευτικοί στην προσπάθειά τους να αφυπνήσουν και να καλλιεργήσουν τη δημιουργική σκέψη των μαθητών. Επίσης ενώ η ανάλυση δεκάδων ορισμών και συμφραζομένων του όρου "δημιουργικότητα" που έγινε κατά τη φάση της βιβλιογραφικής έρευνας κατέδειξε ότι οι ερευνητές δίνουν έμφαση κυρίως στις θετικές διαστάσεις της δημιουργικότητας, οι εκπαιδευτικοί που συμμετείχαν στις ομάδες εστιασμένης συζήτησης επισήμαναν το γεγονός ότι η δημιουργικότητα έχει και αρνητικές διαστάσεις. Για το λόγο αυτό οι εκπαιδευτικοί θα πρέπει να ενθαρρύνουν όχι μόνο τη δημιουργική σκέψη των μαθητών αλλά και συμπληρωματικούς τύπους σκέψης όπως η κριτική (critical thinking), η αναστοχαστική (reflective thinking) και η συναισθηματική (caring thinking) με τους οποίους οι μαθητές είναι ικανοί να κατανοούν τις δυνατές επιπτώσεις της δημιουργικότητάς τους.

Τα αποτελέσματα της έρευνας αυτής της διατριβής απαντούν στα κύρια ερωτήματα περί της δημιουργικότητας στην πρωτοβάθμια εκπαίδευση και συνθέτουν ένα θεωρητικό και πρακτικό πλαίσιο εργασίας που περιλαμβάνει τα παρακάτω: (α) ένα σύνολο από βασικές υποδείξεις για την καλλιέργεια της δημιουργικής σκέψης των μαθητών, (β) έναν αναλυτικό προσδιορισμό της έννοιας "δημιουργικότητα" στο πλαίσιο της πρωτοβάθμιας εκπαίδευσης, (γ) ένα αξιόπιστο πλαίσιο εργασίας για την διαδικτυακή επιμόρφωση (e-training) των εκπαιδευτικών στην συνεργατική δημιουργικότητα, και (δ) ένα πρακτικό μοντέλο αναφοράς για την ανάλυση και κατανόηση των συνεπειών -θετικών και αρνητικών- της ανθρώπινης δημιουργικότητας. Αυτό το πλαίσιο εργασίας μπορεί να αποτελέσει ένα υποστηρικτικό εργαλείο για τους Έλληνες εκπαιδευτικούς της πρωτοβάθμιας εκπαίδευσης στην προσπάθειά τους να καλλιεργήσουν αποτελεσματικά το δημιουργικό δυναμικό των μαθητών τους. Επιπλέον, ερευνητές, στελέχη της εκπαίδευσης, σχεδιαστές εκπαιδευτικής πολιτικής και άλλοι επιστήμονες μπορούν να βρουν σε αυτή τη διατριβή μια ολιστική και αναστοχαστική πραγμάτευση της δημιουργικότητας για πτυχές της οποίας, εξάλλου, προτείνεται στο τέλος της διατριβής η περαιτέρω διερεύνηση και μελέτη.

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APPENDICES

APPENDIX 1

Παναγιώτης Γ. Καμπύλης

Παιδαγωγός – Υποψήφιος Διδάκτορας στη Γνωσιακή Επιστήμη

University of Jyväskylä - Finland

Υπότροφος Ι.Κ.Υ.

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Διδακτορική έρευνα στη Γνωσιακή Επιστήμη

Μάιος 2006

Αγαπητοί εκπαιδευτικοί

Η έρευνα, στην οποία καλείστε να εκφράσετε τις απόψεις σας, αφορά θέματα που σχετίζονται με τη δημιουργικότητα στην πρωτοβάθμια εκπαίδευση. Αποτελεί μέρος της διδακτορικής μου διατριβής στον τομέα της Γνωσιακής Επιστήμης, με θέμα:

Ο ρόλος και οι απόψεις των εκπαιδευτικών της πρωτοβάθμιας εκπαίδευσης για την καλλιέργεια της δημιουργικής σκέψη των μαθητών.

Η δημιουργικότητα -και ειδικότερα η εκπαιδευτική της διάσταση- είναι ένα πολυσύνθετο φαινόμενο που απαιτεί περισσότερη διερεύνηση. Σκοπός αυτής της έρευνας είναι να καταγράψει και να αναδείξει τις απόψεις των εκπαιδευτικών της Πρωτοβάθμιας Εκπαίδευσης, γιατί ο ρόλος τους είναι καθοριστικός για την καλλιέργεια και την εκδήλωση της δημιουργικότητας των μαθητών.

Χρειάζεται να διαθέσετε 20-25 λεπτά για τη συμπλήρωσή της φόρμας. Η ανωνυμία σας και η εμπιστευτικότητα των δεδομένων που θα προκύψουν είναι εγγυημένη, ώστε να είστε ελεύθερες/οι να δώσετε ακριβείς προσωπικές απαντήσεις, οι οποίες θα χρησιμοποιηθούν αποκλειστικά για τους σκοπούς της συγκεκριμένης έρευνας.

Σας παρακαλώ να απαντήσετε στα θέματα που ακολουθούν με προσοχή, έχοντας τη βεβαιότητα ότι συμβάλλετε αποφασιστικά στην επιστημονική διερεύνηση ενός τόσο σημαντικού θέματος όπως είναι η δημιουργικότητα στην Πρωτοβάθμια Εκπαίδευση. Συμμετέχοντας στην έρευνα, θα έχετε άμεση ενημέρωση για τα αποτελέσματά της και τις σχετικές δημοσιεύσεις, εφόσον βέβαια το επιθυμείτε.

Ευχαριστώ πολύ για τη συνεργασία σας

Με εκτίμηση

Παναγιώτης Καμπύλης

Οι απόψεις των Εκπαιδευτικών για τη Δημιουργικότητα στην Πρωτοβάθμια Εκπαίδευση

Συνήθως οι απόψεις μας συμφωνούν ή διαφωνούν με τις απόψεις κάποιων άλλων. Εδώ, σας παρακαλώ να μη λάβετε καθόλου υπόψη σας τις απόψεις των άλλων. Διαβάστε προσεκτικά κάθε θέμα και απαντήστε ανεπηρέαστοι, δίνοντας ελεύθερα και αβίαστα τη **δική σας** άποψη.

Στα θέματα που αφορούν τους μαθητές και τις μαθήτριες, απαντήστε έχοντας στο μυαλό σας τους μαθητές και τις μαθήτριες που διδάσκετε φέτος ή που διδάξατε την τελευταία χρονιά που εργαστήκατε σε δημοτικό σχολείο.

