

**Mexican Higher Education teachers' and students'
conceptions of creativity and the teaching skills needed to
promote it: towards the development of a tool to promote
teachers' reflection.**

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This thesis is submitted for the Degree of PhD

Declaration of own work

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Signed: ~~Lilian Dabdoub A~~.....

Declaration of word count

The number of words in this thesis is 83 926.

Abstract

Creativity has been identified as a key factor for adequately addressing the challenges individuals are required to face in a globalized world, with a quick rate of change where knowledge becomes obsolete very rapidly and where knowledge creation is the basis of the development of a knowledge society.

Generating programmes and strategies to promote teachers' skills for creative teaching is therefore important to accomplish the goal of facilitating students' creativity.

The aim of this research was to develop a tool to facilitate teachers' reflection in relation to what they actually do that may promote students' creativity and also to help them in identifying the kinds of changes they could make to improve their teaching to support students' creativity.

Teachers' implicit theories in relation to creativity are important as they may influence the decisions they undertake in relation to their pedagogical strategies, behaviours and attitudes in the educational environment.

The research was undertaken in a public university in Mexico City, to identify Mexican Higher education students' and teachers' conceptions of creativity, of what enhances or hinders creativity in the classroom environment and what characterizes a creative teacher.

A pedagogical model for 'creative teaching for creativity', was developed using findings from the research. To design the model salient indicators of creative teaching and creative teachers from previous research and explicit theories were also taken into account.

Results of the pilot study of the instrument, called 'Crea-teach', demonstrated that it accomplished the aim for which it was created since teachers' reported that the tool helped them to reflect on their teaching as well as to identify some of the changes they could make to promote students' creativity.

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Chapter 1

The rationale for the research

1.1 Introduction: Background to the present research

More than thirty years ago when I researched my undergraduate thesis, I became interested in creativity, in particular whether it could be developed intentionally. On completion of my studies, I started to teach at the National Autonomous University of Mexico in the School of Psychology and began to run courses for teachers on creative teaching in order to foster the development of creative teaching skills.

Since then I have continued deepening my understanding of the challenges teachers face in order to promote meaningful learning and understanding in their students as well as going further in my attempts to promote students' development.

From my experiences, I reaffirmed my understanding that creativity is a set of skills and attitudes (Rinkevich, 2011; Wisdom, 2006) that teachers need as part of their professional skills. These are particularly important because of the variety of approaches to learning, interests, and motivations which students bring to the learning situation and which teachers have to harness to enhance student learning. Teaching needs to be varied, and stimulating, creating challenges (Wisdom, 2006), introducing novelty supported by the adoption of a wide range of teaching strategies and learning resources that may foster students' motivation, learning and meaningful experiences (Jeffrey, 2006).

I also realized that it was important not only to promote teachers' abilities to teach creatively, but to enhance their skills to promote students' creativity through teaching. So generating strategies and educational programmes to promote teachers' skills for creative teaching seemed to me to be important to accomplish the goal of facilitating students' creativity (Torrance, 1987; Treffinger, 1993; Rinkevich, 2011; Strom & Strom, 2002; Dabdoub, 2008).

Despite the increased demand to promote creativity, historically, there has been little agreement as to its nature. It has taken several years to reach a consensus about what creativity is. Most researchers in the field now agree that creativity is a set of abilities

(Guilford, 1986); involving cognition (Runco, 1986; Runco, 1993) and affective aspects (Amabile, 1987); and is characterized by the production of novel and useful ideas (Cropley, 2009). Novel is understood as the creation of original products, that may be tangible or not (Cropley & Cropley, 2009), while usefulness depends on the kind of need or situation for which a product is developed. Other criteria may be added in relation to specific contexts and domains, in which the generation of novel ideas is proposed, including the influence of the social environment (Csíkszentmihályi, 1988).

If creativity is conceived as an ability or set of abilities, this means that it can be developed in human beings in the same way as other abilities. Once there is an understanding of what kinds of abilities are involved in the creative process or the expression of creativity, it should be possible to stimulate or promote their development within an educational context (Torrance, 1987). Affective and attitudinal aspects have an important role in the creative process (Amabile, 1987; Sternberg, 2003), including curiosity, persistence, openness to the new and unknown, tolerance to ambiguity, disposition to take risks and motivation to engage with creative processes (Torrance, 1981; McCrae, 1987; Davis, 1999).

To attain the understanding of creativity, therefore, it is important to approach it from a dynamic and complex perspective. From the perspective of complexity theory, creativity may be understood as an emergent property of a complex system (Keith Sawyer, 1999; Loi & Dillon, 2006). As a complex phenomenon (Capra, 1997; Capra, 2002; Dabdoub, 2008), it is difficult to state the exact combination of conditions from which creativity will emerge. Nevertheless, some understanding is required of these conditions if creativity is to be developed in educational contexts.

In response to the perceived need for creativity to be promoted I designed workshops to help teachers develop their own creativity and to apply it to the planning, designing and coordination of their courses in order to stimulate their students' creative skills and attitudes alongside facilitating meaningful learning in a particular discipline. Through my work with teachers I have found that sometimes there are misconceptions about creativity which interfere (Weinsberg, 1986) with the possibility of introducing creativity into the learning teaching process, and hence with facilitating students' creativity. Working with teachers at different levels of education, including K-12, undergraduate and postgraduate, I became aware, that they needed some kind of guide that would help them to reflecting on their teaching practices, in order to be able to identify, what they were currently doing

to foster students' creativity, and to become aware of the type of changes they would need to make for promoting students' creativity.

This research focuses on identifying the knowledge, skills and attitudes higher education teachers need to teach creatively for creativity and on offering a tool that can promote teachers reflection on their pedagogical strategies as a means to promote the changes required for them to improve their capacities to teach creatively for creativity.

The rationale for undertaking this research in Higher Education is that, although creativity ideally should be fostered through the whole curriculum, Higher Education may be for a student, the last opportunity to derive benefit from developing creative thinking skills through formal education.

In this dissertation, I present a review of the evolution of the study of the nature of creativity and of creative teaching. I set out an educational model for creative teaching for creativity based on the more influential findings of research in the field and on the results of the present research. I analyse the conditions that may facilitate or hinder teachers' and students' creativity in an educational environment derived from research. This approach will provide the basis for teachers' lifelong learning and teachers' educational programmes, as well as being a source of feedback for institutions to guide ongoing improvement.

1.2 The importance of and constraints to identifying key skills for life for the 21st century?

Several agencies in different countries have been involved in the process of defining the knowledge and skills that learners in the 21st century require. This quest for establishing 'key skills for life' has attempted to establish what kind of knowledge and skills education should promote in students so that they may live a fulfilling and productive life. The basis of this debate involves changing the emphasis of education from learning knowledge and facts to one where skills and the processes of learning are emphasised.

The vision and understanding of what students need to learn while they have the opportunity to be involved in formal education should be a guide for planning the actions needed to achieve that vision. However, defining the skills needed by students of the 21st

century is complex and challenging because of the current conditions of the world in which we are living including: the rapid rate of change; the speed and continuous innovation in technology; the impact of globalization on economies; politics and everyday life; the rapid obsolescence of knowledge; and uncertainty. These will be explored briefly in the next sections.

The rapid rate of change

The speed of change that we are currently experiencing in the 21st century has introduced the need to exercise choice in a wide range of settings and at many levels from the individual through to the collective (Craft, 2003). As Byron (2007) states, in the context of global competition and rapid technological change, the product cycle of Innovation-to-Diffusion-to-Stasis has accelerated from the 1970s, when it could be anything from 6 to 32 yrs. with the diffusion period from 15-20 yrs. becoming in 2000, a cycle of 1-5 years for Innovation and 1-5 years for Diffusion (McWilliam & Haukka, 2008).

The speed and continuous innovation in Technology

The speed of change has been accelerated, in part, by technological developments and the globalization of the economy and culture. Developments in technologies have had a huge impact in all the areas of human life, at work, in everyday life, on social relationships and families. Technology has changed how we work, the nature of work, who works and for how long (Robinson, 2001; Craft, 2002). An increasing proportion of the population now own a personal computer, which potentially provides access to a rapidly shifting information system which is worldwide and instantaneous, and offers the power to connect with others in a very fast developing 'e-marketplace' for ideas and transactions of all kinds (Craft, 2002). These changes affect lifestyles, beliefs and knowledge and "it takes creativity not to be blinded by the trappings of stability, to recognize the coming changes, anticipate their consequences and thus perhaps lead them in a desirable direction" (Csíkszentmihályi, 2006, p. xviii).

The impact of globalization on economies; politics and everyday life

From Weisberg's (1999) perspective, all enterprise associated with global production is less certain and moves faster, setting many demands for the persons involved, such as more

tolerance of ambiguity, more risk-taking, and more capacity devoted to experimentation, variety and adaptation.

Rapid globalization of economic and social systems involves what Schumpeter (1975) has called 'creative destruction', without the certainty that such destruction will lead to creative outcomes. He argues that it will take considerable creativity to deal with the possible side effects of this creative destruction, for instance, in ensuring that "valued traditions of less powerful cultures will not be lost, but integrated with the Western patterns so as to enrich the future instead of impoverishing it" (Csíkszentmihályi, 2006, p. xviii).

The rapid obsolescence of knowledge

In the 21st century, knowledge becomes obsolete at a very rapid rate and it is almost impossible to predict what kind of knowledge students will need to learn professionally or personally in the future. "The knowledge and skills needed for the future may not be known at the time a person studies at school or university" (Cropley, 2001, p. 136). Therefore, institutions cannot limit their goals and efforts to the transmission of content that may soon become obsolete. They should promote skills and attitudes related to creativity and creative thinking such as flexibility, openness to the new, the ability to adapt find new ways of doing things and courage in the face of the unexpected (Cropley, 2001; Craft, 1999).

It is important to foster the development of the skills that will allow individuals to respond and even anticipate the rapid changes they will need to deal with. Seltzer and Bentley state that:

The challenge of delivering an expanding set of skills and competencies is being partially met by the creation of a new lifelong learning infrastructure. However, innovations in lifelong learning continue to exist on the fringes of our education system. The dominant educational paradigm still focuses on what students know, rather than how they use that knowledge (Seltzer & Bentley, 1999, p.9).

Uncertainty

For Craft (2002), “uncertainty is a given in industrialized societies in today’s world” (p. 42). In earlier times, patterns of life were more predictable. They are now much less predictable and this is the case for social structures including families, communities and individuals (Kellner, 1992; Smart, 1993).

1.3 Initiatives to identify the key skills for 21st. century

Policy makers in different countries state their vision and goals for their education system, based on the skill set that they consider important and essential for young people. Governments, employers and research institutions have analysed these issues and have developed guidelines, which suggest what is required. In this section, I will explore some such initiatives including those undertaken by the Organization for Economic Co-operation and Development (OECD), the United Nations for Education, Science and Culture (UNESCO) and the European Union, as well as examples of government initiatives in Japan and the United Kingdom, which have identified skills that are recognized as important. How are decisions taken of what should be included in the curriculum of formal education for preparing students of 21st century? What are the forces that come into play? Clark (1983) indicates three forces that influence the development of programmes in universities and the process of decision-making: the state, the academic community and the market.

The state perspective

The state’s interest in raising standards in universities is in part because of an interest in assuring the quality of the educational services provided in the context of a highly competitive global market. “This trend, coupled with the enormous expenditure that is devoted to education has also precipitated a widespread public request for higher levels of scrutiny concerning the quality of education” (Anderson, 2005,p. 1).

The state may also be interested in accommodating educational objectives and outcomes in order to satisfy the demands of employers in order to sustain and develop economic growth. This interrelationship of interests and stakeholders can lead to a tendency to talk about the development of skills for employability, curriculum design being shaped to meet

these needs. “In particular, governments at all levels are seeking ways of developing skilled flexible workforces that facilitate economic competitiveness and high standards of living” (McMahon & Haines 2006, p.22).

As an example of the initiatives undertaken from the state perspective to define a set of key skills is an initiative undertaken in Japan in 1984 (Jackson, 1994). One of the eight recommendations included in the report stressed the importance of cultivating creativity, thinking skills and the capacity of expression (Jackson, 1994).

The employers’ perspective

It is important to take into account the views of employers when designing curricula as well as teacher education programmes in order to prepare students with the kind of skills that will enable them to have more opportunities in the labour market and hence, to be more successful in their professional and personal lives.

In the 'Information Age', employers demand flexible skills, such as: problem solving and decision making skills; skills in information technology; communication skills, listening skills, the ability to work collaboratively with others; the ability to gain new insights into self, the ability to work unsupervised in various groupings, the ability to organize and manage time and resources; and the ability to be able to plan and execute ideas.

Those individuals who possess expertise in a particular field of knowledge and deploy such knowledge to optimal effect, are highly employable as are those who are creative, who can contribute and help an organization to compete in a highly demanding economic environment thanks to their imaginative thinking (McWilliam & Haukka, 2008). This need was recognized in the UK in the National Curriculum for schools. “Many employers want people who see connections, have bright ideas, are innovative, communicate and work well with others and are able to solve problems. In other words, they need creative people.” (The National Curriculum: Handbook for teachers in England. 1992, p 12).

Employers require individuals who can work independently. Seltzer and Bentley (1999) argue that this requires individuals to have expertise in the following:

Information management concerns the knowledge society, the amount of information and the pace at which it is being produced. This requires the individual to have certain skills to manage information;

Self-organization refers to complexity in the actual context. It requires the person to be more autonomous and to be able to self-manage time and resources in order to be able to accomplish goals.

Inter-disciplinary skills concern the specialization of knowledge and lead to new forms of fragmentation. As each discipline becomes deeper and more complex, individuals are required to be able to work in the intersection of different disciplines);

Personal and inter-personal skills are needed as more complex contexts require individuals to work and interact with a diversity of individual conditions which demand individuals to be able to manage emotions, their own and those of others;

Reflection and evaluation skills are necessary to cope with the amount of information a person is required to manage and the amount of options that demand skills to reflect, compare, and evaluate in order to make grounded decisions.

In the context of Higher Education, Addison, Claydon, and McDowell (1999) at the University of Northumbria, conducted research to design an educational programme that could foster creativity within the 'Systems Design and Fashion program' (Addison, Claydon, & McDowell, 1999). As part of the study, the researchers interviewed employers and academics about the level of importance they attached to developing creative skills in students on the programme, in preparation for them fully contributing to the organizations for which they would work in comparison with other skills. Forty-one percent said creativity was of high importance, 36% of intermediate importance and 8% of low importance while 15% had no preference. This reinforced the high importance given to creative skills by employers reinforces its importance.

The academic perspective

As stated by McWilliam and Haukka (2008), the relationship between formal education and the workplace has traditionally been a difficult one:

Teachers have long argued that the value of their work is much more than simply preparing young people for work, while at the same time industry has bemoaned what they perceive as the skill deficits of young people entering the workforce (McWilliam & Haukka 2008, p. 3).

In contrast to the state perspective, the academic community may perceive that curriculum development should not be restricted by labour market demands. Academics may emphasize the promotion of the holistic development of the potential of all students; an approach influenced by a humanistic tendency that has supported a learner centred education focusing on the students' needs. As Burnard and White argue, "the production of 'benchmarks' and the meeting of 'standards' as displays of quality or measures of achievement are often not linked with the values held by individual teachers or school communities" (Burnard & White, 2008, p. 668).

One academic initiative to focus on the future needs of 21st century students was the 21st Century Learning Initiative. This drew on a wide range of expertise with collaboration with a range of organizations from different countries. The initiative grew out of the work of the Education 2000 trust established in the UK in 1983. The participating experts suggested that to prepare educational systems to stimulate the development of the skills required for individuals in the 21st century, teaching and learning need to be undertaken within the context of the 21st century with the tools of the 21st century. This implied not only the incorporation of information technology within and beyond the classroom, but also making major changes in the planning and delivery of education and developing the skills of those involved in the teaching and learning process including teachers, tutors, students and designers of educational materials.

This Initiative proposed as fundamental skills for students:

Thinking skills and problem solving skills including the capacity to identify and define problems, creativity, intellectual curiosity and critical and systemic thinking.

Self-direction skills including the capacity for adaptation and social responsibility to enable individuals to take decisions and be flexible enough to adapt to different social and economic scenarios.

Skills for interpersonal relationships and collaboration to take account of the growing diversity of the workforce and the need to communicate effectively work and create with others.

A similar set of skills for students of the information age was proposed by a team of researchers participating in the project, Assessment and teaching of 21st Century Skills, managed by the University of Melbourne under a contract between this university and Cisco, Intel and Microsoft. The project had international funding from Australia, Finland, Singapore and USA.). The authors affirm:

No longer can students look forward to middle class success in the conduct of manual labour or use of routine skills –work that can be accomplished by machines. Rather, whether a technician or a professional person, success lies in being able to communicate, share, and use information to solve complex problems, in being able to adapt and innovate in response to new demands and changing circumstances, in being able to marshal and expand the power of technology to create new knowledge, and in expanding human capacity and productivity (Binkley et al., 2012, p. 17).

The research team identified ten skills, which they considered as being required for citizens of 21st century. They organized them into four groupings: **Ways of thinking** (creativity and innovation, critical thinking, problem solving, decision-making and learning; learning to learn, metacognition); **Ways of working** (communication and collaboration); **Tools for working** (information literacy and communications technology (ICT) literacy); **Skills for living in the world** (citizenship, life and career, and personal and social responsibility).

Barnett and Coat (2005) question whether the current emphasis on skills and outcomes are developing the full potential of students to engage with the complex and ever-changing world. They suggest that a curriculum that will prepare students for this type of world needs to engage them not only in knowing and acting upon knowing, but also in being and being aware of self.