Ενότητα Α

*Παρακαλώ διαβάστε προσεκτικά κάθε πρόταση και δηλώστε τη **δική σας** άποψη **κυκλώνοντας** έναν αριθμό σύμφωνα με τα παρακάτω:*

***1** διαφωνώ απόλυτα, **2** διαφωνώ, **3** δεν ξέρω / δεν απαντώ, **4** συμφωνώ, **5** συμφωνώ απόλυτα*

α.	Οι άνθρωποι **αναγνωρίζουν** και **συμφωνούν** στο ότι κάτι είναι δημιουργικό ακόμα και όταν δίνουν διαφορετικούς ορισμούς στη λέξη αυτή	**1 2 3 4 5**
β.	Οι **κοινωνικοί** και **περιβαλλοντικοί παράγοντες** παίζουν σημαντικό ρόλο στην εκδήλωση της δημιουργικότητας	**1 2 3 4 5**
γ.	Υπάρχει μια θετική σύνδεση ανάμεσα στη **δημιουργικότητα** και την **ευφυΐα**	**1 2 3 4 5**
δ.	Είναι πιθανό ένας **πολύ έξυπνος** άνθρωπος να μην είναι δημιουργικός	**1 2 3 4 5**
ε.	Υπάρχει μια θετική σύνδεση ανάμεσα στη **δημιουργικότητα** και το **χιούμορ**	**1 2 3 4 5**
στ.	Η **αυτοπεποίθηση** είναι ένα βασικό χαρακτηριστικό του δημιουργικού ατόμου	**1 2 3 4 5**
ζ.	Οι **Τεχνολογίες Πληροφορίας και Επικοινωνίας** μπορούν να απελευθερώσουν τη δημιουργικότητα του ατόμου	**1 2 3 4 5**
η.	Ο δημιουργικός άνθρωπος δε φοβάται να κάνει **λάθος**	**1 2 3 4 5**
θ.	Η **εύρεση προβλημάτων** είναι πιο δημιουργική διαδικασία από την επίλυση προβλημάτων	**1 2 3 4 5**
ι.	Ο δημιουργικός άνθρωπος κάνει πολλές **ερωτήσεις**	**1 2 3 4 5**
ια.	Ένα άτομο χρειάζεται **προηγούμενη γνώση** σε ένα τομέα για να εκδηλώσει δημιουργικότητα στον τομέα αυτό	**1 2 3 4 5**
ιβ.	Η **συν-δημιουργία** είναι πιο σημαντική για το κοινωνικό σύνολο από τη δημιουργία	**1 2 3 4 5**
ιγ.	Το **δημιουργικό αποτέλεσμα** είναι περισσότερο απόρροια σκληρής και επίπονης εργασίας και λιγότερο αποτέλεσμα στιγμιαίας έμπνευσης	**1 2 3 4 5**
ιδ.	Η δημιουργικότητα είναι αναγκαία συνθήκη για την **προσωπική** και **κοινωνική εξέλιξη**	**1 2 3 4 5**
ιε.	Τα **εσωτερικά κίνητρα** είναι πιο σημαντικά για την εκδήλωση της δημιουργικότητας από τα εξωτερικά	**1 2 3 4 5**

ιστ. Με ποιο από τα παρακάτω συμφωνείτε; *(παρακαλώ σημειώστε **ένα √**)*

*Η δημιουργικότητα μπορεί να καλλιεργηθεί **στον καθένα*** _____ ☐

*Η δημιουργικότητα καλλιεργείται μόνο σε αυτούς που είναι **εκ φύσεως δημιουργικοί*** _____ ☐

*Η δημιουργικότητα είναι **έμφυτη** και δεν καλλιεργείται* _____ ☐

ιζ. Με ποιο από τα παρακάτω συμφωνείτε; *(παρακαλώ σημειώστε **ένα √**)*

*Το δημιουργικό αποτέλεσμα είναι πρωτότυπο για τον **δημιουργό** του και την **κοινωνία*** _____ ☐

*Το δημιουργικό αποτέλεσμα είναι πρωτότυπο για τον **δημιουργό** του και τον **άμεσο κοινωνικό περίγυρο*** _____ ☐

*Το δημιουργικό αποτέλεσμα είναι πρωτότυπο για τον **δημιουργό του*** _____ ☐

*Το δημιουργικό αποτέλεσμα **δεν είναι** κατ' ανάγκη **πρωτότυπο*** _____ ☐

ιη. Δώστε ένα ή περισσότερα **χαρακτηριστικά της προσωπικότητας** του δημιουργικού ατόμου *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

ιθ. Δώστε μια ή περισσότερες **δεξιότητες** που νομίζετε ότι διαθέτει ένα δημιουργικό άτομο *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

κ. Δώστε ένα **σύντομο ορισμό** για το τι σημαίνει για εσάς η λέξη δημιουργικότητα *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

_____

_____

Ενότητα Β

*Παρακαλώ διαβάστε προσεκτικά κάθε πρόταση και δηλώστε τη **δική σας** άποψη **κυκλώνοντας** έναν αριθμό σύμφωνα με τα παρακάτω:*

***1** διαφωνώ απόλυτα, **2** διαφωνώ, **3** δεν ξέρω / δεν απαντώ, **4** συμφωνώ, **5** συμφωνώ απόλυτα*

α. Η δημιουργικότητα είναι χαρακτηριστικό **όλων** των μαθητών/τριών _____ **1 2 3 4 5**

β. Ορισμένες μαθήτριες/τές είναι **πιο δημιουργικές** (ποσοτικά) από τους άλλους _ **1 2 3 4 5**

γ. Όσο πιο δημιουργικός είναι ένας μαθητής/τρια τόσο καλύτερους **βαθμούς** έχει στο σχολείο _____ **1 2 3 4 5**

δ. Οι πολύ δημιουργικές μαθήτριες/τές δεν αντιμετωπίζουν **δυσκολίες** στο σχολείο _____ **1 2 3 4 5**

ε. Οι μαθητές/τριες έχουν πολλές **ευκαιρίες** στο σχολείο για να εκδηλώσουν τη δημιουργικότητά τους _____ **1 2 3 4 5**

στ. Το σχολείο προσφέρει στις μαθήτριες/τές πολλά **μέσα** για να εκδηλώσουν το δημιουργικό τους δυναμικό _____ **1 2 3 4 5**

ζ. Οι μαθητές/τριες είναι πιο δημιουργικοί όταν έχουν **εσωτερικά κίνητρα** _____ **1 2 3 4 5**

η. Οι μαθήτριες/τές έχουν πολλές ευκαιρίες για να εκδηλώσουν τη δημιουργικότητά τους σε δραστηριότητες **εκτός σχολείου** _____ **1 2 3 4 5**

θ. Οι μαθητές/τριες χρειάζονται περισσότερες ευκαιρίες για να χρησιμοποιούν δημιουργικά τα **χέρια** τους _____ **1 2 3 4 5**

ι. Οι μαθήτριες/τές χρειάζεται να **νιώθουν** ψυχολογικά και συναισθηματικά ασφαλείς, για να μπορέσουν να λειτουργήσουν δημιουργικά _____ **1 2 3 4 5**

ια. Ένας μαθητής/τρια μπορεί να είναι δημιουργικός σε πολλούς **τομείς ή σχολικά μαθήματα** _____ **1 2 3 4 5**

ιβ. Μια μαθήτρια **ανακάλυψε** ένα δικό της τρόπο να προσθέτει τριψήφιους αριθμούς αλλά η **τεχνική** της δεν οδηγεί στο σωστό αποτέλεσμα. Είναι αυτή η ανακάλυψη δημιουργική;

ναι ☐ όχι ☐

(Παρακαλώ, δικαιολογήστε την απάντησή σας)

_____

_____

_____

_____

ιγ. Γράψτε ένα ή περισσότερα **παραδείγματα** εκδήλωσης της δημιουργικότητας των μαθητών σας.