Several other organizations have been concerned with issues of creativity. The OECD conference Educating for Innovative Societies (OECD, 2012), discussed the goals of education in innovation-driven societies and how curricula, teaching methods and assessment practices could empower people for innovation. UNESCO offered a framework

that provided a synthesis of the kind of skills required for the 21st century (Delors, 1996) including skills for learning to learn, learning to do, learning to be and learning to live together. These were related to the capacity to learn meaningfully, throughout a lifetime, in an autonomous way and to be able to respond to challenges with creative solutions (Delors, 1996).

Learning to know involves the ability to undertake the learning process and regulate it in an autonomous way. Learning to do requires the individual to possess the skills to apply knowledge in different contexts. Learning to be, refers to the ability for self-knowledge and to be able to develop one's potentialities based on this knowledge and 'Learning to live with others' involves knowing how to generate and manage interrelationships based on a set of values like respect and tolerance and acknowledge of the value of diversity. Delors' framework might provide a useful basis for developing teacher education programmes, particularly if it also included a dimension entitled 'learning to create' (Dabdoub, 2008). This additional dimension involves creative skills and attitudes, which open new options for learning to learn since they represent the ability to find new and varied sources of information for learning; engaging all of the senses and making original connections within a knowledge context and between contexts with no apparent connection. In relation to the dimension of learning to do, creative skills may open up the possibility for applying and transferring knowledge and solutions from one context to another. In the domain of learning to live together, creativity opens roads to new and diverse ways of managing conflict, and collaborating creatively. In the domain of learning to be, the development of creative skills also has a positive effect on self-esteem and supporting the development of a balanced self-concept based on the recognition of one's capacities to offer original and novel responses to the challenges that daily and professional life offers. (Dabdoub, 2008).

Creative skills then should be considered as an essential part of the assets of the citizens of the 21st century. This proposal is congruent with what the current globalized context demands as mentioned by Weisberg (1999): tolerance of ambiguity, more risk-taking and more capacity devoted to experimentation, variety and adaptation.

1.4 Creativity as part of the 21st century key skills assets of an individual

Creativity has been included, as part of the assets, an individual should have in order to deal with a rapid rate of change, globalization, and uncertainty. For Seltzer and Bentley (1999), creativity is the central theme underlying the new demand for skills and is the ability to apply and generate knowledge in a range of contexts in order to meet a specific goal in a new way. It allows the individual to cope well with unknown territory and in recognizing and making choices. These skills involve what has been called 'life-wide creativity' (Craft, 2002).

For society, enhancing individuals' creativity represents the possibility for groups to interact facing unknown conditions full of uncertainty and generate new answers thus building knowledge.

The rising importance of creativity is driven in part from a shift that characterizes moving from an information age (in which knowledge workers are highly valued) to a conceptual age in which creators will be most valued as 'creative human capital' (Pink, 2005). The future of paid work is increasingly about turning symbolic knowledge into valuable economic and social assets and this applies to a much wider range of industries that are currently termed 'the creative industries (Florida, 2002). The creative workforce now includes those employed in a wide variety of industries including computing, engineering, architecture, science, education, arts and multimedia. Similarly, economists and policymakers see creativity, innovation and human talent, as the engine of economic growth and social dynamism (Florida, 2002).

Human creativity involves a constellation of cognitive and emotional factors that once put into action through the creative process may increase individuals' self-esteem and the experience of self-realization (Rogers, 1975). The knowledge era is becoming the creativity era because of the need for individuals to use their knowledge base and skills in diverse and original ways in order to find innovative solutions to problems in their work and lives (Seltzer and Bentley, 1999).

However, creativity is also vital for meeting the social, political and cultural challenges of the next century. Institutional renewal, community regeneration, and the capacity of politics to solve emerging

problems all depend on our ability to marshal the full range of knowledge resources, and to use them in the most effective ways (Seltzer & Bentley, 1999, p. 17).

The importance of developing creativity in students in higher education was recognized internationally, several years ago, for instance, in the United Kingdom, United States of America, and Australia as well as by international agencies such as UNESCO and OECD (DaVia Rubenstein et al., 2013). Yet, despite the significant overall interest in the topic, so far relatively little attention has been paid in Europe, to how creativity and innovation can be enhanced within and by the academic community (European University Association, 2006-2007).

Some countries have introduced the development of creative skills into their national school curricula. For instance, in the United Kingdom the National Curriculum (1992) included the development of creativity as a goal. In the handbook for teachers, the importance of creativity was set out:

By providing rich and varied contexts for pupils to acquire, develop and apply a broad range of knowledge, understanding and skills, the curriculum should enable pupils to think creatively and critically, to solve problems and to make a difference for the better. It should give them the opportunity to become creative, innovative, enterprising and capable of leadership to equip them for their future lives as workers and citizens. It should enable pupils to respond positively to opportunities, challenges and responsibilities, to manage risk and to cope with change and adversity (The National Curriculum: Handbook for teachers in England, 1992, p. 11-12).

1.4.1 The Importance of creativity in Mexican Higher Education context

The Higher Education system in Mexico characterizes by its heterogeneity and diversity. A range of institutions of different types with different regimes and forms of support, including autonomous and non-autonomous, public and private, state, federal, university, technological, teaching schools and intercultural institutions (Chehaibar Náder, et al., 2012).

According to the VI Government Report, in the 2011-2012 school year, enrolment in Higher Education for face to face tuition was almost three million students (2 932 000).

The previous rector of the National Autonomous University of Mexico (UNAM), Dr. José Narro Robles (period 2011-2015), coordinated a study that presented an evaluation of the National System of Education with proposals for reform which would address the challenges identified in the research. This was published in a book with the title *Ten-year plan to develop the national education system*.

In the chapter dedicated to the Higher Education System they reported that over the last two decades, major initiatives to improve the quality of higher education had focused on the association between risk assessment and financial resources as the main strategy to achieve the proposed goals, and that such a strategy had been implemented through multiple and varied programmes.

While the evaluation succeeded in establishing accountability in higher education, it was unfortunately not able to address issues relating to improving the quality of teaching. The indicators used to assess the quality of education, although important for institutions to make improvements (such as increasing the level of education of academic staff, improving the time allocation for teaching, consolidating infrastructure, etc.) did not assess quality itself. The research identified that there were significant quality differences between and within institutions (Chehaibar Náder, et al., 2012).

According to the data reported in the study, by 2012, the total number of teachers in Higher Education, from both public and private institution was 342 269.30. This means that over the last two decades the number of academic staff had nearly tripled (in 1990 figure was 134,424). Of the total jobs, about a quarter were full-time teachers and the average age of such teachers in public universities was 48 years.

According to figures reported on the website of the General Direction of Scholar Administration in 2015, UNAM, where the present study was undertaken had 38,793 academic staff. In addition, in the same year the number of students enrolled in undergraduate programmes was 201,206. These figures give an idea of the complexity of UNAM.

In relation to education programmes for teachers, UNAM has a section called the Directorate of General Academic Staff Affairs, that is responsible amongst other things for offering different kind of training for staff and updating courses. However, each school can also offer a variety of courses, workshops, and diplomas to meet the specific training needs of their academic staff. The complexity of such a system, means that there are a variety of approaches to teacher education programmes that makes it difficult to assess their impact on the quality of education and on students' learning and learning outcomes.

The Mexican Minister of Education, Emilio Chuayffet Chemor, states in the government document, "The National Program for Education 2013-2018", that education is the cornerstone of 'the Mexico of the future', and goes on to argue:

The challenge we are facing is enormous, and the basic elements that will enable us to make the changes required consist of people; better informed individuals, citizens that respect the law and their environment; creative human beings who sympathize with others; persons that can understand and learn, and who are capable of facing challenges, overcoming adversity and building a better tomorrow (The National Program for Education 2013-2018, p. 12).

One of the objectives of this program, objective number 6 states the promotion of scientific and technological education as essential for the transformation of Mexico into a knowledge society member.

The following argues the importance of this purpose:

The ability to innovate is one of the factors that make the difference on the road to development. While graduates of all educational levels should be creative and produce appropriate solutions to the contexts in which they operate, is in higher education, particularly at the post-graduate level, where the generation of new knowledge and creativity become more important. Institutions with postgraduate students have the responsibility to develop in them the capacity to make a direct contribution to the advancement of knowledge, innovation and scientific and technological development, and thereby improve living standards in the country (Education Sector Programme, 2013-2018, p.29).

The document emphasized that, stimulating creativity in students and their approach to productive activities is crucial for the generation of ideas that will later be exploited by society (Education Sector Programme, 2013-2018, p. 29).

One of the strategies mentioned to accomplish this objective is strengthening the analytical and creative ability of Mexicans with a modern view of science and technology.

Three types of actions linked to this strategy are as follows:

Promote programmes that encourage social appropriation of science, technology and innovation, especially among children and young people.

Support projects to encourage the development of creative and innovative talent.

Support mechanisms for measuring the social perception of science and technology in the country.

The Programme, links innovation and creativity to science and technology and therefore to productivity and to the possibility of generating new ideas that would translate into better living conditions for the Mexican people.

In the document cited, there is no mention of the role of teachers in the process of encouraging the development of creative and innovative talent and there is no mention of what kind of educational model might accomplish these aims. The aims should involve teacher education programmes that can create the basis for facilitating the achievement of the objectives.

Zubieta García et al. (2012) affirm that although the quality assessment indicators used until now have been widely criticized, some information has been gained from them about the type of changes that are needed. For example, the research has identified the need to design more flexible educational models which are relevant for the diversity of students and institutions, focused on learning, on learners and on high quality education. Such educational models, amongst other things, should facilitate, as recommended by The Conference Board of Canada (2008), developing students' skills to adapt quickly to different situations, including national and international contexts. Such skills include teamwork, the use of information and communications technology, creativity and

innovation, critical thinking and problem solving, communication and collaboration, adaptability, initiative and autonomy in addition to disciplinary knowledge.

To achieve these goals, teachers must be able to perform their functions effectively including understanding and communicating their knowledge and supporting the generation or the innovative application of knowledge with a balanced distribution of time between academic tasks. It was therefore proposed that there should be a continuation of the implementation of programmes to strengthen the training of teachers in public institutions of higher education at all levels (Zubieta García et al., 2012). Zubieta Garcia and colleagues concluded that innovative, and improvement initiatives in education always need to take into account the role that structure, political guidelines, resources, organizational conditions and teachers play in ensuring their success. They argued that if this was not the case, good intentions might remain as paper exercises without ever reaching the students' everyday reality in relation to educational processes.

1.4.2 Teacher education initiatives to promote creative teaching in the Mexican context

In my role as consultant and creativity educator, I have been involved in initiatives in Mexico providing workshops for teachers to enhance their creative teaching. Although there have been several initiatives in the Mexican context to develop a more creative pedagogical approach to teaching at different educational levels in the public and private sectors of education, there are almost no refereed publications that systematically report what was done and what the outcomes were. One of these initiatives was developed in the context of public education in the state of Jalisco. The Ministry of Education promoted a continuous education program for primary and secondary teachers, with a participation of 938 teachers.

The axes around which the curriculum was developed were:

1. Creativity and its' impact on educational agents.
2. 'Creativ' and its implementation in the programmes and strategies for creative stimulation.

3. Creativity applied in the curriculum.

To date there are no formal publications in relation to the results or impact of this program.

In 1992, the National Autonomous University of Mexico (UNAM, Universidad Nacional Autónoma de México), the largest public university in Mexico, started a program called the Highly Demanding Academic Program (Programa de Alta Exigencia Académica, PAEA-UNAM) which aimed to provide a more challenging education to students with high academic competencies. Ten schools of UNAM participated in this program (Medicine, Chemistry, Psychology, Dentistry, Administration and Accounting, Architecture, Art and Design, Social Work, Engineering, Nursing, Veterinary and the School of higher studies Iztacala. Each school used different types of academic strategies to challenge their students, for example by exposing them very early in the educational process to working alongside researchers in their field.

As part of the activities of this program, which aimed to improve work conditions and to promote students' academic engagement, the researcher was responsible of conducting workshops on Creative Teaching for the Higher Education teacher. The teachers participating in this program in 1994 and 1995 participated in a Creative teaching workshop where they analyzed a conceptual framework to develop their understanding of how students' creativity could be enhanced through teaching. The outcomes of these workshops were not published in any refereed publication as far as the researcher knows.

A private institute called ICRET also developed a program with the name Creativity and Innovation: Human development, Education and Organization. This was offered for several years. As with the other Mexican programmes no formal evaluation was undertaken.

The previous section indicates that while there have been a number of initiatives relating to creativity in Mexican higher education, no formal evaluations of the programmes and their outcomes have been carried out.

1.5 Creativity in education: benefits and challenges

When creativity is included as one of the purposes of education, and the teacher generates the conditions for the expression of skills and attitudes linked with creativity, there are a number of benefits (Runco, 2004):

- self-esteem is strengthened; flexibility is stimulated; tolerance to uncertainty and diversity are promoted;

- students' motivation and involvement in the learning process is stimulated;

- students' freedom and responsible decision making is supported; and skills linked with complex thinking are stimulated, for example, pattern identification and establishing original and remote connections.

Higher Education in the current context faces several challenges (Light, 2002) which are important to take into account when planning to introduce creativity into education.

Amongst them, the following need to be emphasised:

- the issue of transferability;

- in what measure students are able to apply in an original manner what they learn at university to real problems they face in a working environment;

- the way that organizations, and labour market needs change constantly;

- the conceptual shift in thinking from a teaching centred education process to a learner centred education, from a paradigm oriented towards delivering knowledge to developing and fostering independent learning by which students may develop the ability to discover and reconstruct knowledge (and their lives) by themselves.

Another challenge for education is to promote a balance between structure and flexibility, so that structure and organization are not rigid and stagnated. This relates to the concept of the "paradox of structure" (Kirton, 2003). Too much structure inhibits creativity; however, a complete lack of it inhibits creativity, as human beings do not create in a vacuum. Educational policy makers and managers play a crucial role in the definition of educational goals. They need to respond to the paradox of structure, as well as to

challenge of accountability while creating for educational communities and educators the conditions that will allow them to include creativity in their educational processes.

Education systems need to find ways to function as open systems where they may be sufficiently flexible and permeable to enable the flow of new ideas and trends. Current educational discourses highlight the importance of creativity (Jeffrey & Craft, 2006) as it is eminently suited to the multiple needs of life in the twenty first century, which calls for enhanced skills of adaptation, flexibility, initiative and the ability to use knowledge in different ways than has been hitherto realized.

Higher education lecturers are essential actors to achieve those goals since they are in contact on a daily basis with students and are directly involved with the process of learning. Teacher transformation represents a challenge when introducing innovation in education, for instance, in asking them to get involved in the enhancement of students' creativity.

Important questions, related to the kind of competences teachers should have in order to facilitate students' development of their full potential in a range of domains, have to be raised. The task of the higher education lecturer is to deal with and manage individual differences as well as the factors related within the context and with the nature of the context in an efficient manner in order to assure the accomplishment of the educational aims. Hativa (2000) argues that the effective teacher is one who may successfully accommodate all of the factors involved in the process of learning while teaching.

To meet this challenge, lecturer educational programmes will require the development of teaching knowledge and the skills and attitudes required to teach creatively and to foster creative skills and attitudes throughout the curriculum. This relates to the research questions that the present research seeks to answer. These are:

- What conceptions of creativity do Mexican students and teachers hold?
- What are Mexican students' and teachers' perceptions of the factors that enhance and hinder their creativity in the classroom?
- What conceptions of a creative teacher do Mexican students and teachers hold?

- What specific knowledge, skills and attitudes do teachers need to be able to foster students' creativity through the curriculum in higher education?

Based on the findings from these questions and the existing literature, the research will aim to develop and pilot a questionnaire for teachers to use to assess their own needs in relation to teaching creatively. The research question relating to this is:

- To what extent can teachers' awareness of their teaching practices relating to creativity, be enhanced through a process of self-reflection supported by using a self-assessment tool?

1.6 Summary and Conclusions

Human creativity is important for students as they face a world of continuous and rapid change characterized by a high level of uncertainty. Creativity also represents for the individual a constellation of cognitive and emotional factors that once put into action through the creative process can increase self-esteem, self-awareness and the experience of self-realization. It is also important for society providing the possibility of groups interacting facing unknown conditions full of uncertainty, generating new answers, and building knowledge.

In the Mexican context, there have been a number of initiatives undertaken by the public or private education sectors to promote creative teaching. However, there is very little information published which reports the procedures and findings. There is therefore a need for systematic research on teaching for creativity in the Mexican context.

Given the importance of fostering students' creativity, the present research looks to understand the challenges faced by students and teachers and to develop a tool for teachers to assess what they need to do to support them in teaching creatively for creativity.

Several assumptions are critical when making decisions about including creativity in education. One is that creativity can be developed; the other, is that everyone has the

potential for creativity. The following chapter considers previous research, which has considered the nature of creativity.

Brief resume of the succeeding chapters

The thesis is organized in eleven chapters. **Chapter 1** provides a rationale for the research. **Chapter 2** considers the nature of creativity presenting the historical evolution of its study and current ideas. **Chapter 3** analyses the implications of promoting creativity in education and conceptions of what it means to teach creatively and the skills and attitudes identified in previous research. **Chapter 4** presents the aims, the objectives and research questions of the present study. **Chapter 5** presents the rationale for the selection of methodology and outlines the actual methods adopted in the initial research. **Chapter 6** and **Chapter 7** report the findings from the initial study presenting the students' and teachers' perspectives. **Chapter 8** compares the themes emerging from the analysis of students' and teachers' responses. **Chapter 9** sets out the rationale and development of the self-assessment tool designed to facilitate teachers' reflection on their teaching practices and the procedure and findings from a small scale evaluation of it. **Chapter 10** presents a summary of the key findings of the pilot study of the self-assessment tool and **Chapter 11** discusses the limitations of the present research, contributions as well as the implications for education and for further research.

Chapter 2

The nature of creativity

“Creativity requires the courage to let go of certainties.”

E. Fromm

2.1 Introduction

Throughout the history of humanity, a diversity of factors have influenced the study of creativity among them: the philosophical trends of the moment, the values that different cultures recognize as important, the belief systems in society, and predominant socio-political trends, amongst others.

The concept of creativity as it is currently understood, only appeared in the middle of the twentieth century. Prior to that, other concepts related to this phenomenon were in use, for example research relating to genius and giftedness, for instance, the work of Galton (1869). Interest in the process of being creative emerged with the work of Wallas (1975). A key turning point was the lecture given by Guilford when president of the American Psychological Association in 1950. His speech stimulated a more systematic and scientific study of creativity. Guilford brought the attention of his audience to the fact that only 186 out of 12 000 titles listed in Psychological Abstracts were related to the study of creativity (Isaksen, 1988). His intention was to underline the lack of research in the field. Guilford suggested that the lack of research specifically focused on creativity was, in part, because several studies had related the concept of genius to a high IQ. He believed that creativity and creative productivity extended beyond the domain of intelligence. Another issue was the difficulty in assessing creativity. He proposed that this could be overcome if there was a clear definition and if persons were observed under equal environmental circumstances. Since the 1950s, there has been a growing interest in the study and understanding of creativity indicating increased awareness that creativity is important for humankind in a globalized and complex world (Seltzer & Bentley, 1999).

To understand creativity, it is important to approach it from a dynamic and complex perspective. From complexity theory, creativity may be understood as an emergent property of a complex system. Several factors are involved in the emergence of creativity:

the person, the process in which he or she becomes involved, the product, and the environment and social and cultural context in which the process is undertaken. This means that in each case a particular combination and interaction of conditions are required to generate the possibility of a creative act (Schuldberg, 1999).

From a systemic view of creativity, affective aspects and cognitive processes have an important role in the creative process. Among the affective aspects, some attitudes are important, for example, curiosity, persistence, and openness to the new and unknown, tolerance to ambiguity, a disposition to take risks and motivation.

The novel properties that emerge from the interaction between the components of a system influence its future evolution and it may be that a new type of system will be generated; but in this process, there is a certain level of uncertainty. Emergence has the effect of creating novelty that is qualitatively different from the phenomena from which it emerges (Schuldberg, 1999).

In this chapter, I present a theoretical framework for understanding creativity based on the findings of research from different disciplines, although mainly from psychology. Of particular interest are the implications of these findings for education and teachers' educational programmes.

Such a framework, based on research on the nature of creativity and on explicit theories of creativity relates to the research questions. It provided the basis for comparing students' and teachers' implicit theories of the nature of creativity, of what enhances and obstructs their creativity and of what they conceive to be the characteristics of a creative teacher.

There are different approaches to studying creativity and different conceptions of it. The intention here is to focus attention on the research and conceptions, which are relevant for educators and the fundamental questions that they may ask when trying to understand creativity and its implications for education. The key, but not the only questions are what is creativity? What do we know about it? What are the main areas of agreement between researchers?

Reviewing the extensive literature on creativity throughout history suggests there are six major identifiable trends that may provide an organizational framework for understanding the development of the field. These approaches are: 1) the inspirational explanation, 2) the

biological approach, 3) the study of the creative personality, including cognitive and psychometric studies, 4) studies related to the creative process 5) the creative product and 6) the conditions or characteristics of an environment or context that may enhance creativity. These approaches have not evolved in a linear way. They sometimes overlap and some have been developed as new scientific methods or techniques. This is the case for the biological approach, which began looking for the hereditary roots of creativity in the individual and evolved to searching for the role of different brain structures in the creative process (e.g. the right-left brain debate).

2.2 Creativity and inspiration

When tracing the origins of the study of creativity it is apparent that different concepts have been related to creativity, such as genius, giftedness, imagination. From the earliest times up to the Renaissance, it was widely believed that the gods, by God himself or by a muse (Dacey, 1999), inspired all desirable innovations.

There are several historic beliefs related to creativity that have become “myths” (Weisberg, 1986), and which may act as obstacles to the development of a comprehensive understanding of this construct and hence to finding ways of promoting creativity. One of these myths relates to the belief that creativity requires inspiration, which may come from a muse (any cause or principle underlying a creator’s work). Inspiration in this sense means to receive the breath of the muse. Later, through the research of Wallas (1975), which will be considered later in this chapter, this element of creativity was related to the stage of incubation and the transition to illumination. This conceptualization provided the creator with a more active role rather than merely waiting for inspiration to arrive randomly from an external source.

The concept of creativity as linked to inspiration persists among the implicit theories of many people so it is important to consider the kind of influence the persistence of this notion may have on peoples’ behaviours. Inspiration is understood as a sudden understanding of the solution to a problem, a state when everything becomes clear. It is linked to the stage of illumination.

One way a belief in inspiration may influence behaviour is through inculcating a more passive attitude towards the creative process, since the control of the creative process is seen as being outside the individual. In practice, creativity requires the individual to experience feelings of control and self-efficacy in relation to the creative process. As Runco states, "Creative self-efficacy can be fostered by providing genuine praise and feedback about a person's creativity and avoiding discouraging statements" (Plucker & Runco, 1999, p. 672). In education, a more proactive approach should be promoted based on understanding the conditions that may foster each individual's creativity, in such a way that they may generate the conditions that will enhance the experience of that state of 'inspiration' and of self-efficacy.

The "inspiration state" may also be related to the emergence of insights and to the role of the unconscious mind in the creative process (Simonton, 1999). Although there is still controversy in relation to the role of the unconscious in the emergence of insights and creative ideas, several researchers have studied the role of the unconscious and have attempted to understand its contribution to creativity (Hadamard, 1945).

2.3 Nature versus nurture

In the last years of the nineteenth century, there was considerable debate about the relative contribution of nature versus nurture, the biological correlates of creative potential versus the importance of the influence of learning and the environment over the development of such potential. Galton (1869) was one of the influential researchers who examined the hereditary nature of mental abilities in individuals recognized by society as geniuses in an attempt to show that genius was an inherited trait in the same manner that physical features were inherited. Galton's studies were not conclusive about the hereditary nature of 'eminence', but they opened the door to empirical studies on creativity.

The distinction between creative potential and creative performance (Runco, 2003) is also relevant to the current research. It is not only important to possess the potential for creativity but to be able and committed to transform ideas into actions. According to Gardner (1993), what may distinguish creative individuals is the way they productively use their insights, feelings and experiences of childhood.

The study of the biological base of creativity has recently taken a more neurophysiological approach oriented to understanding the functioning of brain structures during the creative process. Advances in technology (e.g. neuro-imaging studies and computerized axial tomography, CAT) have led to opportunities to design studies where the living and working brain can be studied. Despite this, it is very difficult actually to see a brain “working” during a creative process. The research has tended to use simple tasks where the person has to give a novel response in order to see which part of the brain is involved in such an activity. This approach to the study of creativity is rapidly evolving because of progress in transdisciplinary research in the neurosciences (Gardner, 1987).

Early research suggested that the right side of the brain was responsible for much creative activity; however, creativity requires processing from both hemispheres. “Both hemispheres are connected by millions of neural fibers through the corpus callosum, and work together for most tasks” (Runco 2004, p. 664). Newberg and D’Aquili (2000) illustrate this interaction explaining, “the left side helps us to select and use words, but it is the right side that interjects emotional tones and inflections into our language. The right hemisphere allows us to hear the emotional aspect of language.” (Newberg & D’Aquili, 2000, p. 58). Dietrich (2004b), underlines the role of the prefrontal cortex in creativity, since creativity requires cognitive abilities such as working memory, sustained attention, cognitive flexibility, and judgement of propriety, which are typically ascribed to this brain structure. Overall, the evidence suggests that the brain works as an integrated whole and that for creativity to be developed, there is a constellation of factors that interact: cognitive and emotional factors, personality traits, attitudes, and the influence of the environment, learning, and experience.

Previously, several of the educational programmes, which have proliferated, relating to creativity, are based on stimulating right-brain activity as providing the basis for creativity. These have failed to take into account that the normal brain works in a more holistic way and that when we are involved in an analytic task several regions of left and right brain are interacting. “Creativity is not always or entirely intuitive, nor even radically original. Creativity instead reflects originality and appropriateness, intuition and logic. It requires both hemispheres.” (Runco, 2004, p. 664).

There are important implications of the nature vs nurture debate for education as research continues to explore the role of genes on the functioning of the brain, particularly in

relation to creativity (Ukkola-Vuoti et al., 2013). However, there is general agreement about the influence of environmental and pedagogical methods on the development of an individual's skills, attitudes and behaviours in relation to creativity.

2.4 The creative personality

Initial studies on the creative personality were mainly focused on the highly talented and gifted individuals. However, Craft (2000) argues there are differences in terms of the creative achievement that can be attained. The most common level of creativity that everyone may demonstrate, is called creativity with a small c. This involves the daily creative acts that form part of everyday life. Creativity with a capital C involves acts that may have a wider impact in a community or in society. This assertion is in accordance with recent trends in research that look to understand what personality characteristics, skills and attitudes may be more related to creativity and hence if they can be promoted in order to increase creative achievement.

There have been three focuses in the study of what characterizes a creative person: 1) personality studies, 2) psychometric research 3) cognitive studies. The study of the creative individual has continued for several decades, and has been criticized by some researchers who suggest that these studies have given insufficient importance to the role of the social context (Csíkszentmihályi, 1990; Amabile, 1983).

Personality studies

From the earliest years of the twentieth century until the 1960s, several personality studies were oriented towards the identification of personality traits and the attitudes of highly creative individuals. These studies used different research methods and strategies, such as interviews, and personality questionnaires, while other phenomenological studies, were based on anecdotal or biographical resources (e.g. Poincaré, 1913; Cox, 1926; MacKinnon, 1975; Gardner 1983, 1988; Amabile, 1987).

Several instruments were designed to explore personality characteristics whose presence is thought to increase the likelihood of creativity (Cropley, 2000). For example, the Creativity Checklist (CCL) is used by observers to rate the behaviour of people at all age

levels to assess them across eight dimensions (Johnson, 1979). The personal properties that are assessed are: ingenuity, resourcefulness, independence, positive self-referencing, and preference for complexity. The cognitive dimensions are fluency, flexibility and constructional skills. Another example of the measures developed is the Creatix Inventory (C &RT) (Byrd, 1986). This instrument integrates the cognitive (thinking) and non-cognitive (motivation) dimensions of creativity. The test consists of two blocks of 28 self-rating or attitude statements, one to measure creative thinking and the other risk-taking. Respondents select an option from a 9-point scale ranging from complete disagreement to complete agreement. Scores are plotted on a two-dimensional matrix (creativity versus risk-taking) and the person is assigned to one of eight styles: reproducer, modifier, challenger, practicalizer, innovator, synthesizer, dreamer and planner. The innovator is high on both dimensions.

Several researchers have identified personality traits related to creativity. Some characteristics emerge consistently. For example, Barron (1961) and MacKinnon (1975) concluded, from their research on highly creative persons, that two important features were common: originality and openness to the context. Stein (1984) identified self-assertiveness; curiosity; persistence; achievement; being open to feelings and emotions; and being involved in self-fulfillment and self-realization.

Jackson and Messick (1965) offered a model that organized the traits into two facets: intellectual and personality traits. Among the personality traits, they identified originality, sensitivity, flexibility and being poetic. The authors explained this last trait as a way of expressing the kind of achievements the creative person offers which simultaneously might unravel complications and get to the significant part. Among the intellectual or cognitive traits, they identified tolerance of incongruity, analysis and intuition, open-mindedness, reflection and spontaneity.

Runco's (2007) description of a creative personality includes two of the traits mentioned by Jackson and Messick (1965), flexibility and sensitivity. This last trait has been linked in particular to artists. From Runco's perspective, "the paradox here concerns how creative people can be sensitive but at the same time resilient and stand up to pressures to conform and to be conventional" (Runco, 2007, p. 299).

Other traits mentioned by Runco (2007) in his characterization of a creative person are: autonomy, preference for complexity, openness to experience, playfulness, tolerance for ambiguity, risk taking and risk tolerance, psychological androgyny, self-efficacy, wide interest and curiosity. As will be discussed later, all these traits are required or at least are desirable to cope with the conditions that the creative process demands from a person.

Sternberg (1988) mentioned two additional characteristics, which have become important for creativity. These are perseverance and willingness to grow. These characteristics are linked to motivation, which is a critical aspect of the creative person.

At the individual level, motivation to create may be driven by multiple incentives, internal or external. Extrinsic motivation, involves the need to receive recognition or by a genuine desire to contribute to society. In everyday life, individual creativity may be oriented from a very practical approach to solve a problem, which requires a novel solution. Intrinsic motivation relates to the satisfaction that the individual gets from experiencing achievement and self-actualization through the creative process (Rogers, 1975).

MacKinnon (1975) describes intrinsic motivation in relation to creativity more as a personality trait and as expression of personality than a temporal state.

For Heinzen (1994) there is a continuum with proactive creativity at one end and reactive creativity at the other. This concept is useful in understanding that a person can in some cases, be guided by intrinsic motivation and in others, by the expectation of external rewards or recognition (e.g. extrinsic motivation).

In summary, Table 2.1 shows the traits that are frequently mentioned by researchers in relation to a creative personality.

Table 2.1 Most common traits of a creative personality

Personality trait	Description	Authors
Persistence	This characteristic is relevant for the creative process since frequently it involves a large investment of time to arrive to important insights and to develop novel products. Perseverance allows the creative individual to continue being involved in the process in spite of fatigue or frustration.	Runco (2007) Csíkszentmihályi (1996) Torrance (1988)
Openness to experience/ open-mindedness	This involves sensitivity to fantasy, feelings, aesthetics, ideas, actions, and values. It relates to the capacity to receive new information without prejudice.	McCrae (1987) Runco (2007) Jackson and Messick (1965)
Sensitivity	This involves the capacity to perceive reality with all of the senses. It requires being a good observer and being able to identify the kind of emotions that such observation awakens. This is linked to openness.	Jackson and Messick (1965) Runco (2007)
Tolerance of ambiguity	This allows the person to deal with the ill-defined nature of problems that have creative potential.	Runco (2007) Tegano (1990) Sternberg and Lubart (1996)

Risk taking or risk tolerance	Creativity involves exploring the unknown and testing different and unfamiliar situations. The creative person is more inclined to take risks.	Byrd (1986)
Intrinsic motivation	A creative person is driven mainly by intrinsic motivation.	Rogers (1975) MacKinnon (1961) Heinzen (1999)
Self-efficacy and confidence	This characteristic is required to face adverse situations and to test original and unknown pathways.	Runco (2007) Bandura (1997)
Wide interest and curiosity	Curiosity brings opportunity to the creative person to integrate information from a diversity of fields that will be useful for creating remote and unusual connections.	Stein (1984) Runco (2007)

The characteristics of a creative personality are important to take into account when planning to include creativity enhancement in education for the following reasons. It is necessary to analyse how education and the teaching process may enhance these characteristics or at least give them a place in the normal educational process. Likewise, it is also important to consider how teachers could become role models for their students by showing positive dispositions towards developing these characteristics or towards recognizing and accepting them in their students.

Educators should be aware that self-confidence and a sense of self-efficacy, are relevant for undertaking creative efforts and that these can be enhanced through meaningful learning experiences in the context of an educational environment free of psychological

threats. "Above all, innovativeness requires an unshakeable sense of efficacy to persist in creative endeavours" (Bandura, 1997, p. 239).

2.4.1 Psychometric and cognitive studies

Early psychometric studies of creativity were linked to intelligence tests. Initial research studied eminence and giftedness, for instance, the work of Terman. In one study on highly intelligent children, Terman (1925) shifted the focus from genius to giftedness, which was defined based on performance on various mental tests. In the 1950s, the focus shifted again to creativity, in part due to the need for innovation in science, industry, business, and art (Getzels, 1975).

At this time, there was also a need to define the relationship between intelligence and creativity:

Indeed, a number of the early test makers themselves argued that certain types of cognition -- notably creativity -- might be independent of, or at least only moderately related to, the measures of intelligence they were constructing. And whereas common observation insists on distinguishing between knowing and discovering, between the ability to remember and the ability to invent, between being 'intelligent' and being 'creative', it is this distinction that seems largely to have been lost sight of in the rush to apply the intelligence test or some derivative of it to everything from grouping children in the kindergarten to selecting students for graduate work, from choosing executives in business to assigning scientists to research positions (Getzels, 1962, p. viii).

To clarify the difference between intelligence and creativity, in the following description, Cropley (1999b) characterizes intelligence based on the main processes that it involves:

Conventional intelligence is heavily dependent on recognizing, recalling, and reapplying, and requires among other things substantial knowledge of facts, effective acquisition of new facts, rapid access to the contents of memory, accuracy in finding the best answer to factual questions, and logical application of the already known (Cropley, 1999b p. 516).

In contrast, creativity requires the production of novelty. It departs from facts and information generating new connections. For Cropley (1999b), creativity and intelligence are interacting aspects of intellectual ability and are not either identical or completely different. Intelligence deals essentially with the transformation of partly unfamiliar situations into familiar and traceable situations, while the term creativity can be reserved for total task novelty, where it becomes difficult to identify a familiar pattern (Raaheim, 1974). Gardner and Sternberg (1994) consider that intelligence is best captured at the medium ranges of novelty, where there is the opportunity for people to make intelligent use of their previous knowledge.

Once it was recognized that creativity could not be measured by traditional intelligence tests, researchers oriented their efforts to developing instruments to assess creative skills. Most of these instruments assessed the 'level of creativity' (Kirton, 1976), i.e. the level in which the individual demonstrated the skills involved in creativity.