_____

_____

_____

_____

ιδ. Προάγει τη δημιουργικότητα η εργασία των μαθητών/τριών επάνω σε συγκεκριμένα **θέματα** (**projects**);

ναι ☐ όχι ☐

(Παρακαλώ, εξηγείστε την απάντησή σας)

ιε. Επιλέξτε τα **διδακτικά αντικείμενα** στα οποία θεωρείτε ότι είναι πιθανό οι μαθήτριες/τές να εκδηλώσουν το δημιουργικό τους δυναμικό *(παρακαλώ σημειώστε ένα ή περισσότερα* ✓*).*

Γλώσσα ☐	*Μαθηματικά* ☐	*Φυσική* ☐	*Γεωγραφία* ☐
Μουσική Αγωγή ☐	*Εικαστική Αγωγή* ☐	*Θεατρική Αγωγή* ☐	*Αγωγή Υγείας* ☐
Φυσική Αγωγή ☐	*Ξένες γλώσσες* ☐	*Θρησκευτικά* ☐	*Ιστορία* ☐
Εμείς και ο κόσμος ☐	*Κοιν. & πολ. Αγωγή* ☐	*Πληροφορική* ☐	*Ευέλικτη ζώνη* ☐

ιστ. Με ποιο από τα παρακάτω συμφωνείτε; *(παρακαλώ σημειώστε* ***ένα*** ✓*)*

Οι μαθητές/τριες με υψηλό δημιουργικό δυναμικό πρέπει να παρακολουθούν ***ειδικά προγράμματα*** _ ☐

Όλες οι μαθήτριες/τές πρέπει να παρακολουθούν ***ειδικά προγράμματα*** *για την δημιουργικότητα* ___ ☐

Δεν υπάρχει ανάγκη για ***ειδικά προγράμματα****. Η δημιουργικότητα πρέπει να χαρακτηρίζει και να διατρέχει ολόκληρο το αναλυτικό πρόγραμμα.* _____ ☐

Ενότητα Γ

*Παρακαλώ διαβάστε προσεκτικά κάθε πρόταση και δηλώστε τη **δική σας** άποψη **κυκλώνοντας** έναν αριθμό σύμφωνα με τα παρακάτω:*

***1** διαφωνώ απόλυτα, **2** διαφωνώ, **3** δεν ξέρω / δεν απαντώ, **4** συμφωνώ, **5** συμφωνώ απόλυτα*

α. Η δημιουργικότητα μπορεί να **διδαχθεί** _____ **1 2 3 4 5**

β. Ο **ρόλος** μου σαν εκπαιδευτικός είναι να καλλιεργήσω τη δημιουργικότητα των μαθητών/τριών μου _____ **1 2 3 4 5**

γ. Νιώθω καλά **καταρτισμένος** για να καλλιεργήσω τη δημιουργικότητα των μαθητριών/τών μου _____ **1 2 3 4 5**

δ. Μπορώ να **αναγνωρίσω** τα δημιουργικά επιτεύγματα των μαθητών/τριών μου ___ **1 2 3 4 5**

ε. Μπορώ να **αξιολογήσω** τα δημιουργικά επιτεύγματα των μαθητριών/τών μου ____ **1 2 3 4 5**

στ. Μπορώ να λειτουργήσω σαν **δημιουργικό πρότυπο** για τους μαθητές/τριες μου **1 2 3 4 5**

ζ. Αναφέρετε μια ή περισσότερες **εργασίες** ή **δραστηριότητες** που γίνονται στο σχολείο και θεωρείτε ότι προάγουν το δημιουργικό δυναμικό των μαθητριών/τών *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

_____

η. Αναφέρετε μια ή περισσότερες **τεχνικές** που χρησιμοποιείτε για να καλλιεργήσετε τη δημιουργικότητα των μαθητών/τριών σας *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

_____

Ενότητα Δ

*Παρακαλώ διαβάστε προσεκτικά κάθε πρόταση και δηλώστε τη **δική σας** άποψη **κυκλώνοντας** έναν αριθμό σύμφωνα με τα παρακάτω:*

***1** διαφωνώ απόλυτα, **2** διαφωνώ, **3** δεν ξέρω / δεν απαντώ, **4** συμφωνώ, **5** συμφωνώ απόλυτα*

α. Το **σχολείο** αποτελεί ιδανικό περιβάλλον για να εκδηλώσει ένα παιδί τη δημιουργικότητά του _____ **1 2 3 4 5**

β. Το **Αναλυτικό Πρόγραμμα** επιτρέπει στις μαθήτριες/τές να εκδηλώσουν το δημιουργικό τους δυναμικό _____ **1 2 3 4 5**

γ. Τα **σχολικά βιβλία** και το εκπαιδευτικό υλικό γενικότερα, προωθούν την δημιουργική έκφραση των μαθητών/τριών _____ **1 2 3 4 5**

δ. Το **σχολικό περιβάλλον** που δίνει έμφαση στον ανταγωνισμό και την αξιολόγηση, αποθαρρύνει την εκδήλωση της δημιουργικότητας των μαθητών _____ **1 2 3 4 5**

ε. Οι περισσότερες **σχολικές εργασίες** και **δραστηριότητες** επιτρέπουν την εκδήλωση της δημιουργικότητας των μαθητριών/ών _____ **1 2 3 4 5**

στ. Οι μαθητές/τριες έχουν αρκετό **χρόνο** για να εκδηλώνουν τη δημιουργικότητά τους στα πλαίσια του σχολικού προγράμματος _____ **1 2 3 4 5**

ζ. Η **ατμόσφαιρα της τάξης** είναι βασικός παράγοντας για την εκδήλωση της δημιουργικότητας των μαθητριών/ών _____ **1 2 3 4 5**

η. Η ομαδοσυνεργατική διδασκαλία ενθαρρύνει την εκδήλωση της **συνδημιουργικότητας** των μαθητών/τριών _____ **1 2 3 4 5**

θ. Το **Ολοήμερο Σχολείο** δίνει πολλές ευκαιρίες στις μαθήτριες/τές να εκφραστούν δημιουργικά _____ **1 2 3 4 5**

ι. Τι νομίζετε ότι χρειάζεται η **Πρωτοβάθμια Εκπαίδευση** για να ενθαρρύνει και να καλλιεργήσει πιο αποτελεσματικά τη δημιουργικότητα των μαθητριών/ών; *(παρακαλώ περιγράψτε)*

_____

_____

_____

_____

_____

κ. Παρακαλώ, **προσθέστε οτιδήποτε** νομίζετε ότι αφορά τη δημιουργικότητα στην πρωτοβάθμια εκπαίδευση και δεν καλύφθηκε από τις ερωτήσεις που προηγήθηκαν.