An alternative approach to the measure of creativity has been to identify preferred cognitive styles with which a person prefers to solve problems or create (Kirton, 2003). From Kirton's perspective (1976), individuals show a preferred cognitive style that can fall in a continuum between a mainly adaptive or an innovator style. Commonly, creativity links to an innovator style, which characterizes by the tendency of the person to look for solutions beyond the boundaries of well-known and familiar solutions; the person with this style tends to break the rules and be prolific in ideas (an expression of what Guilford calls fluency). Innovators tend to do things in a different way from the norm and tend to challenge the definition of the problem. In contrast, the adaptive style relates to the preference to create or solve problems looking for solutions within the boundaries of existing and accepted paradigms of what is known about the problem. Adaptors tend to accept definitions of problems. Solutions suggested by adaptors tend to relate to improvement, finding ways to do things better in a more efficient or detailed manner. Both styles are expressions of creativity. Individuals may learn strategies from other styles if that is useful in their work (Kirton, 2003).

It is important for educators to understand the implications of the adoption of these styles since persons with different styles tend to have different ways of approaching a problem,

which influences their communication with others, and team work. Both styles have strengths and weaknesses and both are required within organizations since they contribute in different ways to the evolution of the organization and to the creative processes operating within organizations.

Wilson, Guilford, Christensen and Lewis (1954) undertook a study to isolate and define abilities in the domain of creative thinking particularly as it applied to science, engineering and invention. They administered fifty-three tests to measure aspects of creative thinking to 410 air cadets and student officers. The scores were correlated and after orthogonal rotations, 14 identifiable factors were identified. Nine of them were previously identified in other studies. The five new ones related to creativity: originality, redefinition, adaptive flexibility, spontaneous flexibility, and sensitivity to problems.

Guilford (1967) acknowledged that creativity could not be assessed with traditional intelligence tests. He developed a test where the participant was required to develop original responses. He used a multifactorial approach to identify the mental operations and skills involved in intelligence and creative thinking, and they mainly related to what is known as divergent production. He developed a model of the structure of intellect (SOI) identifying different factors which were organized into categories depending on three aspects: the mental process involved, the type of content, and the product or result. Based on the combination of these components, Guilford identified eight abilities related to creativity: fluency, flexibility, originality, elaboration, sensitivity for problems, redefinition, analysis, and synthesis.

Flexibility means the ability to deconstruct schemes or familiar patterns, to see things in an unusual manner. *Fluency* is the capacity to generate many ideas. Originality is the ability to generate novel ideas. *Sensitivity* to identify problems enables the person to identify inconsistencies and opportunities to apply her creativity. *Elaboration* involves the degree of detail generated about the idea. *Analysis* relates to the ability to break a whole into its components. And *synthesis*, is the ability to integrate different ideas into a new structure or organization.

Likewise, Torrance made important contributions to the measurement of creativity, although his main concern related to teaching creativity and creative teaching (Torrance, 2003). Initially his purpose was to develop an all-purpose test of creativity that could be

used from kindergarten through old age. The tasks were open ended so all the participants could respond in terms of their experiences. Torrance (2003) developed his measurement looking to select tasks that would sample the most important ways of thinking creatively, such as: hypothesizing, thinking of possible uses, and imagining possibilities in impossible situations. The most frequently used Torrance tests are the Torrance Test of Creative Thinking (TTCT) and Thinking Creatively in Action and Movement. Two of the tasks of the TTCT were related to Guilford's divergent thinking abilities, Product Improvement and Possible Uses (Torrance, 2003). However, there is a difference from the original Guilford's tests when giving instructions to the participants. The instructions for the TTCT look to stimulate individuals' motivation by telling them that their creative abilities such as flexibility, fluency, originality and elaboration are going to be tested. This is not the case when administering Guilford's test. Torrance (2003), states that TTCT predicts creative achievement, whereas the Guilford measures do not. The use of different measures of creativity has been useful in operationalizing the different concepts related to this construct.

The cognitive approach has also been used to study the intellectual processes and knowledge structures involved in the generation of original and adaptive ideas, solutions and insights as indicative of creative potential (Runco, 2003). Amongst the cognitive processes involved in creativity are attention; associative thinking; divergent and convergent thought; metaphorical thought and imagination.

-Attention. While the importance of sudden insights in creativity is frequently raised, Csíkszentmihályi (1988) established the importance of effort, time, and intentional attention for creative performance. While defocused attention and sudden insight may facilitate creativity, this commonly occurs after a period of time dedicated to conscious work. Some authors have suggested that when attention is widely deployed it opens the opportunity for accessing remote and original ideas (Wallach, 1970).

-Associative thinking. Koestler (1981), developed the theory of bisociation to explain the way in which ideas previously unrelated become connected in original and novel ways. He explains that association involves usual connections between ideas while bisociation produces unusual connections. It requires previous work and time dedicated to the search for ideas.

-Divergent and convergent thinking. Two cognitive processes related to creativity are divergent and convergent thought (Guilford, 1967). The first is oriented towards looking for the correct or unique answer, and the second, which has been more associated with creativity, looks for a wide variety of options or points of view to arrive at a solution or to find an answer. De Bono (1977) has used the terms vertical and lateral thinking for these concepts. For many years much emphasis has been put on divergent thought in creativity, but the creative process requires both types of thought. In the first stages of the creative process, divergent thought is useful, but in the verification stage, when the person has to decide which of the many ideas generated is the one which meets more criteria (novel, appropriate, useful, etc.), convergent thought becomes necessary.

Creativity techniques such as brainstorming (Osborn, 1957) have been developed to enhance the generation of multiple and varied ideas in search for novelty. Later, a need to develop techniques to enhance convergent thought was identified and techniques such as hits and evaluation matrix were developed (Treffinger, Isaksen & Dorval, 2003).

-Metaphorical thought. Original and new ideas may emerge from connecting ideas, concepts or realities with no apparent relationships amongst them. Analogical thought and metaphors have been studied as an important means to arrive at solutions or ideas that would not easily emerge without this resource. Lubart and Getz (1997), argue there is an important role for the emotions, in the creation of metaphors that may support creative thinking.

Gordon (1961) developed a series of creativity techniques based on analogical thought called Synectics. The author focused on two perspectives: 1) turning the unknown into something familiar or well-known and 2) turning the well-known into something unknown. These approaches force the individual to adopt a different perspective when searching for unusual ideas and connections. These techniques, as other creativity techniques can be adapted to stimulate students' creative skills in the context of education.

-Imagination. The possibility to generate representations that may be related to stimuli that come from the outside or the inner world of the individual is related to creativity. Damasio (2001) argues that, "a strong generation of representational diversity [...] is the ability to generate – to bring to your conscious mind- a variety of novel combinations of entities and parts of entities as images." (Damasio, 2001, p.65). This capacity is linked to

fluidity and to flexibility, mentioned earlier in Guilford's studies. Imagination consists of visualizing in the inner mind solutions or realities that do not yet exist. It brings to mind what is recalled as well as what is 'invented'. It has been linked to what Craft calls 'possibility thinking' (Craft, 2005).

One of the contributions of such psychometric and cognitive studies to education is that once the skills and processes involved in creativity are understood, they can be enhanced through teaching and a diversity of teaching strategies can be designed to stimulate students' dispositions towards using them on a daily basis. Understanding the kinds of characteristics, attitudes and cognitive processes that are related to creativity is important for education since they can be promoted and enhanced through modelling and using specific pedagogic strategies. These will be considered in the next chapter.

2.5 The creative process

The four stages of the creative process identified by Wallas (1926), mainly based on an analysis of anecdotal resources of highly creative individuals, have been influential in research and the understanding of creativity. The four stages are: 1) preparation, 2) incubation, 3) illumination, and 4) verification. In the preparation stage the person is confronted with a need or a problem which requires a novel response, so s/he becomes involved in an active search for information and data, until s/he feels s/he has sufficient information or feels blocked. This stage provides the person with knowledge, facts, data and observations which may constitute the building blocks for the generation of new ideas. From Stein's (1984) view, this stage requires conscious, voluntary work. Each stage of the creative process relates to an emotional state, and during preparation, the person may experience dissatisfaction and a certain level of anxiety since at this moment s/he does not have a clear idea of how the process will work. However, during this stage interest and curiosity drives the process (Cropley, 2001).

The second stage, called incubation, represents a period in which the creative person steps aside from his/her quest because s/he has not found the answer or solution. This stage is frequently considered to consist of unconscious work (Hadamard, 1945), through which in a given moment, the person would find the novel connections or approaches s/he was

searching for. This stage relies on the amount, variety and novelty of connections a person makes including their past knowledge and experience and the recent information from the preparation stage. During this stage, the individual may decide to continue with the process. Tolerance for ambiguity is highly important in this stage (Cropley, 2001).

If the individual continues, the third stage called illumination is referred to as the moment when a person has the experience of finding the solution to a problem, finding the “right” idea for the situation. This is what Koestler (1981) called the “aha” moment and what traditionally has been linked to a moment of ‘inspiration’. This moment relates to an emotional experience of joy and excitement (Csíkszentmihályi, 1996).

The last stage of the creative process is verification or evaluation of the idea, when it is tested to establish if it resolves the need or problem, and is recognized as valuable in some sense. This stage has frequently been neglected from creativity training programmes but is important. During this stage, the person evaluates the relevance and effectiveness of the solutions or ideas generated. During this stage, depending on the results, the person may experience satisfaction and pride (Cropley, 2001).

The important contribution of researchers like Wallas and Koestler among others in attempting to explain the creative process, has demystified the creative process and helped more people understand that everyone can be involved in creativity in different circumstances and at different points in their lives.

Creativity has been widely linked to problem solving and these early studies influenced the later development of models for the creative solution of unstructured problems which required original, novel and useful solutions (e. g. Parnes et al., 1962; Isaksen et.al. 1985) and the development of techniques for the generation of ideas, the “development of heuristics”.

There is agreement regarding some general characteristics of the creative process. There is a perception of an inconsistency, problem, or gap (Torrance, 1962; Sternberg, 1988; Runco, 2004). It involves the generation of novel associations. There is a reorganization of knowledge structures (Piaget, 1972); intuition constitutes an element of the process; it is not a linear process; most of the time, it involves an impulse to communicate the results,

adding a social dimension to the creative act; and it may involve serendipity (the possibility of finding something you were not looking for).

These findings and conclusions are important for education since they can support teachers as they design teaching strategies to enhance students' creativity. Teachers need also to take into account that each of these stages relate to emotional states so it is important to give adequate support and feedback. However, it is important to underline that the creative process is not a linear one, since each person may experience the passing through different stages in an iterative manner.

2.6 Conditions for creativity

Several researchers in the field of creativity have analysed the conditions in which creativity is more likely to emerge (Isaksen, & Lauer, 1998). An important element of this is the characteristics of a socio-affective environment that promotes creativity. During the 1980s and 1990s there was increasing interest in the influence of the environment on creativity (Ekvall, 1996; Amabile 1995; Isaksen & Lauer, 2002).

Amabile and Gryskiewicz (1989) identified several situational factors that may affect creativity in organizations including liberty, autonomy, good role models, resources (including time), and stimulation, in particular for originality, the absence of criticism and norms which recognize innovation and that do not consider mistakes in a fatal manner.

According to Ekvall (1996) organizational culture consists of the beliefs, values and history of the organization. It is grounded in the roots of the organization. Climate is defined as the behaviours, feelings and attitudes in everyday life of the organization. Climate consists of the psychological and organizational climate (Isaksen, Lauer, & Ekvall, 1999). The psychological climate refers to the appreciation of the environmental attributes from the perspective and interpretation of the individual. Factors that may influence the psychological climate are the cognitive style related to the person's preferences to be creative and to solve problems (Kirton, 1976) and personal expectations and personality traits.

The role of the leader may influence as much as 70% of the perceptions of climate of members of the organization (Davis, Gibbons, & Milton, 1997). Ekvall (1990), in Sweden, developed a questionnaire to evaluate the perceptions that people had of the aspects of their organisation that may facilitate or hinder their creativity. The Creative Climate Questionnaire (CCQ) was later translated into English and was validated in the United States of America by Isaksen and Lauer (1998). It evolved into the Situational Outlook Questionnaire (SOQ). This measure has been translated into Spanish and validated in Mexico (Dabdoub, 2003a). Table 2.2 sets out the dimensions of organisational climate and its definitions.

Table 2.2 Climate for creativity: dimensions and definitions

Dimension	Definition
Challenge and involvement	The degree to which the members of the organization are involved in daily activities and in relation to long term goals.
Freedom	The independency of conduct, which the people in the organization have.
Trust and openness	The level of psychological safety that people perceive in the relationships in the organization.
Time for ideas	The amount of time people can dedicate (and use) to generate new ideas.
Play and humour	The spontaneity that people express in the work environment.
Conflict	The presence of personal and emotional tensions in the organization (this is different from the tension derived from the difference of opinion which is referred to in the debate dimension).
Idea support	The way in which new ideas are treated.
Debate	The disagreements between different points of view, ideas, experiences and knowledge.
Risk-taking	Tolerance for ambiguity and uncertainty experienced in the organization.

*adapted from Isaksen, Lauer, & Ekvall (1999)

Another instrument developed to assess the organizational climate for creativity is the Work Environment Inventory (WES) known as KEYS. Amabile and Gryskiewicz (1989) developed this instrument, to provide a measure of the aspects that influence the generation and development of creative ideas (new and useful). Amabile (1988) argues that some degree of pressure is seen to have a positive influence if it is perceived as rising from the urgent, intellectually challenging nature of the problem itself. Amabile distinguished two forms of pressure; the first has a negative influence on creativity, for instance, excessive workload pressure, the second has a positive influence, for instance, an adequate level of challenge.

In an educational environment, it is important to promote the generation of these kinds of conditions at all levels in the institution in order to promote creativity. Teachers play a crucial role in generating such conditions.

2.7 The creative product

External criteria established by social norms influence the definition and perception of what is creative. Usually, products and outcomes of the creative process are assessed in a very intuitive manner depending on the context and the purpose for which they were created.

At a very general level, an act may be evaluated as a creative one if: it is new or original at least for its creator; if it solves a need in a very wide sense of the word; and if it is relevant (i.e. emotional need of expression, to solve an economic matter). A further criteria might be that it is ethical and does not cause harm (Cropley, 2001). It is important to note that a creative product or result cannot be evaluated without taking into account the specific context in which it was created, because what may be original and new in one context may not be in another.

Jackson and Messick (1965) distinguish four kinds of judgment relating to the assessment of intellectual performance: unusualness, appropriateness, transformation and condensation. The first deals with the degree to which the response meets certain subjective and psychological criteria, the “goodness” of a person’s response. *Unusual* responses, which are far from what is familiar, are identified as “original” and “creative” ideas. However, to assess what is original there is a need to consider the context since certain responses may be original in one context but not in other. “The infrequency of a response is relative to norms, which thus serve as a judgmental standard for evaluating unusualness” (Jackson & Messick, 1965, p.313). *Appropriateness* deals with the degree to which certain objective and logical criteria are satisfied. A response is qualified as correct if it satisfies objective criteria within the constraints of logic and reality. So it is not enough to present a response that is original, it is necessary for it to be pertinent. “The major role of the appropriateness criterion, as it is used here, is to help eliminate from the set of unusual products those that are simply absurd” (Jackson and Messick, 1965, p. 313). The third criteria, *transformation*, relates to the power of a product to transform the constraints of reality defying tradition and stimulating in the viewer a new perspective of reality. The fourth criterion deals with the property of *condensation*. The products that meet this criterion offer something new each time we experience them (Jackson & Messick, 1965). They have intensity and a concentration of meaning requiring continued contemplation.

The authors stress that judgments of condensation and transformation, are more problematic than the others are and that there will be more differences in viewpoints and agreement will be more difficult to reach.

These criteria of creativeness, unusualness, appropriateness, transformation and condensation may generate different types of aesthetic experience. The viewer may react with surprise in relation to an unusual response but with satisfaction towards an appropriate response. The viewer will experience stimulation when a response shows transformative power and savor the condensation of a creative product. The reactions of surprise, satisfaction and stimulation are intensified and enduring when evaluating a product that meets the condensation criterion. Jackson and Messick refer to the personal disposition related to the property of condensation as poetic, which for them involves the terms concentrated, imaginative and powerful.

The authors also underline the importance of taking into account the transaction among three elements in relation to creativity: the creative person, his product and the world's response to it. Table 2.1 presents a synthesis of the criteria offered by Jackson and Messick (1965) and relates them to personal predisposition or cognitive styles, personal qualities, judgemental standards and the aesthetic responses that products that accomplish each of the mentioned criteria may generate in the viewer.

Table 2.3 Assessment of creative products or responses

Predisposition Cognitive styles	Personal Qualities	Criteria	Judgmental standards	Aesthetic responses
Tolerance of incongruity, of inconsistency, etc.	Original	Unusualness	The norms	Surprise
Analytic and intuitive	Sensitive	Appropriateness	The context	Satisfaction
Open-minded	Flexible	Transformation	Constraints - the strength and nature of the constraints that were transcended and the	Stimulation

			effect it raises on the viewer	
Reflective and spontaneous	Poetic	Condensation	Summary power	Savoring

From Jackson & Messick (1965)

Besemer and Treffinger (1981), developed the Creative Product Analysis Matrix (CPAM), that included: novelty, related to how new the product is in terms of techniques, processes, concepts; the capacity or potential of a product to generate new products inspired by it; resolution, which is related to the extent to which a product meets a need, or resolves a situation and finally synthesis, the extent to which a product combines elements which are unlike, into a coherent unit.

The initial proposal has been evolving through the years and Besemer and O'Quin (1999) defined three criteria and a set of indicators for evaluating a creative product. The criteria are: 1) novelty (it is original, surprising, and germinal); 2) resolution (the product solves a need so it is valuable, logical, useful, and understandable), and 3) elaboration and synthesis (the product is organic, elegant, complex, and well-crafted). These criteria and indicators provide some "visible" parameters to judge creativity.

And Amabile (1996) contributes to assessment of products with the technique known as the Consensual Assessment Technique that consists of evaluating a product as creative providing that independent observers agree on its creativity.

These different approaches have been used in different contexts, but in particular the approach of Besemer and Treffinger (1981) and Besemer and O'Quin (1999) may be adapted to an educational context to assess students' productions.

Cropley and Cropley (2004) present similar criteria using slightly different terms. These authors mention four criteria: novelty, usefulness, beauty and seminality. Beauty, in this case indicates that the product is understandable, complete, well finished and internally harmonious. These criteria are similar in essence to those proposed by Jackson and Messick and Besemer and O'Quin. Table 2.2 provides a synthesis of the various criteria set out by the different authors referred to above.

Table 2.4 Criteria to assess products

Criteria	Authors
Novelty/ unusual	Jackson and Messick (1965) Besemer and O'Quin (1999) Cropley and Cropley (2004)
Usefulness/ appropriateness/ resolution	Jackson and Messick (1965) Besemer and O'Quin (1999) Cropley and Cropley (2004)
Beauty/condensation/elaboration and synthesis	Jackson and Messick (1965) Besemer and O'Quin (1999) Cropley and Cropley (2004)
Seminality/transformation/germinal	Jackson and Messick (1965) Besemer and O'Quin (1999) Cropley and Cropley (2004)

2.8 Summary and conclusions

In this chapter different historical trends in the study of creativity were presented including creativity as inspiration; the biological paradigm; the study of personality; cognitive and psychometric studies and studies related to the creative process, the product, the conditions that may enhance creativity and issues relating to the assessment of creative products.

Each of these approaches has influenced the development of a corpus of knowledge related to understanding the nature of creativity and what conditions may enable or obstruct its development.

From these studies a number of conclusions can be drawn: Creativity is important for human beings in a globalized and complex world such as the one in which we are now living (Seltzer & Bentley, 1999).

Some beliefs about creativity are “myths” (Weisberg, 1986), and can create obstacles to the development of a comprehensive understanding of the construct and hence to finding ways of promoting creativity.

Creativity requires a set of abilities (Guilford, 1975) which can be developed in human beings as can other abilities.

Creativity involves cognitive (attention, associative thinking, divergent and convergent thought) and affective (motivation, joy, anxiety) aspects (Runco, 1995).

Creativity is characterized by the production of novel and useful ideas (Sternberg, 1988; Weinsberg, 1986). Novel is understood as original productions (that may be tangible or not).

All individuals have the potential for creativity;

Creativity may be expressed in different ways and contexts, generating different degrees of impact. By understanding what is involved in the creative process, the individual may have a more active role in managing the process and generating the conditions and use of appropriate cognitive skills that will lead to better creative outcomes. Defocused attention and sudden insight may facilitate creativity, but creativity commonly occurs after a period of time dedicated to conscious work.

Effort, time, and intentional attention are important for creative performance (Csíkszentmihályi, 1988).

Different levels of creativity have been distinguished. The creative process involves several stages that are not developed in a linear way. Each one of the stages of the process involves different thinking process and affective states that may influence the process as well as the results. Society has an influential role in the recognition and assessment of creative products, which can be tangible or intangible, i.e. physical objects, ideas, procedures, etc. (Torrance, 1967).

An environment that enables creativity is characterized by: trust, openness to risk, the possibility of learning from mistakes, time to think, challenges (Isaksen et al., 1999).

A creative product may be evaluated in relation to the context where it has been created. Three criteria may work as a general framework: novelty, resolution and elaboration and synthesis (Besemer & O'Quin, 1999).

The above summary underlines the main ideas that need to be taken into account when planning to develop students' creativity in higher education. The following chapter considers the literature relating to creative education and teaching.

Chapter 3

Creative education and creative teaching

“Some people see things as they are and ask 'why'?

I see things as they have never been and ask 'why not'?”

George Bernard Shaw

3.1 Introduction

Creativity has been widely recognized as an important asset that citizens of the 21st century require. This recognition means that creativity should be an inherent part of education at all levels. Although there have been a number of efforts to include creativity as part of desirable educational goals and outcomes, much still has to be done. One area that requires further study is the implication of this for the education of teachers. If creativity is so important, and if there is a general agreement that it should be included in education, what needs to be done so that teachers have the knowledge, skills and attitudes for accomplishing this goal? We need to understand what can enhance the development of students' creativity in an educational environment, and how a pedagogical approach which promotes creativity can be included in daily teaching practice.

When designing a pedagogical model for promoting creativity it is important that students' and teachers' perceptions of what enhances or obstructs their creativity as well as their general conception of creativity and what they expect from a creative teacher is taken into account. Studies undertaken to understand teachers' and students' conceptions and implicit theories in relation to the nature of creativity, as well as what enables or obstructs creativity in an education environment are presented in this chapter. Relatively few studies relating to this have been undertaken in the higher education context, so some studies discussed here are related to elementary or secondary education. However, important contributions to understanding creativity in the higher education context have been made by the researchers involved in the Imaginative Curriculum Project (Jackson et al., 2006), and will be included.

It is also important to contrast teachers' and students' implicit theories of creativity with researchers' explicit theories (Runco, 2007). Such comparisons enable us to see how teachers' and students' implicit theories are related to knowledge that has already been tested and accepted by the scientific community in this field. A pedagogical model of creative teaching that may provide a framework for designing teacher education programmes and developing strategies to influence teachers' teaching practice must take account of implicit and explicit theories of creativity.

3.2 Developing creativity through education

Once the importance of creativity for individuals and society and the role of education in developing it is recognized (Jackson, 2006), the challenge for policy makers and educators is to find ways to promote creativity through the educational system. Two assumptions underpin the proposition of including creativity in education (Lin, 2011). The first is that creativity can be developed (Fryer, 1996; Isaksen & Parnes, 1985; Torrance, 1972). The second is that all individuals have the potential to be creative (Vernon, 1975; Esquivel, 1995; Craft, 2001; NACCCE, 1999).

Fryer (2010) argues that

Creativity education can help students imagine future possibilities, visualize current tasks better, tackle new problems, shape their own futures, cope with extremes of rapid change and stagnation, survive in challenging situations, live more fulfilling lives, realize their potential, and go beyond apparent limitations (Fryer, 2010, p.5).

Since creativity implies novelty and a certain degree of deviation from familiar and from well-known solutions to a problem, the individual who is involved in creative activities may feel isolated as they oppose the group. Sternberg & Lubart (1995a) describe this as "defying the crowd" and "contrarianism". This characteristic of creativity may be perceived in an educational or organizational context as a threat. Therefore, it may seem paradoxical to foster a creative "spirit" and at the same time, expect the individual to conform to certain social norms. Researchers adopting a living systems perspective argue that living

organisms struggle between the need for self-affirmation and the need to feel part of a bigger whole, a tendency towards integration (Capra, 1997).

One strand of research on creativity suggests that it cannot be conceived as isolated from the socio-cultural systems in which the individual functions. Such systems and contexts can facilitate or hinder the development and expression of creativity as well as influence judgments about a creative product or an idea. Among the researchers that support this approach, Csíkszentmihályi (1999) considers that creativity should be perceived as a cultural and social phenomenon rather than merely a mental process.

Culture and creativity

A study undertaken by Torrance et al. (1965) highlighted the role of culture in creativity. In the study, they identified that the values held in different cultures support or hinder creativity and argued that some are questionable or counter-productive. Overall, Individual creativity is influenced by the belief and value systems prevailing in the cultural context (Csíkszentmihályi, 1988). Creativity involves change and each cultural context allows some kinds of change but not others. Culture determines, in a more explicit or implicit way, how much novelty is tolerated, and what kind and what measure of deviation from the norms is tolerated (Cropley, 2006). For Csíkszentmihályi “original thought does not exist in a vacuum” (Csíkszentmihályi, 1999, p.315). He calls attention to the role of “social agreement” as one of the elements of creativity.

Society and creativity

Authors like Csíkszentmihályi (2006) have underlined the importance of studying the role of society in the stimulation or limitation of creativity. Society has an influential role in the recognition and evaluation of products, which can be tangible or intangible, for instance, physical objects, ideas, procedures (Torrance, 1965). The psychological mechanisms through which a society may influence creativity are amongst others, reinforcement or incentives, family influences, promoting inquiry, modelling and mentoring (Cropley, 2006; Treffinger, 1995; Csíkszentmihályi, 1988; Bramwell et al., 2011). There has been controversy in terms of the effect of rewarding creativity and stress on the importance of generating an appropriate socio-affective climate where there is trust, openness and support for new ideas (Sternberg, 1991; Rogers, 1954; Amabile & Grysiewicz, 1987;

Isaksen et al., 1999). The characteristics of such a climate or environment will be discussed later in this chapter.

Cropley (2006) distinguishes between socially radical creativity and orthodox effective novelty. The first of these involves the generation of effective novelty supported by the willingness to venture further from the norms. Orthodox effective novelty occurs within socially prescribed limits and is not open and free. As a result, the promotion of creativity and the type of novelty that will be 'tolerated' and rewarded, depends on society's values and rules. Sometimes creative products or expressions of creativity are not recognized as such by society initially and only recognized when certain circumstances are present or after a lapse of time.

However, it is not only society or the community that may influence an individual's creativity. The individual can influence the social context when introducing novelty and new approaches to solving problems. The individual can be transformed by the creative process and may affect the social context and bring about change that will involve a certain degree of transformation. As Merry (1995) argues, taking into account the characteristics of complex adaptive systems, societies and individuals have the capacity to transform themselves, their behaviour, and the relationships that will allow them to create the novelty demanded by ongoing changing conditions.

Creativity in the context of education and in the micro-culture of the classroom

In the context of education in the micro-culture of the classroom, there are also norms that may be expressed explicitly or implicitly in relation to the kind of novelty that is allowed, and that will influence the ways new ideas are received.

From Csíkszentmihályi's (2006) perspective, the culture-lag between what is needed by society in the present and what schools offer is growing ever larger since, amongst other things, schools teach how to answer, instead of how to question; they teach isolated disciplines that become more and more difficult to integrate; and the concern for transmitting past knowledge predominates. In his words, "young people have to learn how to relate and apply past ways of knowing to a constantly changing kaleidoscope of ideas and events. And that requires learning to be creative." (Csíkszentmihályi, 2006, p. xix).

In this context, the teacher becomes a role model who can influence the attitudes and behaviours of the students towards their own and others expressions of creativity. If a teacher is open to students' ideas or new approaches this contributes to generating a creative atmosphere in the classroom. Sometimes teachers may indicate that they expect and desire students to be more creative and that they would like students to express their creativity more freely. However, their behaviours and attitudes may be incongruent with this unless they are good listeners. They may also perceive creative students as disruptive (Chan & Chan, 1999).

Teachers' actions are embedded in the communities in which they live and work (Bramwell et al., 2011). These communities set the values and educational models or approaches to education that shape everyday life in this context. The specific context where teachers spend most of their time is the classroom community. Successful teaching depends on adapting to students taking account of their perceived interests, abilities, and needs. These shape teachers' creativity (Bramwell et al., 2011). The educational community includes educational structures and factors as diverse as official curricula, resources (or, more often, the lack of them), and school timetables. Administrators can support teachers' creativity when they help them to overcome limitations within educational structures.

The results or products generated through the creative process may lead a person to experience joy and satisfaction and a sense of accomplishment. Students should have the opportunity in the educational context, to have such experiences, since they may have an impact on their sense of self-efficacy and self-esteem (Runco, 2004). In this way creative education may generate a process of self-transformation. Teaching should create scenarios where students are challenged to create, apply knowledge and past- experience, thinking skills and attitudes to the generation of products (tangible or not tangible) such as inventions or innovations.

Jackson (2006) analysed what was involved in accomplishing the goal of promoting creativity in higher education and identified five aspects that should be taken into account. The first was that creativity lies at the heart of learning and performing in any subject-based context and that the highest levels of performance in a field are generally the most creative acts. This means that it is important to understand how creativity applies to or becomes visible in different professional contexts and how it can be promoted through teaching in a variety of disciplines (Jackson, 2006). A pedagogical model should give

examples of how a teacher may adapt his/her teaching practices to the specific context of the discipline or field.

Secondly, although teaching is recognized as inherently creative, teachers' creativity is largely implicit and rarely publicly recognized. As a result, it would be important to make teachers' creativity more visible and intentional. Jackson (2006) describes programmes where creative teachers are recognized. Another approach to making teachers' creativity more visible would be to systematize and share ideas more broadly with the teaching community to promote a wider impact. Sometimes best practice is only known to the students of creative teachers and is not disseminated more widely.

Thirdly, the importance of promoting students' creativity, while recognized, is rarely mentioned explicitly as a learning or assessment objective. Additionally, assessment tasks and criteria frequently limit students' responses and can inhibit students' and teachers' creativity. To promote creativity it is important to consider it as an explicit learning outcome and to define ways to assess students' achievement with criteria and indicators relevant and pertinent to the subject taught and to the specific context where it is being taught.

Fourthly, teachers' motivation may be related to the passion they experience in relation to a certain subject or discipline. Creativity may only have meaning when it is directly associated with the practices and forms of that discipline. Most teachers are not familiar with creative approaches to teaching even within their own discipline so it is important to promote teachers' awareness that teaching for creativity within their disciplines is an important component of what constitutes good teaching.

Finally, Jackson suggests that teachers may perceive that including creativity in their teaching would mean more work. Teachers need to understand that introducing creativity does not need to include "more content" but teaching in a different way, using different teaching strategies which are more student rather than teacher centred (Dabdoub, 2008).

In summary, to introduce a higher level of creativity in teaching in higher education requires: a) understanding what creativity means within different disciplines; b) defining creativity as one element of learning outcomes including criteria and assessment tasks that allow the evaluation of students' achievement, and c) promoting teachers' knowledge and

awareness of what creative teaching for creativity implies within the specific discipline that they teach.

In order to promote creativity in higher education in Mexico several questions need to be answered:

What conceptions of creativity do teachers' and students' in Mexico hold and how do these conceptions influence their behaviour in the classroom?

What kind of teaching is required to enhance creativity in the Mexican context? This involves defining a pedagogical model which enhances the development of creativity.

What characteristics, knowledge, skills or attitudes should Mexican teachers possess in order to be able to promote students' creativity and how can teachers learn to include creativity in their teaching?

What conditions are required in Mexican educational institutions/organizations (external) and in classrooms (internal) to enhance the possibility of creativity to emerge?

The theoretical approach that will be adopted to consider these questions throughout this chapter will be the systems approach with contributions from complexity and chaos theory. It is not possible to find linearly causal explanations for creativity in terms of stating, for example, what will work as facilitators or obstacles to creativity for everyone in all contexts. However, there may be some general principles which are more generally applicable, as seen in the personality and psychometric studies mentioned in the previous chapter (Guilford, 1967; Sternberg, 1998; Gardner, 1994; Csikszentmihályi, 1988) that make it possible to identify factors which are commonly perceived as promoting creativity. Despite this individual personal, prior experience, perceptions and beliefs play an important role.

3.3 Students' and teachers' implicit theories of creativity

Among the factors that may influence students' creativity is the way in which teachers define and operationalize creativity (Andiliou & Murphy, 2010).

The facilitation of creativity in the classroom will ultimately depend on the teacher's ability to identify creative potential in students, to recognize creative outcomes, to encourage personal attributes and cognitive processes that have been found to relate to creativity, and, finally, to structure the educational environment in a way that will render it more conducive to creativity (Diakidoy&Kanari, 1999, p. 2).

An individual's belief system, implicit theories, conceptions of creativity and beliefs about what enhances or obstructs their creativity may influence their behaviour and attitudes and consequently the development and expression of their creativity (Sternberg, 1988).

In an educational environment it is important to understand these perceptions in order to be able to purposefully create the conditions that may foster creativity. Research of students' and teachers' beliefs about creativity is found mainly in relation to school contexts (Torrance, 1983; De Souza Fleith, 2000; Fryer & Collings, 1991; Treffinger, 1968). Although the current research is related to higher education, the more influential of the research undertaken in school contexts will be considered alongside the important contribution in relation to higher education

3.3.1 Studies about teachers' implicit theories of creativity in education

Findings from the studies related to the conceptions of creativity that teachers and students hold fall into one of four categories: 1) the nature of creativity (conceptualization); 2) environments for promoting creativity; 3) teaching strategies for promoting creativity and 4) creative students and creative teachers.

De Souza Fleith's (2000) research studied three of the categories mentioned above. Interviews were undertaken with seven teachers from two elementary public schools in Connecticut, USA (three teaching in 3rd grade, three in fourth grade and one teaching in both grades) and 31 students. The interviews were designed to explore classroom environments that enhanced/inhibited creativity, the activities and strategies implemented in the classroom which enhanced students' creativity, definitions of creativity, and the criteria used to evaluate a student as creative. The methodology also included focus groups, interviews with four experts, and questionnaire responses from three others.

In relation to an environment, which enhanced creativity in the classroom, teachers described it from three main perspectives: teachers' attitudes, strategies, and activities. They referred to attitudes that contributed to creativity as not imposing too many assignments and rules; giving students' choice, providing students with opportunities to become aware of their creativity, accepting students as they are; and boosting students' self/confidence (De Souza Fleith, 2000).

In relation to the strategies that may foster creativity they included: cooperative groups (giving students access to different points of view); cluster groups (taking into account students' interests and strengths), and free time such as a bonus Friday. The findings suggested that open/ended activities, creative writing and a broad range of activities should be developed within a creative classroom. Unstructured time was also mentioned as a way to enhance classroom creativity.

Among the factors which were raised as inhibiting students' creativity teachers referred to: students' beliefs that they could not share their ideas, that ideas were ignored, that mistakes were not tolerated, that one correct answer was required, timed testing, structures and schedules, an overloaded curriculum, and lack of time. They mentioned as activities that could inhibit creativity: drill work and the use of a large number of worksheets. De Souza Fleith (2000) also argued that 'controlling' teachers inhibited students' creativity.