_____

_____

_____

_____

_____

Ενότητα Ε

α. Φύλλο:

Γυναίκα ☐ Άνδρας ☐ *(παρακαλώ σημειώστε ένα ✓)*

β. Ηλικία:

20-30 ☐ *31-40* ☐ *41-50* ☐ *50 και άνω* ☐

γ. Χρόνια εκπαιδευτικής εμπειρίας *(παρακαλώ σημειώστε ένα ✓)*

0-5 ☐ *6-10* ☐ *11-15* ☐ *16-20* ☐ *21 και άνω* ☐

δ. Αυτή τη σχολική χρονιά…

… διδάσκω στο ☐ Δημοτικό Σχολείο ☐

… δεν διδάσκω, είμαι… ☐

ε. Η ειδικότητά μου είναι… ☐

στ. Άλλες σπουδές: Μεταπτυχιακό ☐ Διδακτορικό ☐

Μετεκπαίδευση ☐ Άλλο *(περιγράψτε)* ☐

ζ. Περιοχή που διδάσκω (ή δίδαξα τελευταία)…

☐

η. Επιθυμώ να ενημερωθώ για τα αποτελέσματα της έρευνας *(παρακαλώ σημειώστε ένα ✓)*

ναι ☐ όχι ☐

Αν ναι, παρακαλώ γράψτε στο πλαίσιο που ακολουθεί την ηλεκτρονική σας διεύθυνση.

☐

Παρακαλώ ελέγξτε αν έχετε απαντήσει σε **όλα** τα θέματα και δώστε τη συμπληρωμένη φόρμα στον ερευνητή.

Ευχαριστώ πολύ για τον χρόνο σας και τη συνεργασία !

Ενότητα Ε

α. Φύλλο: Γυναίκα ☐ Άνδρας ☐ *(παρακαλώ σημειώστε ένα ✓)*

β. Έτος γεννήσεως: ☐

γ. Παρακολουθώ το ☐ εξάμηνο σπουδών

δ. Έχω κάνει Πρακτική Άσκηση στα μαθήματα:

☐

☐

☐

☐

ε. Άλλες σπουδές: ☐

στ. Επιθυμώ να ενημερωθώ για τα αποτελέσματα της έρευνας *(παρακαλώ σημειώστε ένα ✓)*

ναι ☐ όχι ☐

Αν ναι, παρακαλώ γράψτε στο πλαίσιο που ακολουθεί την ηλεκτρονική σας διεύθυνση.

☐

Παρακαλώ ελέγξτε αν έχετε απαντήσει σε **όλα** τα θέματα και δώστε τη συμπληρωμένη φόρμα στον ερευνητή.

Ευχαριστώ πολύ για τον χρόνο σας και τη συνεργασία !

APPENDIX 2

Panagiotis G. Kampylis

Primary Teacher – Ph.D. Candidate

Scholar of Greek State Scholarships Foundation

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University of Jyväskylä – Finland

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panagiotis.g.kampylis@jyu.fi

Research in Cognitive Science

September 2006

Dear student

The research you have been asked to participate in, concerns creativity in primary education. It is a pilot study for a doctoral dissertation in Cognitive Science entitled:

Fostering primary-school students' creative thinking: Teachers' role and viewpoints

Creativity is a multifaceted and controversial phenomenon that needs more study, especially in primary education. The aim of the current research is to point out student teachers' opinions and beliefs.

You need 25-30 minutes to complete the form and send it to the researcher. The data you provide in this investigation will be anonymous and confidential; please feel free to provide **your** opinions, which will only be used for the current research purposes.

Please respond to the statements and questions in this form based on **the way you feel** and according to your studies and experience. The data obtained will be useful for the scientific investigation of this significant issue. If you so wish, you will be informed of the results via e-mail.

Your cooperation is highly appreciated

Panagiotis Kampylis

A matter of opinion: Prospective teachers' point of view on creativity in primary education

In general, we agree with some people and disagree with others. Please do not think about that. Read each item carefully and provide your **personal** responses. In questions about students, please respond having in mind your studies and your experience.

Unit A

Please read each statement carefully and circle appropriately.

1 *strongly disagree,* ***2*** *disagree,* ***3*** *neutral (e.g. I don't know, I don't want to answer),* ***4*** *agree,* ***5*** *strongly agree*

a.	People can **recognize** and often **agree on** creative outcomes, even when they offer different definitions for creativity	**1 2 3 4 5**
b.	**Social** and **environmental factors** influence creative performance	**1 2 3 4 5**
c.	There is a positive link between **creativity** and **intelligence**	**1 2 3 4 5**
d.	It is possible for a very **intelligent person** not to be creative	**1 2 3 4 5**
e.	There is a link between **creativity** and **humour**	**1 2 3 4 5**
f.	**Self-confidence** is a basic characteristic of a creative person	**1 2 3 4 5**
g.	**Information and Communication Technologies** can liberate a person's creative potential	**1 2 3 4 5**
h.	A creative person is not afraid to make **mistakes**	**1 2 3 4 5**
i.	**Problem finding** is more creative than problem solving	**1 2 3 4 5**
j.	A creative person produces a lot of **questions**	**1 2 3 4 5**
k.	A person must have **prior knowledge** in a domain in order to manifest creativity	**1 2 3 4 5**
l.	**Co-creativity** is more important and valuable than individual creativity	**1 2 3 4 5**
m.	**A creative outcome** is more a result of hard and continuous work and less a result of an insight	**1 2 3 4 5**
n.	Creativity is a key factor for **social** and **personal evolution**	**1 2 3 4 5**
o.	**Intrinsic motivation** is more important than external factors in creativity	**1 2 3 4 5**

p. With which of the following do you agree? *(please choose **only one**)*

*Creativity can be developed in **every person*** ☐

*Creativity can be developed only in people who are **creative by nature*** ☐

*Creativity is **innate**; it can not be developed* ☐

q. Which of the following do you think is true? *(please choose **only one**)*

*Creative **outcomes** are novel for the creator and the society* ☐

*Creative **outcomes** are novel for the creator and the immediate social/peer group* ☐

*Creative **outcomes** are novel for the creator* ☐

*Creative **outcomes** are not necessarily novel* ☐

r. Can you define one or more **traits** of a creative person? *(please describe)*

s. Can you define one or more **abilities** or **skills** of a creative person? *(please describe)*

t. How do you **define** creativity? *(please describe)*

Unit B

Please read each statement carefully and circle appropriately.

***1** strongly disagree, **2** disagree, **3** neutral (e.g. I don't know, I don't want to answer), **4** agree, **5** strongly agree*

a. Creativity is a characteristic of **all students** and it is not a rare phenomenon _ **1 2 3 4 5**

b. Some students are **more creative** (in a quantitative way) than others _____ **1 2 3 4 5**

c. The most creative students have best **grades** in school _____ **1 2 3 4 5**

d. The most creative students often face **obstacles** in school _____ **1 2 3 4 5**

e. Students have a lot of **opportunities** to manifest their creativity in school ____ **1 2 3 4 5**

f. Students have a lot of **means** to express their creativity in school _____ **1 2 3 4 5**

g. Students are more creative when they feel **intrinsically motivated** _____ **1 2 3 4 5**

h. Students have many opportunities to manifest their creativity **out of school** __ **1 2 3 4 5**

i. Students need more opportunities to use their **hands** creatively _____ **1 2 3 4 5**

j. Students need to **feel comfortable**, physically and psychologically, to focus on creative tasks _____ **1 2 3 4 5**

k. A Student could manifest his/her creativity in a variety of **domains** and in a variety of **ways** _____ **1 2 3 4 5**

l. A student **discovers** a new way to add three-digit numbers but the **strategy** does not lead to the correct solution. Would you consider this student creative?

yes ☐ no ☐

(Please specify your answer)

_____

_____

_____

_____

m. Please describe one or more **examples** of creativity as manifested by students.

_____

_____

_____

_____

_____

_____

n. Do you believe that a **classroom environment**, in which students work on projects at their own pace, promotes creativity?

yes ☐ no ☐

(Please specify your answer)

_____

_____

_____

_____

_____

o. Please select the **school subject or subjects** in which you consider it likely for a student to manifest his/her creativity *(please choose one or more).*

Finnish ☐	*Mathematics* ☐	*Science* ☐	*Geography* ☐
Physical Education ☐	*Foreign Languages* ☐	*Religion/ethics* ☐	*Drama Education* ☐
Musical Education ☐	*Arts* ☐	*Health Education* ☐	*History and civics* ☐
	Civics ☐	*ICT* ☐	

p. With which of the following do you agree? *(please choose only one)*

*Students with high-level creative potential must attend **special programs** to enhance their potential* _____ ☐

*All students must attend **special programs** to enhance their creative potential* _____ ☐

*There is no need for **special programs**. The whole curriculum must promote creativity* _____ ☐

Unit C

Please read each statement carefully and circle appropriately.

***1** strongly disagree, **2** disagree, **3** neutral (e.g. I don't know, I don't want to answer), **4** agree, **5** strongly agree*

a. Creativity can be **taught** _____ **1 2 3 4 5**

b. My **role** as a teacher will be to promote students' creativity _____ **1 2 3 4 5**

c. I feel well-trained to **promote** creativity to my students _____ **1 2 3 4 5**

d. I feel well-trained to **recognize** creative achievements of my students in many domains or subjects _____ **1 2 3 4 5**

e. I feel well-trained to **assess** creative products of my students _____ **1 2 3 4 5**

f. I can serve as a **role model** for creativity _____ **1 2 3 4 5**

g. Indicate one or more **school assignments** or **tasks** you consider likely to promote students' creativity *(please describe)*

h. Can you define one or more **techniques** you will use to promote students' creativity *(please describe)*

Unit D

Please read each statement carefully and circle appropriately.

1 *strongly disagree,* ***2*** *disagree,* ***3*** *neutral (e.g. I don't know, I don't want to answer),* ***4*** *agree,* ***5*** *strongly agree*

a. The **school** is the best environment for students to manifest their creativity ___ **1 2 3 4 5**

b. The **Greek Cross-Thematic Curriculum Framework** allows for the manifestation of students' creativity _____ **1 2 3 4 5**

c. The Greek **textbooks** end **educational materials** in general allow for the manifestation of students' creativity _____ **1 2 3 4 5**

d. A **school environment** which emphasizes competition, evaluation and conformity discourages the manifestation of students' creativity _____ **1 2 3 4 5**

e. Most of school **assignments** demand creative responses _____ **1 2 3 4 5**

f. Students have enough **time** to manifest their creativity in the classroom _____ **1 2 3 4 5**

g. **The class environment** is a key factor for the manifestation of students' creativity _____ **1 2 3 4 5**

h. Team-work and collaborative learning facilitate **collaborative creativity** _____ **1 2 3 4 5**

i. If you think the Greek educational system requires changes in order to enhance students' creativity, what do you think these changes should be? *(please describe)*

_____

_____

_____

_____

_____

_____

j. Feel free to add whatever you like about creativity in primary education

_____

_____

_____

_____

_____

_____

Unit E

a. Gender:

Female ☐ Male ☐

b. Age ☐ years

c. Year of studies ☐

d. Extra-curricular studies/hobbies:

☐ Yes ☐ No

If yes, please specify ☐

e. Educational experience:

☐ Yes ☐ No

If yes, please specify ☐

h. I want to be informed of the results

yes ☐ no ☐

If yes, please give your e-mail address.

☐

Please **check** that you have responded to <u>all the items</u> and return the questionnaire.

Thank you very much for your time and cooperation!

APPENDIX 3

Έρευνα
Έρευνα

Οι απόψεις των Ελλήνων Εκπαιδευτικών για τη

Δημιουργικότητα στην Πρώτη Βαθμίδα της Εκπαίδευσης

Απρίλιος 2007

Αγαπητοί συνάδελφοι

Η δημιουργικότητα -και ειδικότερα η εκπαιδευτική της διάσταση- είναι ένα πολυσύνθετο φαινόμενο που απαιτεί ιδιαίτερη διερεύνηση. Η έρευνα, στην οποία καλείστε να εκφράσετε τις απόψεις σας, έχει σαν βασικό στόχο **να αναδείξει τις απόψεις των εκπαιδευτικών** για θέματα που σχετίζονται με τη δημιουργικότητα στην πρώτη βαθμίδα της εκπαίδευσης γενικότερα και την Μουσική Αγωγή ειδικότερα.

Χρειάζεται να διαθέσετε **10-15 λεπτά** για τη συμπλήρωσή της φόρμας. Η **ανωνυμία** σας και η **εμπιστευτικότητα** των δεδομένων που θα προκύψουν είναι εγγυημένη, ώστε να μπορείτε να δώσετε ελεύθερα και αβίαστα **τη δική σας άποψη**. Όλα τα δεδομένα θα χρησιμοποιηθούν αποκλειστικά και μόνο για τους σκοπούς της συγκεκριμένης έρευνας.

Σας παρακαλώ να απαντήσετε στα θέματα που ακολουθούν αφού πρώτα τα **διαβάσετε με προσοχή**. Στα θέματα που αφορούν τους μαθητές, απαντήστε έχοντας στο μυαλό σας τους μαθητές που διδάσκετε φέτος ή που διδάξατε την τελευταία χρονιά που εργαστήκατε στην πρωτοβάθμια εκπαίδευση (η αναφορά σε εκπαιδευτικούς και μαθητές γίνεται στο αρσενικό γένος καθαρά για λόγους οικονομίας και καλύτερης αναγνωσιμότητας του κειμένου).

Συμμετέχοντας στην έρευνα, θα έχετε άμεση ενημέρωση για τα αποτελέσματά της και τις σχετικές δημοσιεύσεις, εφόσον βέβαια το επιθυμείτε.

Ευχαριστώ πολύ για τη συνεργασία σας

Παναγιώτης Καμπύλης

Παιδαγωγός – Υποψήφιος Διδάκτορας στη Γνωσιακή Επιστήμη,

University of Jyväskylä – Finland, Υπότροφος Ι.Κ.Υ.