In a study focused on conceptions of creativity, Tan (2000) reported that teachers described creativity as "imagination" and "uniqueness" but most often associated creativity with "artistic ability". Similarly, Aljughaiman and Reynolds (2005) analysed elementary school teachers' conceptions of creativity and creative students. The authors used questionnaires to examine attitudes, beliefs, and current classroom practices in four schools in a district in northern Idaho. Seven close-ended statements were used to examine participants' beliefs, opinions, and attitudes towards teaching creativity in the classroom. More than fifty percent of the teachers agreed or strongly agreed that creativity could be taught to anyone, while 81% indicated that creativity could be developed in the classroom. However, when teachers were questioned about whether it was the classroom teacher's responsibility for developing student creativity, the percentage of agreement dropped to 33%. This suggests that teachers believe that their

main responsibility is to ensure that students' acquire the knowledge that is required in the curriculum.

In several of the reviewed studies, teachers' conceptions of creativity related to originality or to the capacity to generate original ideas (Aljughaiman & Reynolds, 2005). Eighty eight percent of the teachers in their study mentioned that creativity involved original ideas. Consistent with prior studies (Fryer & Collings, 1991; Runco, Johnson, & Bear, 1993; Tan, 2000) 35% of the teachers defined creativity as "artistic production".

Kleiman (2008) conducted research with 12 academics from a range of disciplines using in-depth, semi-structured, face-to-face interviews. Five main categories describing qualitatively different ways of understanding creativity in the context of learning and teaching emerged. These were creativity as a constraint-focused experience; a process-focused experience; a product-focused experience; a transformation-focused experience; and a fulfilment-focused experience. These findings are congruent with the outcomes identified in creativity research.

Bjerstedt and colleagues (1976) conducted a study in Malmö, Sweden, using an unstructured questionnaire and a structured survey, to explore 650 teachers' views about how to promote creativity in schools. Classroom observations were used to identify teacher-student interactions relevant for promoting creativity and a test for creativity was developed and applied. The researchers observed that lessons were teacher-centered, with only about 8% of student initiated activities occurring during an average lesson. The observations on thought processes in classrooms showed that processes were reproductive (66.4%), convergent (24.9%), divergent (3.9%) and evaluative (4.8%). Overall, there was little that could be described as creative.

The most common definition of creativity among the teachers was related to 'independent work', followed by 'richness of ideas', 'originality' and the 'ability to combine'. The teachers who participated in the sample suggested that the main characteristics that they associated with a creative pupil were being: 'flexible', 'full of ideas', 'keen to discuss things', 'curious' and 'conscious of problems'. The findings of this study showed that it was possible to stimulate aspects of creativity by using specific types of study materials an aim, which was supported by the Swedish school curriculum. Overall, the study showed that

existing practice in schools did not encourage creativity but that teachers had conceptions of creativity and creative individuals, which were broadly in line with academic research.

Although the studies presented so far were undertaken with students and teachers from different educational levels, some with small samples, there is considerable agreement between teachers' conceptions of creativity as being related to originality and linked to the generation of original ideas. There is also agreement that it is possible to enhance the development of creativity.

Seminal research was undertaken by Fryer and Collings (1991) exploring British teachers' perceptions and attitudes towards creativity. The authors asked 1028 teachers working with pupils between five and eighteen years old in England and Wales, to complete a questionnaire. The instrument they used included items related to: definitions of creativity, factors they believed helped or hindered the development of creative behaviour in children, methods considered as useful for identifying creative pupils and creative school work, opinions about various teaching methods and educational goals, and teaching style preferences. The results indicated that creativity was perceived mainly as related to 'originality', 'imagination' and 'self-expression'. Ninety percent of the teachers believed that creativity could be developed; 70% of the teachers thought that creativity was "rare", and 53% thought that creativity involved nothing more than "divergent thinking". Of particular interest was the finding that attitudes to and perceptions about creativity in education co-varied with preferred ways of teaching. "This led to the proposition that these might be rooted in some kind of underlying value system linked to person orientation" (Fryer, 2006, p.76).

3.3.2 Inter-group, cultural and disciplinary subject differences in relation to conceptions of creativity

Several studies have underlined differences in conceptions of creativity that emerge when comparing groups with different characteristics, for example, female and male teachers, people from different cultures or perspectives of creativity from different subject disciplines.

Inter-group and gender differences

A study undertaken in 1989, Project 1000, identified the views of over 1,000 UK teachers and further-education lecturers about creativity, and teaching and learning and found “highly significant differences in perceptions of creativity and preferred creativity assessment criteria between male and female staff, and amongst those teaching different disciplines” (Fryer, 2006, p. 76). For example, Fryer (1989), found that female participants were significantly more likely to identify self-expression as an aspect of creativity than were men ($p < 0.01$). Although participants in the study were not asked directly if they thought that men and women were creative in the same way, when the data were analysed in terms of gender, “significant inter-group differences were revealed in male and female perceptions of creativity, how they preferred to assess it, and how they preferred to teach” (Fryer, 2006, p.79).

Fryer (1989) concluded “Broadly, the females, the young teachers, the creative arts and general subject teachers, and the nurse tutors had a stronger preference for a pupil-oriented approach to learning than did the males, the older teachers and the maths/science/technology teachers.” (Fryer, 1989, p.306).

Cultural differences in conceptions of creativity

In addition to gender differences in conceptions of creativity there also appear to be cultural differences. To date most of the research has been undertaken in Western cultures, particularly in the USA or Northern Europe. Most studies have been referred to in the previous sections or later in the chapter (particularly see section 3.5.1). Unsurprisingly, the findings have tended to be similar. Further support for the already reported findings comes from a study in Finland (Saarilahti, Cramond&Sieppi, 1999) which used interviews with three elementary teachers. They were asked their views of the conditions that may foster students' creativity in a classroom environment. The participants acknowledged that teachers' attitudes such as providing encouragement, freedom, allowing for risk-taking and collaboration could create the psychological safety needed for creativity.

One study undertaken in Southern Europe, in Cyprus, explored conceptions of creativity in student teachers. Diakidoy and Phtiaka (1999) administered a questionnaire to 49 student teachers enrolled at the University of Cyprus and majoring in education. The questionnaire included a series of questions, some open-ended requiring the students to define creativity, to describe its relationship to factors such as intelligence and degree of knowledge, and to list the domains in which they thought creativity was possible. Students were also asked about the facilitation of creativity. The questionnaire examined students' beliefs relating to issues such as extent of manifestation, domain-specificity, novelty and appropriateness of outcomes, facilitation and academic achievement, and the personal and environmental correlates of creativity. The findings showed that the trainee teachers described creativity as the ability or process that resulted in unexpected or novel outcomes. Creative students were seen as independent, intrinsically motivated, and open-minded. The trainee teachers identified prior knowledge and problem solving strategies as the foundations of creativity. 38.7% of the student teachers associated creativity with the 'making of things', while 14.3% associated creativity with self-expression and the fulfilment of potential and personal needs. Some students (14.3%) related creativity to insight, imagination, and inventiveness. These findings reflect those from the research reported earlier. However, the findings relating to self-expression and the fulfillment of potential and personal needs are associated with an eastern interpretation of creativity as proposed by Sharma Sen & Sharma (2004).

According to Sharma Sen & Sharma (2004), “although creativity is a psychological construct, its meaning is based on a cultural definition of what it means to create something or to be creative.” (Sharma Sen & Sharma 2004, p. 153). They argue that, for example, the Eastern perspective of creativity differs from the Western perspective, since the emphasis is not so much on producing something original or novel but on being able to produce new and applicable responses to the daily challenges of living. Hence, the Eastern perspective of creativity relates more to a state of personal fulfilment, and is the expression of an inner essence, spiritual and religious self-expression (Sharma Sen & Sharma, 2004).

To date there is no reported research on student’ and teacher’ conceptions of creativity and the factors which affect it based in South America, although there have been some projects attempting to enhance creativity in students in higher education. The research reported here will address that issue.

Conceptions of creativity from different disciplinary subjects

Some studies have analyzed whether creativity means different things for specialists from different disciplinary fields (Jackson and Shaw, 2006; Fryer, 2006; Craft et al, 2007). In higher education, it has been argued that the primary cultural domains are the disciplinary or subject fields. Jackson and Shaw (2006) taking account of Csikszentmihalyi’s (1997) conceptions of creativity as being socially and culturally constructed explored whether being creative meant different things in different disciplinary contexts and also where creativity constituted part of the curriculum. They used two approaches. One was to use 18 QAA Subject Benchmarking Statements to identify both explicit and indirect aspects of students’ learning that might be associated with creative thinking and behaviours. The second approach consisted of conducting email surveys in four disciplinary fields (Earth and Environmental Sciences, History, Engineering and Social Work). Over 60 academics and field-based practitioners participated in these surveys. The core questions were:

What does it mean to be creative in your subject?

What is it about your subject that stimulates/encourages teachers and students to be creative?

How do higher education teachers in your field help/enable students to be creative?

How do teachers in your field recognise and assess creativity?

What are the barriers to creativity?

Is creativity valued in your disciplinary field?

Findings from a preliminary review of the 18 subject benchmark statements, considering that the benchmark statements represented the views of the field on what was valued in students' learning. It appeared that for academics, who teach different subjects, creativity did not have a central place to shaped curricula, teaching, learning or assessment. Only seven subjects (Art and Design; Medicine; Geography; Dance; Drama and Performance; Engineering; Nursing; Business and Management) made any explicit mention of 'creativity' per se as a desirable feature of curricula in their discipline (Jackson & Shaw, 2006). Five of the subject groups (Nursing; Business and management; Dance, Drama and Performance; Engineering; Social Work) referred to creativity or creative outcomes in their benchmark assessment criteria for defining standards and only one subject (Dance, Drama and Performance) considered creativity as an underlying principle of education and student development. Despite this, the pilot surveys suggested that there was a general acceptance that creativity was widely recognised in disciplinary contexts (Jackson & Shaw, 2006). While the authors demonstrated that being creative meant specific things in particular disciplines, they identified patterns of meanings that included:

Originality, as represented by creating something new, which is useful, recognised and incorporated into the culture of the discipline (Jackson & Shaw, 2006, p. 95).

Imagination, which represented people working in a disciplinary field using imagination to find solutions and unknown possibilities when engaged in disciplinary thinking and practice. Imagination as a thinking process acts a source of personal inspiration, it stimulates curiosity and sustains motivation, it generates ideas from which creative solutions are selected and facilitates interpretations in situations, which cannot be understood by fact or observations alone (Jackson & Shaw, 2006, p.96).

Finding and making sense of complex problems was raised by academics in all disciplines as an area where creativity was used and necessary in working with problems that were new, challenging, and complex.

Thinking out of the box and transferring ways of thinking, and methodologies from different disciplines were perceived as being required in order to find solutions and to generate ideas. The blending and intelligent use of these different sources of knowledge and methodologies to solve particular problems is potentially another source of creativity (Jackson and Shaw, 2006, p.100).

Communication of ideas was perceived as part of the creative process. Academic practitioners from different disciplines may be creative in the way that they communicate with people outside their disciplines

Overall, although there was a general acceptance of the relevance of creativity in different disciplinary contexts, creativity did not have a central place in most curricula, teaching, learning or assessment. Generally, creativity from the view of those working in different discipline contexts was conceptualised as related to originality, imagination, finding and making sense of complex problems, thinking out of the box, and communicating ideas.

In a study with National Teaching Fellows (NTF), Fryer (2006) indicated that more than half of the participants believed that creativity was different in different cultures: “there is no evidence that ethnicity has a bearing on creative ability, but there is evidence of some cultural differences in how creativity is perceived and expressed” (Fryer, 2006, p.79). In the questionnaire, NTFs were asked to describe creativity in terms of their own discipline. Fryer (2006) argues that most of the answers could apply to any discipline. Responses included those conceptualizing creativity as relating to:

-New theories, original work, seeing new applications for existing mathematics (maths).

-Originality: developing, producing, manufacturing; bringing about ideas and design solutions in different, unusual ways; to critically analyse, reflect and apply and develop ideas and attitudes (design history).

-Finding new ways of engaging with students; tapping into unconventional ways of assessing student learning (neuroscience).

In a study in primary and secondary education, Craft, A., Cremin, T., Burnard, P., and Chappell, K. (2007), explored eight music teachers’ views about creativity and creative teaching and learning. Teachers’ emphasized the importance of understanding each

learner as an individual, supporting a child's artistic voice and the ability to critique and review. Teachers valued collaboration and experimentation for discovery in small children, but in older children teachers valued more individual work and experimentation structured by subject knowledge. These opinions underlined a particular approach to creativity from the context of music teaching.

To summarize, when studying conceptions of creativity it is important to take into account the differences that may emerge in different contexts and from different populations. Research has explored differences between female and male teachers and those teaching different subjects. The research has also been undertaken in different cultures, although typically these have been developed Western societies. To date there has been no reported research from Mexico. To enhance creativity in Mexico, it is important to understand the patterns of thought and shared meanings or interpretations that held by students and teachers which will support the development of creativity in higher educational contexts as it is not appropriate to assume that findings from other countries can be generalized to the Mexican context.

To conclude, as Raina (2004) affirms: "We, the people interested in creativity, consider variety as an expression of human creativity and we have to equally respect diversity and richness of environments, as they influence the understanding of creativity across cultures" (p. 26).

3.4 What kind of teaching is required to promote the development of creativity?

The current research was concerned with the way Mexican students' creativity could be enhanced through teaching in higher education. The main focus was not the teaching of creativity per-se but how to characterize a teaching-learning process that might facilitate the development of students' creativity throughout the curriculum. It is commonly asserted that teaching is inherently creative since teachers face a variety of circumstances depending on the specific students they are teaching, their interests, their skill levels, and their motivation. Teachers need to respond to those circumstances based on their experience, knowledge, skills and attitudes. This may include their creative problem solving skills. Teachers may also put their creative skills into practice when designing sessions or

planning a course. However, teachers also face organizational pressures to respond to standardization, assessment and accountability issues. Teachers can respond to this pressure through adopting a lecturing approach to their teaching.

Researchers looking to define the characteristics of teaching which may promote creativity have made a distinction between creative teaching or teaching creatively and teaching for creativity (Craft, 2004; NACCCE, 1999).

Creative teaching

A common misconception when using the adjective 'creative' to teaching involves interpreting it to mean that teachers adopt a series of playful and hands-on activities in order to keep students motivated and 'active'. In the context of this research, it is considered inadequate to keep students motivated, amused, active or busy in order for teaching to be seen as creative.

For Woods and Jeffrey (1996), creative teaching focuses on the practitioner. Their research suggests that practitioners feel creative when they control and take ownership of their practice, when they are innovative and ensure that learning is relevant to learners. The creative practitioner can envisage possibilities and differences, and follow these through. These criteria proposed by Woods (1990) are applicable for teaching creatively as well as for creative learning: innovation, ownership, control and relevance.

In the report 'All our futures' (NACCCE, 1999), 'creative teaching' is argued to be related to the capacity of teachers to use imaginative approaches to make learning more interesting, exciting and effective. The quality of creativity refers to the kind of teaching which is characterized by novelty in the use of a wide variety of methodologies, strategies and resources in order to stimulate learning.

For Lilly & Rejskind (2004), the dynamics of creative teaching involve macro and micro processes. Macro processes include preparation, connection and reflective teaching, while micro-processes refer to: content and temporal constraints, awareness of self and students within the process, feedback from students and colleagues and values and goals. Creative teaching involves how the teacher designs, organizes, plans, conducts and evaluates the teaching experience (Kiely, 2004).

For Reid and Petocz (2004),

Creative teaching could be said to consist of setting up a learning environment that encourages students to see the essence as well as the detail of the subject, to formulate and solve problems, to see the connectedness between diverse areas, to take in and react to new ideas, and to include the element of surprise in their work. Such a learning environment involves not only appropriate materials and assessment techniques, but also methods of learning that address the important affective dimensions of creativity (Reid & Petocz, 2004, p.45).

It involves the student perceiving that there are certain conditions that enhance the expression of their creativity, the climate or environment. This issue is discussed later in this chapter. One of these conditions consists of a degree of freedom, which represents a window of opportunity for the student to make decisions and experiment with new ideas.

Teaching for creativity

‘Teaching for creativity’ focuses on the student; it involves giving him or her opportunities to make choices, to explore. Teaching for creativity means that the teacher looks to promote creative thinking in their students, which might lead to creative learning; a kind of learning that generates new knowledge, new ideas and possibilities. Teaching for creativity may be guided by the principles proposed by NACCCE (1999): encouraging young people to believe in their creative identity; identifying young people’s creative abilities and fostering creativity by developing some of the common capacities and sensitivities of creativity such as curiosity; recognizing and becoming more knowledgeable about the creative processes that help fostering creativity development, and providing opportunities to be creative, a hands on approach; and understanding the development of creative thinking skills and attitudes.

From Jeffrey and Craft’s (2004) perspective, “the relationship between teaching creatively and teaching for creativity is an integral one. The former is inherent in the latter and the former often leads directly to the latter”. (Jeffrey & Craft, 2004, p. 84). In this research, the focus is on the relationships between teacher and students in the context of the classroom. However, creative teaching for creativity may be applied to virtual classrooms as well; to the relationship established between students and teachers mediated by technology since

the focus here is on the way a teacher may generate the conditions that may allow creativity to flourish through education.

Lin (2011) offers an integrative pedagogical frame of reference by proposing that a creative pedagogy involves three interrelated elements: creative teaching, teaching for creativity and creative learning. These three processes interact in a highly connected way generating resonance among them.

To synthesise, creative teaching involves teaching creatively and teaching for creativity. The general purpose of creative teaching is to enhance students' creativity as an objective across in the curriculum. 'Creative teaching', requires teachers understanding the nature of creativity, learning about what enhances and what hinders creativity, and developing certain skills and attitudes.

3.4.1 Teaching practices for enhancing creativity

From a more specific approach to teaching, Sternberg (1991) offers a variety of teaching strategies oriented to promote students' creativity based on his investment theory. This theory proposes that creative thinkers are like good investors: they buy low and sell high. Keeping the analogy of investors in the world of finance, he suggests that creative people invest in the world of ideas by taking a unique, typically undervalued idea and convincing other people of its worth. According to Sternberg (1991) an educational environment supportive of creativity should include the following components: allowing time for creative thinking; rewarding creative thinking; rewarding creative ideas and products; encouraging sensible risks; allowing mistakes; imagining other viewpoints; exploring the environment; and questioning assumptions.

Fryer (1989) identified twelve factors that teachers think most assist the development of creativity. These are set out in Table 3.1. The main aspects that may help to foster students' creativity mentioned by teachers were: building confidence, encouraging pupils to ask questions, having a creative teacher, having some free choice at home and choice of tasks and of learning methods, having an involved and supportive family, asking provocative questions, setting un-assessed tasks, emphasizing success, setting goals and making expectations clear.

Table 3.1 Factors identified by teachers as influencing students' creativity

Factors	%
Building pupils confidence	99
Encouraging pupils to ask questions	97
A creative teacher	94
Some free choice at home	92
Some choice of tasks	90
Involved and supportive family	89
Some choice of learning methods	75
Informal teaching	70
Asking provocative questions	68
Setting some unassessed tasks	64
Emphasizing success	60
Setting goals/making expectations clear	54

Source Fryer, 1989, p.75, included in Fryer, 1996

These factors and the priority given by teachers to build students' confidence, to enhance students' inquisitiveness as well as giving them some freedom to make decisions and choices, are consistent with what has been considered earlier in relation to the traits of a creative person and the conditions that promote creativity. Similarly, Starko (1995) in his book *Creativity in the classroom, a guide for teachers*, mentions as enhancers: finding interests and problems; generating multiple hypotheses; focusing on broad ideas rather than facts; and thinking about the thinking processes.

Tan (2001) in a study undertaken with 116 experienced elementary school teachers and student teachers from Singapore perceived that collaborative and independent student-directed learning activities fostered creativity. Experienced teachers agreed that all learning activities promoted creative thinking. However, student teachers rejected rote memorization and teacher-centred activities. In a study in Hong Kong, Cheung et al. (2005)

compared 449 elementary language teachers' views and practices concerning creativity, and creative writing strategies for developing creative writing skills. Participants underlined as major elements of creativity: imagination, inspiration, and original ideas. They indicated that they used the following teaching practices to support creative writing skills: giving a topic for writing, providing no guidance, allowing writing at home, and setting word and time limits. Although language teachers indicated that they knew of other strategies that may support creativity, they said that they rarely used them.

In relation to teaching practices oriented to motivate students' creativity, findings to date suggest that it is not advisable to emphasize grades, gold stars, incentives and other extrinsic motivation (Runco, 2007). This is because creativity often depends on intrinsic motivation. Students need to follow their own interests without worrying about pleasing the teacher. In Runco's words, "the student may be self-expressive instead of conforming. Additionally, extrinsic factors sometimes direct one's thinking. A student may be thinking more about 'what does the teacher expect here' instead of thinking in a self-expressive manner." (Runco, 2007, p.191).

Researchers such as Deci (1985), and Hennessey and Zbiwoski (1993) argue that students can be immunized to ensure that they will not lose their intrinsic interests. This topic is controversial and can be analysed from different perspectives. Eisenberger and Armeli (1997) showed that extrinsic rewards could influence children's achievement in music when they were rewarded for 'creative' behaviours such as incorporating unexpected elements or producing alternative possibilities. Cropley and Cropley (2000) argue that a clear definition of the criteria that will be used to assess creative products or outcomes may have a positive effect on students' performance in activities that demand for creativity.

The role of feedback in enhancing creativity has not been studied sufficiently. Ipsative feedback focuses on learner progress (Hughes, 2011), and although it has not been explored with particular reference to enhancing intrinsic motivation and creative performance, it seems that it would be important to explore its effects in creative education. Since ipsative feedback is based on informing "the learner how s/he has progressed since the previous assessment" (Hughes, 2011, p.2) it could enhance students' intrinsic motivation to improve his/her performance given that clear definitions of what behaviours, thinking processes and attitudes are linked to a creative performance.

Cropley (2001) in relation to motivation, states that

teachers should seek to foster in students: a concept of creativity and a positive attitude to it; curiosity; willingness to risk being wrong; drive to experiment; task commitment, persistence and determination; willingness to try difficult tasks; desire for novelty; freedom from domination by external rewards (intrinsic motivation); readiness to accept challenge; readiness for risk taking (Cropley 2001, p.148).

In considering what might promote creativity, it is also important to be aware of the kind of practices that hinder creativity in the classroom. In order to promote students' creativity, teachers need to avoid certain behaviours and attitudes, such as using what have been called 'squelchers', phrases that may "kill" creativity such as: 'don't rock the boat'; 'too risky'; 'be practical' (Davis, 1999). Alencar (2002), outlines the following 'inhibiting practices': a) emphasis on the correct response, reinforcing the fear of failure, b) an exaggerated emphasis on the reproduction of knowledge, c) low expectations about students' creative potential, d) emphasis on students' obedience and passivity, and e) little emphasis on fantasy and imagination as important aspects to be taken into account.

Colleagues may positively influence teachers' creativity by suggesting ideas, sharing successful teaching experiences, bringing new educational approaches or new teaching methods for discussion.

3.5 The creative teacher and the creative learner

Creativity relates to two other important human processes that can be unified by a capital C: capacity to learn and change. Creativity involves a set of thinking skills, cognitive and affective aspects which allow people to respond to novel situations, to transform reality, applying knowledge and background in order to generate original and pertinent results (Dabdoub, 2008). Creativity requires abandoning rigid habits and viewpoints and relates to the capacity to learn new approaches, new procedures, even new attitudes and habits. The capacity to learn requires knowing how to use a variety of strategies to search, to analyze, and to process information. Creative learning involves generative learning (Dabdoub, 2008). This means that what is learned becomes raw material to expand possibilities, to make connections, to apply what learning from other contexts in innovative ways. Learning

and creativity both involve change. The capacity to manage change has become an important skill and not only involves the capacity to respond to changes initiated by others, but also the ability to be proactive and initiate changes. The capacity to change involves being able to abandon the familiar, to expand comfort zones, having the capacity to take risks, having a positive attitude to try new things and experiences, to identify and manage fear, and the capacity to manage mistakes in a productive way. Creativity, the ability to learn permanently and the ability to manage change, interact in a way that translates into the transformation and enrichment of the person.

Torrance (1963) defined two different ways in which children can learn: learning creatively and learning by authority. Children learn by authority when they are told what they should learn and accept ideas from authority (e.g. teachers, books). In contrast children can learn through questioning, inquiring, searching, manipulating, experimenting, and through aimless play. Teacher practices such as questioning, stimulating imagination, and presenting challenges enhance creative. Cropley (2001) affirms that teachers who foster creativity are those who:

- encourage students to learn independently
- have a co-operative, socially integrative style of teaching;
- do not neglect mastery of factual knowledge;
- tolerate 'sensible' or bold errors;
- promote self-evaluation;
- take questions seriously;
- offer opportunities to work with varied materials under different conditions;
- help students learn to cope with frustration and failure; and
- reward courage as much as being right.

These characteristics are consistent with the ones of a creative person. A creative teacher needs to acquire these attitudes and skills in order to foster students' creativity. Teacher

education programmes need to consider this when devising curricula and assessment procedures.

3.5.1 Teachers' conceptions and perceptions of creative students

Torrance (1965) using the Torrance Ideal Pupil checklist identified teachers' perceptions of creative students. The research involved over a thousand teachers from the United State, Germany, India, Greece and the Philippines. He found that each culture accepted or denied certain traits as linked to creativity. Each culture supported specific traits and values related to creativity while others were not acceptable for that culture. Tables 3.2 and 3.3 show the five most favoured and five most rejected characteristics of each culture as perceived by the teachers.

Table 3.2 The five most favoured pupil characteristics for each cultural group in Torrance's study

United States	Germany	India	Greece	Philippines
Independent thinking	Sincere	curious	Energetic	Industrious
Curious	Sense of humour	obedient	Strives for distant goals	Obedient
Sense of humour	industrious	Does work on time	Thorough	Courteous
Considerate of others	Independent in thinking	courteous	Sincere	Healthy
Industrious	Attempts difficult tasks	healthy	Non-conforming	Considerate of others

Table 3.3 The five less favoured pupil characteristics for each cultural group in Torrance's study

United States	Germany	India	Greece	Philippines
Haughty and self-satisfied	Disturb class	Disturb class		Stubborn
Domineering	Fault finding	Fault finding	Negativistic	Talkative/ disturb class
Negativistic	Talkative	Talkative	Timid	Bashful
Disturbs class	Haughty	Regresses	Domineering	Timid
Fault finding	Domineering	Stubborn	Disturbs class	Fault finding

What this research showed was that teachers might welcome not all of students' creative characteristics. It is important for teachers to be aware that some of the characteristics that a creative student may exhibit in the classroom may be perceived as disruptive. Teachers need to be able to manage those behaviours without hindering students' creativity and still create an environment suitable for constructive learning for the individual and for the group.

Scott (1999) explored 144 elementary teachers' attitudes in the USA towards creative and less creative students. The author used a comparative scale. Teachers successfully identified the profiles of creative children based on the provided descriptions and rated the following characteristics as typical of a creative child: attracted to novelty; flexible; reorganizes ideas; thinks of fanciful ideas and is disruptive in class.

Another study undertaken by Chan and Chan (1999), involved asking 204 Hong Kong primary and secondary school teachers to list the characteristics of either creative or uncreative students. The most frequently mentioned creative attributes were "imaginative," "always questioning," "quick in responding," "active," and "high intellectual ability," whereas the most frequently mentioned uncreative attributes were

"conventional," "timid," "lack of confidence," and "conforming." Unlike the findings from the USA studies, this research suggested that Chinese teachers regarded some characteristics of creative students as socially undesirable and others as being highly associated with intellectual functioning.

Findings from a study carried out by Runco (2002) to compare parents and teachers' implicit theories of creative children across two countries, the USA and India, show that parents and teachers from both cultures viewed the characteristics of creative children as desirable. American teachers gave higher ratings to attitudinal and intellectual traits than Indian teachers, while American parents and teachers assigned higher mean ratings to traits considered as indicative of creativity in comparison with Indian parents and teachers.

Teachers who participated in a study undertaken by Aljughaiman and Reynolds (2005) mentioned similar characteristics. The researchers asked teachers to list the top five characteristics they felt best described the creative student. Their responses were consistent with their definitions of creativity. The characteristic "thinks differently" was ranked as the number one characteristic of creative students. This corresponds to the teachers' most frequent definition of creativity: having original ideas. Teachers participating in Aljughaiman and Reynolds (2005) research, also frequently mentioned words like imaginative, artistic, has rich vocabulary, and intelligent when they were asked to describe creative students, further linking their definitions of creativity as pertaining to aesthetic production, intelligent behaviours, linguistic production, and imagination. Aljughaiman and Reynolds (2005) further stated that teachers did not seem to like creative personalities. Teachers participating in the study showed a preference for students with high IQs, less creativity, and greater compliance. Their practices tended to discourage creativity by emphasizing obedience, good manners, and traditional thinking.

Candy, Crebert and O'Leary (1994) synthesized what they considered were the characteristics of an idealized creative learner as follows:

- an inquiring mind, characterized by curiosity, and a critical attitude;
- wide knowledge of a field and a wide vision that allows interconnectedness of different fields;
- a deep approach to learning;

-a favourable self-concept;

-self-organizing skills; and

-a positive attitude towards learning.

These studies show there is some agreement regarding the characteristics of a creative student. However, teachers do not always value them in normal classroom activity. This may be because different teaching environments, educational policies and teacher skills and attitudes are required to manage constructively students who show the characteristics mentioned above.

3.5.2 Creative teachers

Much has been researched and written about students' creativity and about the characteristics of the creative student. There is much less research about the characteristics of a creative teacher (Bramwell et al., 2011).

Teachers can support creative talents in various ways. They can provide unconditional positive regard, for example, but they can do much more than that. [...] They can, for instance, support creativity with particular attitudes and actions. The teacher is after all, a model for students (Runco, 2007, p.189).

Bramwell et al. (2011) underline the fact that although some research has examined creative pedagogy (e.g., Craft, Jeffrey & Leibling, 2001; Sawyer, 2004), few studies have examined creative teachers themselves, creative teachers' characteristics, the creative processes they engage in, and the outcomes of their creativity (Bramwell et al., 2011).

The role of teachers is crucial to facilitate students' creativity since they have the ultimate responsibility for creating a classroom environment positive for creativity. Their beliefs about creativity influence their pedagogical activity and decision making (Beghetto, 2006). They become role models when they put their creativity into action in the classroom.

Other role models for students' creativity in addition to the classroom teacher are remote models, for instance, eminent creators that students may come to know, through books, videos. The use of remote models as a stimulus for creativity in the classroom has

particular benefits: giving students opportunities for creative thought; 2) encouraging creative thought; 3) modelling creative behaviour.

Teachers express everyday creativity when carrying out their work in the classroom environment. When they plan, they face challenges such as lack of motivation from the students, restriction of resources or highly demanding administrative tasks, while conforming to curriculum demands (Rejskind, 2000; Richards, 2007).

Ripple (1989) defined ordinary creativity as “creativity [which] results from ordinary people thinking in identifiably unique ways when they meet everyday problems in real-life situations” (Ripple 1989:189). Everyday creativity in a teachers’ daily life involves mainly

combining and integrating different educational theories, stances, and models about teaching, learning, and instruction in novel ways to address the needs of unique learners. There are no clear-cut, explicit, or correct solutions to address learning issues and teaching dilemmas; there are myriad ways to conduct teaching and instruction emergent from multitudinous frameworks. Therefore, the main preoccupation for creative teachers is to overcome obstacles, both for students and themselves (Bramwell et al., 2011, p. 229).

A creative teaching research group in Canada carried out studies of creative teachers (Bramwell et al., 2011). They reviewed 20 documents representing 15 data sets and selected participants for whom they could point to evidence of creativity, such as creating a new teaching strategy or solving a problem in their classes in an innovative way. The authors highlighted that teachers’ creative processes grew out of the interaction between teachers’ personal characteristics and the communities in which they lived and worked, and these processes in turn resulted in a variety of outcomes, which reflected teachers’ values and communities (Bramwell et al., 2011). This is congruent with the areas of creativity that have been identified as person (teachers’ personality characteristics, skills and attitudes), process (the actions they undertake), context (in this case teachers’ communities), and product (outcomes of their creativities). In the studies undertaken by Bramwell et al. (2011), the outcomes of teachers’ creativity fell into four categories: (a) observable products, (b) learning/personal development, (c) motivation, and (d) connection (interpersonal relationships and community).

In relation to teachers' personality, research has found that teachers who possess personality characteristics associated to the ones that may enhance students' creativity, such as being open, accepting and flexible (Esquivel, 1995), tend to have a humanistic philosophical outlook of life (Torrance & Myers, 1970), and prefer a learner-centred approach to teaching (Fryer & Collings, 1991). The essence of education from a humanistic approach (Rogers, 1954) consists of generating the conditions for an individual to become a fully functioning self-actualized person (Maslow, 1999). Such an approach to education is learner-centred, supporting the individual's development of creative qualities to face everyday problems, to support their need for self-actualization and self-transformation, as well as enhancing their capacities for future success (Ai-Girl et al., 2004; Lin, 2011). This type of approach is link closely to enhancing students' creativity.

Hickey (1999) argues that creative teachers encourage students' creative abilities such as independence, curiosity, originality and provide safe climates wherein students can take risks and go beyond familiar boundaries in order to try new paths. A creative teacher directs his or her activity towards the achievement of important transversal learning objectives (Dabdoub, 2008) such as:

Promoting students' creative thinking.

Developing a positive attitude towards taking creative risks, which relates to the ability to manage the process of change, and learning to deal with uncertainty.

Stimulating students' creative skills in order to be able to learn to create, to learn to transform reality and to manage the emotions involved in the process of change and in the creative process.

Promoting students' motivation to learn continuously.

Enabling individuals to become strategic learners, capable of continuous learning through the lifespan and adopting novel responses depending on the circumstances and challenges they need to face.

Stimulating students' self-esteem and confidence in relation to their own creative skills to transform their lives according to their dreams and goals.

Finding ways to promote students' self-confidence and self-esteem, which provide the foundation for confidence when exploring original ways to use background knowledge and experiences.

Promoting students' capacity to self-regulate their learning and their creative processes.

Promoting the expression of an ethical creativity.

The achievement of these kinds of objectives requires a type of teaching that is learner-centred and that can be qualified as creative. If creativity is understood as the potential individuals have for generating novel and useful ideas to respond to situations that demand unusual responses and that allow them to transform reality and themselves, what would it mean to add the adjective of creative to teaching? To begin with, there are three implications. This kind of teaching would involve the use of a variety of novel strategies and activities designed to respond to the challenges and needs of a specific educational context. Such strategies and didactic procedures would be useful for attaining the educational objectives. They should be supported by an ethical and value base to generate in the classroom an environment characterized by respect to all the participants where students' self-esteem and their whole development is promoted. Although teachers may recognize the importance of creativity in education, they may not be knowledgeable about the way they can promote creativity. They may also be unaware of their role in promoting creativity in their own discipline.