Διεύθυνση: Αγίου Ιωάννου 50 Α, 14342, Νέα Φιλαδέλφεια

Τηλέφωνο επικοινωνίας: 697 4461544, e-mail: pankabilis@sch.gr

*Παρακαλώ διαβάστε προσεκτικά κάθε πρόταση και δηλώστε τη **δική σας** άποψη **κυκλώνοντας** έναν αριθμό σύμφωνα με τα παρακάτω: **1** διαφωνώ απόλυτα, **2** διαφωνώ, **3** δεν ξέρω / δεν απαντώ, **4** συμφωνώ, **5** συμφωνώ απόλυτα*

Ενότητα Α

α. Οι άνθρωποι **αναγνωρίζουν** και **συμφωνούν** στο ότι κάτι είναι δημιουργικό ακόμα και όταν δίνουν διαφορετικούς ορισμούς στη λέξη αυτή _____ **1 2 3 4 5**

β. Οι **κοινωνικοί** και **περιβαλλοντικοί παράγοντες** παίζουν σημαντικό ρόλο στην εκδήλωση της δημιουργικότητας _____ **1 2 3 4 5**

γ. Είναι πιθανό ένας **πολύ έξυπνος** άνθρωπος να μην είναι δημιουργικός _____ **1 2 3 4 5**

δ. Οι **Τεχνολογίες Πληροφορίας και Επικοινωνίας** μπορούν να απελευθερώσουν τη δημιουργικότητα του ατόμου _____ **1 2 3 4 5**

ε. Ο δημιουργικός άνθρωπος δε φοβάται να κάνει **λάθος** _____ **1 2 3 4 5**

στ. Ο δημιουργικός άνθρωπος κάνει πολλές **ερωτήσεις** _____ **1 2 3 4 5**

ζ. Ένα άτομο χρειάζεται **προηγούμενη γνώση** σε ένα τομέα για να εκδηλώσει δημιουργικότητα στον τομέα αυτό _____ **1 2 3 4 5**

η. Η **συν-δημιουργία** είναι πιο σημαντική για το κοινωνικό σύνολο από την ατομική δημιουργία _____ **1 2 3 4 5**

θ. Το **δημιουργικό αποτέλεσμα** είναι περισσότερο απόρροια σκληρής και επίπονης εργασίας και λιγότερο αποτέλεσμα στιγμιαίας έμπνευσης _____ **1 2 3 4 5**

ι. Η δημιουργικότητα είναι αναγκαία συνθήκη για την **προσωπική** και **κοινωνική εξέλιξη** _____ **1 2 3 4 5**

ια. Η δημιουργικότητα μπορεί να καλλιεργηθεί **σε κάθε άνθρωπο** _____ **1 2 3 4 5**

ιβ. Γράψτε τις **τρεις** πρώτες **λέξεις** που σας έρχονται στο μυαλό ακούγοντας τη λέξη δημιουργικότητα.

ιγ. Γράψτε ένα έως τρία **χαρακτηριστικά της προσωπικότητας** του δημιουργικού ατόμου.

Ενότητα Β

α. Η δημιουργικότητα είναι ενδογενές χαρακτηριστικό **όλων** των μαθητών _____ **1 2 3 4 5**

β. Ορισμένοι μαθητές είναι **πιο δημιουργικοί** (ποσοτικά) από τους άλλους _____ **1 2 3 4 5**

γ. Όσο πιο δημιουργικός είναι ένας μαθητής τόσο καλύτερους **βαθμούς** έχει στο σχολείο _____ **1 2 3 4 5**

δ. Οι πολύ δημιουργικοί μαθητές αντιμετωπίζουν **δυσκολίες** στο σχολείο _____ **1 2 3 4 5**

ε. Οι μαθητές έχουν πολλές **ευκαιρίες** στο σχολείο για να εκδηλώσουν τη δημιουργικότητά τους _____ **1 2 3 4 5**

στ. Οι μαθητές είναι πιο δημιουργικοί όταν έχουν **εσωτερικά κίνητρα** _____ **1 2 3 4 5**

ζ. Οι μαθητές έχουν πολλές ευκαιρίες στο σχολείο για να χρησιμοποιήσουν δημιουργικά τα **χέρια** τους _____ **1 2 3 4 5**

η. Οι μαθητές χρειάζεται να **νιώθουν** ψυχολογικά και συναισθηματικά ασφαλείς, για να μπορέσουν να λειτουργήσουν δημιουργικά _____ **1 2 3 4 5**

θ. Ένας μαθητής μπορεί να είναι δημιουργικός σε πολλούς **τομείς ή σχολικά μαθήματα** _____ **1 2 3 4 5**

ι. Γράψτε **ένα παράδειγμα** εκδήλωσης της δημιουργικότητας των μαθητών σας.

_____

_____

ια. Επιλέξτε **τα διδακτικά αντικείμενα** στα οποία θεωρείτε ότι είναι πιθανό οι μαθητές να εκδηλώσουν το δημιουργικό τους δυναμικό *(παρακαλώ σημειώστε ένα ή περισσότερα* ✓*).*

Γλώσσα	☐	*Μαθηματικά*	☐	*Φυσική*	☐	*Γεωγραφία*	☐
Μουσική Αγωγή	☐	*Εικαστική Αγωγή*	☐	*Θεατρική Αγωγή*	☐	*Αγωγή Υγείας*	☐
Φυσική Αγωγή	☐	*Ξένες γλώσσες*	☐	*Θρησκευτικά*	☐	*Ιστορία*	☐
Εμείς και ο κόσμος	☐	*Κοιν. & πολ. Αγωγή*	☐	*Πληροφορική*	☐	*Ευέλικτη ζώνη*	☐

Ενότητα Γ

α. Η δημιουργικότητα μπορεί να **διδαχθεί** _____ **1 2 3 4 5**

β. Υπάρχει ανάγκη για **ειδικά προγράμματα καλλιέργειας της δημιουργικότητας** στο πλαίσιο της πρωτοβάθμιας εκπαίδευσης _____ **1 2 3 4 5**

γ. Νιώθω καλά **καταρτισμένος** για να βοηθήσω τους μαθητές να εκδηλώσουν τη δημιουργικότητά τους _____ **1 2 3 4 5**

δ. Μπορώ να **αναγνωρίσω** τα δημιουργικά επιτεύγματα των μαθητών μου _____ **1 2 3 4 5**

ε. Μπορώ να **αξιολογήσω** τα δημιουργικά επιτεύγματα των μαθητών μου _____ **1 2 3 4 5**

στ. Μπορώ να λειτουργήσω σαν **δημιουργικό πρότυπο** για τους μαθητές μου ____ **1 2 3 4 5**

ζ. Η δημιουργικότητα πρέπει να χαρακτηρίζει και να διατρέχει **ολόκληρο το αναλυτικό πρόγραμμα** της πρωτοβάθμιας εκπαίδευσης _____ **1 2 3 4 5**

Ενότητα Δ

α. Η Μουσική Αγωγή αποβλέπει στη **γενικότερη καλλιέργεια της δημιουργικότητας** των μαθητών _____ **1 2 3 4 5**

β. Στα σχολεία όπου διδάσκεται η μουσική, δίνονται **πολλές δυνατότητες** στους μαθητές **για δημιουργία** _____ **1 2 3 4 5**

γ. Το μάθημα της Μουσικής πρέπει να έχει **χαρακτήρα εργαστηριακό**, λόγω της ανάγκης ανάπτυξης δεξιοτήτων και πρακτικών δημιουργικών διαδικασιών _____ **1 2 3 4 5**

δ. Το **Αναλυτικό Πρόγραμμα** της Μουσικής περιλαμβάνει ξεκάθαρους στόχους και κατευθύνσεις για την καλλιέργεια της δημιουργικότητας των μαθητών _____ **1 2 3 4 5**

ε. Οι μαθητές έχουν αρκετό **χρόνο** για να εκδηλώνουν τη δημιουργικότητά τους στο πλαίσιο του μαθήματος της Μουσικής _____ **1 2 3 4 5**

στ. Το **παιδαγωγικό κλίμα της τάξης** είναι βασικός παράγοντας για την εκδήλωση της δημιουργικότητας των μαθητών _____ **1 2 3 4 5**

ζ. Η ομαδοσυνεργατική διδασκαλία ενθαρρύνει την εκδήλωση της **συνδημιουργικότητας** των μαθητών _____ **1 2 3 4 5**

η. Η **αξιολόγηση** των μαθητών στο μάθημα της Μουσικής πρέπει να γίνεται με βάση τις δημιουργικές εργασίες – δραστηριότητες στις οποίες συμμετέχουν _____ **1 2 3 4 5**

θ. Αναφέρετε μια **εργασία** ή **δραστηριότητα** που γίνεται στο πλαίσιο της Μουσικής Αγωγής και θεωρείτε ότι προάγει τη δημιουργικότητα των μαθητών *(παρακαλώ περιγράψτε με συντομία)*

ι. Τι νομίζετε ότι χρειάζεται η διδασκαλία της **Μουσικής στην πρωτοβάθμια εκπαίδευση** για να ενθαρρύνει και να καλλιεργήσει πιο αποτελεσματικά τη δημιουργικότητα των μαθητών; *(παρακαλώ περιγράψτε με συντομία)*

ια. Παρακαλώ, **προσθέστε οτιδήποτε** νομίζετε ότι αφορά τη δημιουργικότητα στην πρωτοβάθμια εκπαίδευση γενικότερα ή τη Μουσική Αγωγή ειδικότερα και δεν καλύφθηκε από τις ερωτήσεις που προηγήθηκαν.

Ενότητα Ε

α. Φύλλο: Γυναίκα ☐ Άνδρας ☐

β. Ηλικία: 20-30 ☐ 31-40 ☐ 41-50 ☐ 51 και άνω ☐

γ. Η ειδικότητά μου είναι

δ. Χρόνια εκπαιδευτικής εμπειρίας: 0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21 και άνω ☐

ε. Άλλες σπουδές:

στ. Έχετε παρακολουθήσει μαθήματα, σεμινάρια ή επιμορφωτικά προγράμματα για τη δημιουργικότητα στην εκπαιδευτική διαδικασία; Ναι ☐ Όχι ☐

ζ. Το σχολείο που εργάζεστε, διαθέτει ξεχωριστή αίθουσα μουσικής; Ναι ☐ Όχι ☐

η. Αν επιθυμείτε να ενημερωθείτε για τα αποτελέσματα της έρευνας, γράψτε την ηλεκτρονική σας διεύθυνση στο πλαίσιο που ακολουθεί.

Παρακαλώ, πριν παραδώσετε τη συμπληρωμένη φόρμα, ελέγξτε αν έχετε απαντήσει σε όλα τα θέματα.

Ευχαριστώ πολύ για τη συμμετοχή σας στην έρευνα!

APPENDIX 4

Survey

Survey

Primary music teachers' conceptions of creativity

April 2007

Dear colleagues,

Creativity is a multifaceted and controversial phenomenon that needs more study, especially its educational dimensions. The aim of the current research is to point out primary music teachers' opinions and beliefs about creativity in primary education in general and music education in particular.

You need 15-20 minutes to complete the form. The data you provide in this investigation will be anonymous and confidential; please feel free to provide **your** opinions, which will only be used for the current research purposes.

Please read carefully and respond to the survey items. When the items refer to students, please respond while keeping in mind the students whom you are teaching this school year or the students you taught when you last worked in a primary school.

If you wish, you will be informed of the survey results via e-mail.

Your cooperation is highly appreciated!

Panagiotis G. Kampylis

Primary teacher – Ph.D. Candidate
Scholar of Greek State Scholarships Foundation
Postal Address: P.O. Box 35 FI-40014
University of Jyväskylä – Finland
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panagiotis.g.kampylis@jyu.fi

Please read each statement carefully and circle appropriately.
***1** strongly disagree, **2** disagree, **3** neutral (e.g. I don't know, I don't want to answer), **4** agree, **5** strongly agree*

Unit A

a. People can **recognize** and often **agree on** creative outcomes, even when they offer different definitions for creativity **1 2 3 4 5**

b. **Social** and **environmental factors** influence creative performance **1 2 3 4 5**

c. It is possible for a very **intelligent person** not to be creative **1 2 3 4 5**

d. **Information and Communication Technologies** can liberate a person's creative potential **1 2 3 4 5**

e. A creative person is not afraid to make **mistakes** **1 2 3 4 5**

f. A creative person produces a lot of **questions** **1 2 3 4 5**

g. A person must have **prior knowledge** in a domain in order to manifest creativity **1 2 3 4 5**

h. **Collaborative creativity** is more important and valuable than individual creativity **1 2 3 4 5**

i. **A creative outcome** is more a result of hard and continuous work and less a result of an insight **1 2 3 4 5**

j. Creativity is a key factor for **social** and **personal evolution** **1 2 3 4 5**

k. Creativity can be developed in **every person** **1 2 3 4 5**

l. Please write down the first **three words** that come into your mind when you encounter the term "creativity".

m. Please write down **one to three traits** of a creative person.

Unit B

a. Creativity is a characteristic of **all students** and it is not a rare phenomenon **1 2 3 4 5**

b. Some students are **more creative** (in a quantitative way) than others **1 2 3 4 5**

c. The most creative students have best **grades** in school **1 2 3 4 5**

d. The most creative students usually face **obstacles** in school **1 2 3 4 5**

e. Students have a lot of **opportunities** to manifest their creativity in school **1 2 3 4 5**

f. Students are more creative when they feel **intrinsically motivated** **1 2 3 4 5**

g. Students have many opportunities in school to use their **hands** creatively **1 2 3 4 5**

h. Students need to **feel comfortable**, physically and psychologically, to focus on creative tasks **1 2 3 4 5**

i. A student could manifest his/her creativity in a variety of **domains/school subjects** and in a variety of **ways** _____ **1 2 3 4 5**

j. Please, describe one **example** of creativity as manifested by your student(s)

---

k. Please select the **school subject or subjects** in which you consider it likely for a pupil to manifest his/her creativity *(please choose one or more).*

Greek Language ☐	*Mathematics* ☐	*Science* ☐	*Geography* ☐
Music Education ☐	*Arts* ☐	*Drama Education* ☐	*Health Education* ☐
Physical Education ☐	*Foreign Languages* ☐	*Religion/Ethics* ☐	*History* ☐
Environmental Studies ☐	*Civics* ☐	*ICT* ☐	*Flexible Zone* ☐

Unit C

a. Creativity can be **taught** _____ **1 2 3 4 5**

b. There is a need for **special programs** for the fostering of primary students; creativity _____ **1 2 3 4 5**

c. I feel **well-trained** to foster students' creativity _____ **1 2 3 4 5**

d. I feel well-trained to **recognize** the creative achievements of my students _____ **1 2 3 4 5**

e. I feel well-trained to **assess** the creative products of my students _____ **1 2 3 4 5**

f. I can serve as a **role model** for creativity _____ **1 2 3 4 5**

g. The theme of creativity must characterize and run through the **whole curriculum** of primary education _____ **1 2 3 4 5**

Unit D

a. Music education **aims to foster** students' creativity _____ **1 2 3 4 5**

b. Music education provides students with many **opportunities to create** _____ **1 2 3 4 5**

c. Music must be taught in appropriate **laboratories** in order to enhance students' creative skills _____ **1 2 3 4 5**

d. The **Cross-Thematic Curriculum Framework** includes comprehensible targets and directions for the fostering of students' creativity _____ **1 2 3 4 5**

e. Pupils have enough **time** to manifest their creativity in music education _____ **1 2 3 4 5**

f. **The class environment** is a key factor for the manifestation of students' creativity _____ **1 2 3 4 5**

g. **Collaborative classroom activities** encourage the expression of students' collaborative creativity _____ **1 2 3 4 5**

h. Students must be **assessed** in music education through their participation and performance in creative activities _____ **1 2 3 4 5**

i. Please, report briefly on **a task or activity** that takes place in a music education context and that promotes student creativity

_____

_____

j. In your opinion, **what does music education need** in order to foster more effectively student creativity more effectively? *(please describe)*

_____

_____

_____

k. Feel free to **add whatever you like** about creativity in primary education in general or creativity in music education in particular

_____

_____

_____

Unit E

a. Gender: Female ☐ Male ☐

b. Age: 20-30 ☐ 31-40 ☐ 41-50 ☐ 51 - 60 ☐

c. My expertise is

d. Years of teaching experience: 0-5 ☐ 6-10 ☐ 11-15 ☐ 16-20 ☐ 21 και άνω ☐

e. Additional studies:

f. Have you ever attended courses, seminars, or training programmes that were concerned with how to foster student creativity? Yes ☐ No ☐

g. Does your school have a special classroom/laboratory equipped for teaching music? Yes ☐ No ☐

h. If you want to be informed of the results, please write down your email address

Please **check** that you have responded to <u>all the items</u> and return the questionnaire.

Thank you very much for your time and cooperation!

APPENDIX 5

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΕΘΝ. ΠΑΙΔΕΙΑΣ &ΘΡΗΣΚ/ΤΩΝ
ΕΝΙΑΙΟΣ ΔΙΟΙΚΗΤΙΚΟΣ ΤΟΜΕΑΣ ΣΠΟΥΔΩΝ
ΕΠΙΜΟΡΦΩΣΗΣ ΚΑΙ ΚΑΙΝΟΤΟΜΙΩΝ

Δ/ΝΣΗ ΣΠΟΥΔΩΝ Π.Ε.
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FAX : 210 3238580
e-mail : t05spe3@ypepth.gr
ΚΑΤ

Να διατηρηθεί μέχρι
Βαθμός ασφαλείας

Αθήνα, 23-11-2006

Αριθ. Πρωτ. Βαθμός Προτερ.
Φ15/ 1135 / 120576 /Γ1

Προς: : κ .Παναγιώτη Καμπύλη
Αγίου Ιωάννου 50Α
143 42 Νέα Φιλαδέλφεια

Κοιν: 1. Παιδαγωγικό Ινστιτούτο
Μεσογείων 396
153 41 Αγ. Παρασκευή
2. Αρμόδιους Σχολικούς Συμβούλους
(Μέσω των Δ/νσεων Π.Ε. Α΄ Αθήνας,
Β΄ Αθήνας, Γ΄ Αθήνας , Δ΄ Αθήνας,
Αν. Αττικής & Πειραιά)
3. Δ/ντές Εκπ/σης Π.Ε., Α΄ Αθήνας,
Β΄ Αθήνας, Γ΄ Αθήνας, Δ΄ Αθήνας,
Αν. Αττικής & Πειραιά

ΘΕΜΑ: Έγκριση έρευνας

Απαντώντας σε σχετικό αίτημά σας και έχοντας υπόψη την αριθμ. 8/06 πράξη του Τμήματος Ε.Τ.Ε.Τ. του Παιδαγωγικού Ινστιτούτου, σας κάνουμε γνωστό ότι εγκρίνουμε τη διεξαγωγή της έρευνάς σας με θέμα: "*Οι απόψεις των Εκπαιδευτικών της Πρωτοβάθμιας Εκπαίδευσης για τη Δημιουργικότητα.*", η οποία θα πραγματοποιηθεί στα σχολεία του συνημμένου πίνακα με τις ακόλουθες επισημάνσεις:

1. Η άδεια χορηγείται για μια τριετία.

2. Πριν από τις επισκέψεις σας στα σχολεία να υπάρχει συνεννόηση με τους Διευθυντές τους και συνεργασία με το διδακτικό προσωπικό, ώστε να εξασφαλίζεται η ομαλή λειτουργία των σχολικών μονάδων.

3. Τα αποτελέσματα της έρευνάς σας να κοινοποιηθούν στο Παιδαγωγικό Ινστιτούτο και στη Δ/νση Σπουδών Π.Ε.

4. Η συμμετοχή των εκπαιδευτικών στην έρευνα είναι πάντα προαιρετική και γίνεται με δική τους ευθύνη και εφόσον το επιθυμούν.

5.Τα ερωτηματολόγια είναι πάντοτε ανώνυμα.

Οι Διευθυντές Πρωτοβάθμιας Εκπαίδευσης στους οποίους κοινοποιείται το έγγραφο αυτό, παρακαλούνται να ενημερώσουν σχετικά τα σχολεία στα οποία θα πραγματοποιηθεί η έρευνα.

Συν.: 7 φύλλα

Εσωτ. Διανομή
Δ/νση Σπουδών Π.Ε.
Τμήμα Α΄

Ο ΑΝΑΠΛΗΡΩΤΗΣ ΔΙΕΥΘΥΝΤΗΣ

ΡΗΓΑΣ ΓΕΩΡΓΑΚΟΠΟΥΛΟΣ

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
ΥΠΟΥΡΓΕΙΟ ΕΘΝΙΚΗΣ ΠΑΙΔΕΙΑΣ & ΘΡΗΣΚΕΥΜΑΤΩΝ

Πιστό Αντίγραφο
Από τη Διεύθυνση Διοικητικού
Τμήμα Διεκπ/σης & Πρωτοκόλλου

ΜΥΛΩΝΑΣ ΠΑΝΑΓΙΩΤΗΣ

APPENDIX 6

ΑΠΟΣΠΑΣΜΑ ΠΡΑΚΤΙΚΩΝ ΤΗΣ Γ.Σ. ΤΟΥ Π.Τ.Δ.Ε. ΤΗΣ 11-5-2006

ΜΕΡΟΣ Α΄ (Με συμμετοχή Γ.Σ.)

ΘΕΜΑ 2^{Ο} : Αιτήσεις

Ανακοινώνεται η υπ΄αριθμ. 1484/14-4-2006 αίτηση του κ. Παναγιώτη Γ. Καμπύλη, σύμφωνα με την οποία ζητά να εγκριθεί η διεξαγωγή έρευνας – πιλοτική φάση - που επιθυμεί να πραγματοποιήσει στα πλαίσια της διδακτορικής του διατριβής, σε τεταρτοετείς φοιτητές στο Π.Τ.Δ.Ε.

Η Γ.Σ. λαμβάνει γνώση και **εγκρίνει**.

Η ΓΡΑΜΜΑΤΕΑΣ

ΕΥΓΕΝΙΑ ΓΕΩΡΓΙΟΥ

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