3.6 Assessment of creativity in education

As revealed in the literature review, creativity may be conceptualized and understood, from different perspectives. Torrance (1977) defines creativity as the process of sensing problems or gaps in information, forming ideas or hypotheses, testing and modifying these hypotheses, and communicating the results. This process may lead to a variety of kinds of products: verbal and nonverbal, concrete and abstract.

In the educational context, it is important to define the kind of indicators and criteria that might be used to assess students' creative products. If such criteria are used, they should be clearly communicated to students to avoid confusion or disappointment. In addition, it

is important to stimulate students' capacity to evaluate their own and others work. Teachers modelling expert judgment could be an appropriate strategy for doing this.

In the context of Mexican higher education, students' creativity is included as part of the general aims of a high quality education, as stated in Chapter 1 in reference to the National Plan of Education. However, it is rare to find it included in learning objectives or learning outcomes and therefore it is not evaluated. As in other international contexts, Mexican education has been strongly influenced by the tendency to emphasize the accomplishment of knowledge centred standards, which may not include creative thinking or creative behaviour. However, creativity is considered essential to professional profiles such as those working in art, marketing, architecture and industrial and graphical design. In such academic contexts, teachers expect creativity from students and hence, they assessed it. Formal publications in relation to the teaching and assessment methods in these areas followed to attain these objectives are rarely available in refereed publications. Institutional guidelines tend to be maintained in the internal context of the institutions involved in such efforts.

Fryer (2006) underlines the need to address the assessment of creativity in HE, especially the relationship between creative ability and academic achievement (Fryer, 2006, p.74). Although different tests to assess creativity have been developed, (some examples are set out in Table 3.3), assessment of creativity in education has been, in general, approached in an informal manner. Fryer (2006) reports that over one-third of the sample of the study undertaken with NTFs assessed students' creativity informally; with just over one-quarter undertaking some kind of formal assessment (Fryer, 2006, p. 84).

Table 3.4 Examples of tests developed to assess creativity

Name of the test	General purpose	Authors
The adjective checklist	Designed to measure personality characteristics	Gough, H. G., & Heilbrun, A. B. (1952)
Alternate uses	Designed to measure one aspect of creativity that relates to flexibility of idea generation.	Christensen, P. R., Guilford, J. P., Merrifield, P. R., & Wilson, R.C. (1983)
Khatena-Torrance creative perception inventory	Two separate measures: something about myself (SAM) and What kind of person are you? (WKOPAY). The overall purpose is to identify creative self-perceptions to assist in special education and job placement.	Khatena, J., & Torrance, E. P. (1976); revised 1998.

Source: Puccio, G. & Murdock, M. (1999). *Creativity assessment. Readings and resources.* Buffalo, N.Y.: Creative Education Foundation

Fryer (2006) showed that where creativity was formally assessed, the criteria were not always explicitly stated. Where they were they included: going beyond boundaries; being prepared to take risks; innovation, innovative thinking; originality; entrepreneurship; problem-solving ability; imaginative use of media within the context of the brief; initiative; inventiveness; sophistication; engagement, motivation; ability to analyse critically; and creativity per se.

In relation to the assessment of students' creativity in Higher Education, Jackson (2005) offers conclusions derived from workshops held at the University of Hertfordshire (May 2005); the University of Portsmouth (January 2005); and at the Indiana University, Purdue University Indianapolis (USA) (March 2004); and from perspectives gained from discussions with subject practitioners in history, earth sciences and engineering and from the literature.

Teachers' views on whether creativity could be assessed fell into four groups:

- Creativity may be evaluated through explicit assessment criteria;
- At best, the evaluation and recognition of creativity is implicit;
- It is not possible and or desirable to assess creativity;
- Some teachers value creativity but do not know how to assess it.

Jackson (2005) identified at least three possibilities for assessing students' creativity: assessing the product, the process or a combination of both. Students' products that may be assessed in the context of Higher Education included essays and other forms of writing including, reports, diaries and reflective logs, poems, the products of electronic discussions; posters, the results of problem working, design and synthesis, independent projects, laboratory or field notebooks. There were different possibilities for assessing processes, which involve creative acts, and in which creative outcomes might be produced, individually or collaboratively. The process may be assessed through direct observation or indirectly through the use of videos, diaries, or reflective accounts supported by evidence.

Jackson (2005) discussed the issue that an individual can make a judgment based on values but argued that teachers may be biased when they assess students' creativity. This could be overcome by involving several judges, or including clear criteria to assess products or processes. Jackson suggests that assessing creativity could make an important contribution to developing students' capacity and awareness of their own creativity and to understanding why something is creative. Jackson (2005) suggested that general descriptors might embrace such things as originality, lateral thinking, generative thinking, viewing problems from different perspectives, identifying multiple possibilities, and the ability to evaluate possibilities and justify the approaches chosen. However, these

descriptors would need to be contextualised to embody the types of behaviours that teachers say they are trying to develop in different subjects. The authors mentioned examples including: analytical abilities in engineering; clinical reasoning focused on the individual in occupational therapy; exploration of other domains of knowledge/approaches in Informatics and Design; and original thinking within boundaries in Accounting (see Table 3.5. for example criteria).

Table 3.5 Criteria that may be used for assessing students' creativity

Criteria to assess products/outcomes	Criteria to assess processes
<p>Solutions to problems and how they are justified Difference (standing out from the crowd)</p> <ul style="list-style-type: none"> • Representations e.g. ability to write clearly and concisely; drawings and models; performance • Alternative solutions to a problem that relates to the client • Drawing previously unrecognised parallels between models, topics, situations • Student's sense making • How knowledge and skills have been applied to a problem • How existing knowledge has been used in novel ways. 	<p><i>Ideas and motivations</i></p> <ul style="list-style-type: none"> • Vision and imagination • The amount and quality of ideas and how they are evaluated • Ownership of a project: the way it is personalised and made interesting and relevant to the individual. <p><i>Behaviours and processes</i></p> <ul style="list-style-type: none"> • Manifestations of particular skills and abilities • Use of knowledge and understanding relevant to context • Attitudes • Critical thinking, including unlearning, relearning and new learning • How logical thinking and thinking that is not so logical but is associative are used, connected and integrated • Developing intuition <ul style="list-style-type: none"> • Students' representations of their own creative process through reflective accounts that retrace experience (in light of reflection, conceptualisation, applied theory) and show criticality in thinking about How? Why? When? Where?

Adapted from Jackson (2005)

Jackson (2005) also outlined approaches that teachers may use to assess students' creativity including:

Giving clear outlines of how to assess the standard of work which they have access to;

Developing students' understanding of the power of being able to take risks;

-using unsolved real life problems to evaluate creative skills;

-recognizing creativity in others;

-examining the use and fluency of language;

-evaluating presentations;

-vivas;

-portfolios - that provide context, evidence, process, decision making/justification, outcomes

-annotated albums of learning;

-scrap books;

-blogging and messaging;

-computer conferencing;

-sketch books;

-concept maps;

-conducting interviews in relation to a student identified dilemma;

-using critique sessions where students defend their process, opinions etc.;

-asking students to set criteria within the problem/need, then change their role to solving the problem and providing evidence of learning against their criteria;

-looking for portfolio of process, reflection, transfer of abilities to other disciplines; and

-project based assessment of drawings, models, reflection.

Another issue to be taken into account when assessing students' creativity in Higher Education is different levels of creativity. Taylor (1959) elaborated a framework of five levels of creative engagement through the metaphor of an artist, although these levels

may be taken as a useful framework in the context of Higher Education in relation to teaching in different disciplines. The levels are:

Primitive and intuitive expression: This does not require technical knowledge; the creator has not been trained in art.

Academic and technical level: The individual has learned skills and techniques that allow a variety of creative expression.

Inventive level: At this level the person uses a knowledge base to experiment and explore different ways of using tools and mediums by breaking rules and challenging the boundaries of academic tradition. Exploring different ways of using familiar tools and mediums.

Innovative level: The person introduces materials and methods out of the ordinary; there may be improvement through modification. The creator breaks the boundaries here.

Genius level: Taylor underlines that at this level the accomplishments of individuals in art and science defy explanation. Outcomes at this level may involve the generation of new principles, which influence a discipline or generate new knowledge tendencies.

Teachers could use these levels as a frame of reference to assess students' products, although they would need to be adapted depending on the subject, the context, and their knowledge and skill level. Jackson (2005) affirms that in the higher education context it may be that educators are looking to encourage students' creative potential at the second and third levels.

Overall, the evidence presented in this section indicates that assessment of students' creativity is important, challenging and complex. The assessment of students' creativity is beyond the purpose and scope of the present research. The current research is focused, as an initial step, as an exploratory investigation, on promoting teachers' recognition of the importance of including the promotion of creativity in all subject domains included in the curriculum and to help teachers to become aware of how they are or not promoting creativity through teaching and learning strategies.

In certain specific educational contexts in Mexico such as industrial engineering, graphic and industrial design, arts, and marketing, where the role of creativity has been more

widely recognized, it is important to acknowledge the importance of issues of the assessment of creativity.

To summarize, the assessment of students' creativity should be part of any effort designed to promote students' creativity in the curriculum in any discipline in Higher Education. In the present research, a decision was made to leave the analysis or consideration of creativity assessment strategies for further research and to focus attention on developing an instrument to promote teachers' reflection of their current teaching practices and orient their attention towards creativity. While it would have been possible to include statements referring to how teachers assessed students' creativity, from experience in the context of Higher education in Mexico, in UNAM and from teachers' and students' responses, it could not be concluded that creativity was part of learning outcomes, or academic expectations so it seemed that asking how teachers assessed students' creativity was premature.

3.7 Conditions for creativity in the classroom

It is important to identify the external conditions of educational institutions or organizations that may hinder or facilitate creativity, as well as the internal conditions (within the classroom) under which teacher and students express their creativity.

Characterization of a creative environment in the classroom includes considering where teachers and students are motivated towards learning, where students can experiment, be respected, trusted and where there is openness to ideas (Torrance, 1965); and where exploring and discovering meaning is perceived as an exciting and meaningful experience (Raina, 1989).

'Classroom climate' is used to identify these conditions. It is defined as the conduct, attitudes and feelings people experience in a social context. Isaksen and Lauer (1998) basing their research on Ekvall's (1995) studies on organizational climate, identified nine dimensions of such a climate for creativity and change. These dimensions are freedom, risk taking, support for ideas, playfulness and humour, trust and openness, time for developing ideas, challenge and involvement, conflict and debate. In educational contexts, teachers need to create consciously the necessary conditions for students to feel confident and to

experiment with a certain degree of freedom to be able to explore different ways of expressing their creativity. “We may not need to create ‘creativity’ so much as generate conditions in which it can flourish”. (Tosey, 2006, p. 29).

According to Fitzsimmons and Lanphar (2011), it is important to consider the role of emotions in the creative process and in the creative classroom. Creativity implies making positive changes in the world. It involves connecting intellectual and emotional landscapes. In an educational environment, emotions and their expression are important in order to create a community of learners where every voice is valued. All emotions can be expressed but in a way, that includes everyone. A creative climate in the classroom involves creating the conditions for everyone to feel included, respected and valued.

A creative climate involves the possibility for the people to interact and exchange knowledge, experiences and ideas in order to learn, to solve problems and create together. As argued by Stöckle-Schobel (2011), social interaction shapes the way we understand others as well as the way we understand the world. Interaction, in the sense of inter-subjective processes, emerges from many different kinds of encounters between those individuals and may be facilitated in a climate characterized by respect for others, and in general by a perception of psychological safety.

In order for teachers to be able to generate such conditions in the classroom, they need a framework based on their understanding of creativity, and skills and attitudes for creative teaching. The research reported here will attempt to establish these within the context of higher education in Mexico providing a model for the design of educational programmes for teachers, which will support them in developing creativity in their classrooms.

As Runco states, in the classroom environment,

A great deal can be done within the classroom setting to encourage the creativity of students. In fact, some of the earliest empirical research on divergent thinking confirmed that the environment plays a critical role. Unless it is permissive and supportive, creative skills will remain hidden (Runco, 2007, p.188).

3.8 How to promote teachers' performance towards creative teaching?

There are gaps in the literature in relation to promoting teachers' performance towards the adoption of a creative teaching approach. The importance of fostering creativity in HE has been acknowledged. However, research or reports in relation to how to help teachers develop the required skills for teaching for creativity in Mexico are difficult to find in refereed publications. This does not mean that there have not been initiatives undertaken at different levels, however the outcomes of which have not been published. There is still a need to design and test methods and strategies, which will support teachers in learning how to enhance students' creativity in the Mexican HE context.

At an international level, more research has focused on teachers' views than on how teacher education programmes can support teachers in developing a pedagogy oriented towards enhancing students' creativity. In the Mexican context, no studies referring to teachers' views on creativity or on creative teaching have been undertaken or published in refereed publications. In addition, there has been no research on strategies to enhance teachers' motivation to work towards developing a creative teaching approach.

The innovative contribution of the present research is that it focuses on providing an initial step towards promoting teachers' motivation to become involved in making the necessary changes to introduce a more creative pedagogical approach in their teaching based on higher education students' and teachers' views on creativity and creative teaching in the Mexican context.

If teachers wish to teach creatively, they need to take a positive decision to do so. They need to be aware of what is required to promote students' creativity through teaching. Creative teaching involves making choices and decisions about the kind of teaching practices, methods, strategies and resources that will be used. Creative teaching should as well include description of how they will be implemented, in order to promote all elements of creativity; for instance, stimulating students' thinking, questioning, curiosity, capacity for making unusual connections, and applying past knowledge and experience to achieve novel products or outcomes.

To make this happen teachers will need to be inducted into a process of personal and professional transformation. Teaching programmes for creative teaching need to be based

on the stimulation of reflexive thought and self-observation, in order for teachers to understand their personal creative style; to recognize the personal attributes skills, attitudes and emotional processes that may influence the creative process as well as how it develops successfully under certain circumstances and how it is hindered by others. This reflective and meta-cognitive process can be termed 'meta-creativity' – the process that allows the person to become conscious of the subjective processes and factors involved in his or her creative process. Meta-creativity may enable the person to increase or develop his or her creative potential; to be more deliberate when getting involved in a creative process, to better handle the possible obstacles (internal or external) to creativity and to be able to generate adequate conditions for promoting his or her own creativity.

Creative teaching does not represent exclusively the application of a series of strategies or techniques in a mechanical manner. It involves teachers in a holistic way, as persons, as professionals, as practitioners; as persons, with beliefs, attitudes and fears; as professionals of education with experiences and pedagogical and disciplinary knowledge; as practitioners with abilities developed from experience and with preferred teaching strategies.

3.9 Summary and conclusions

In order to promote creativity in education teachers need to have knowledge and understanding of creativity, have attitudes favourable to creativity, and need to be able to use teaching strategies that enhance students' creativity.

The conceptions a teacher holds in relation to creativity may influence his/her attitudes and behaviours and subsequently his/her actions in the classroom.

Some teachers may not feel comfortable interacting with creative students particularly those who are disruptive in class. A creative student may challenge a teacher who is responding to system pressures relating to attainment.

Teacher education programmes need to support teachers in developing creative teaching since this involves a process of change. Several studies have identified teaching strategies and conditions that may enhance creativity in the educational environment. Such teaching

practices, might include several possibilities, such as, building students' confidence; encouraging pupils to ask questions; allowing time for creative thinking; rewarding creative ideas and products; encouraging sensible risks; questioning assumptions; asking provocative questions; some choice of learning methods; finding interests and problems; generating multiple hypotheses; and focusing on broad ideas rather than specific facts (Fryer & Collings, 1991; De Souza Fleith, 2000; Sternberg, 1991; Starko, 1995).

The following chapter sets out the aims and objectives of the present research.

Chapter 4

Aims and objectives of the present research

4.1 Need for the present research

Despite the increase in research on creativity in education, on its benefits and importance for society and for the individual, there is a need to explore ways in which higher education teachers can transform their teaching in order to enhance students' creativity.

The present research recognizes the complexity of the change process involved in introducing innovation in education. Teachers become familiar with a particular pedagogic approach and may feel secure and comfortable with that approach not wishing to change it. The educational context also plays a role in shaping what becomes an accepted approach to the teaching-learning process through institutional demands in relation to attaining certain standards.

In order to introduce changes to the pedagogical approach that teachers adopt, it is essential for them to recognise the need for change find the motivation required to establish new attitudes, behaviours and ways of thinking about teaching and how it is undertaken on a daily basis in the classroom context.

Hence, the present research focuses on developing a tool in the format of a questionnaire, which can be useful first, to help teachers recognize that fostering creativity through teaching is important and that is not exclusive to the specific domains of the arts, marketing, industrial design or engineering. Secondly, it might be useful to enhance teachers' awareness of the teaching strategies they currently use that may enhance students' creativity. The assumption is that these two foci may enhance teachers' motivation to engage in the transformative process required in order to move towards a more creative approach to the teaching-learning process.

Although it is recognized the importance of the assessment of creativity in the educational context, is not a main purpose of the present research. A separate research project would be required for this.

4.2 Research propositions and questions

The theoretical positions that underlie the research questions are presented here. One proposes that creativity may, and should be enhanced in educational environments (Seltzer & Bentley, 1999). It has also been recognized that teachers' behaviour, the pedagogical strategies that they use and the attitudes they display while conducting their teaching may influence the development and expression of creative thinking skills on the part of their students (Torrance, 1965). Human beings are able to recognize the conditions that facilitate or hinder their creativity as has been shown by studies such as those undertaken by Ekvall (1991) and Isaksen and Lauer (1998) which identified the characteristics of the social environment that may foster creativity in different types of organizations by describing the worst and best case scenarios.

Five research questions were addressed:

- What conceptions of creativity do Mexican students and teachers hold?
- What are Mexican students' and teachers' perceptions of the factors that enhance and hinder their creativity in the classroom?
- What conceptions of a creative teacher do Mexican students and teachers hold?
- What specific knowledge, skills and attitudes do teachers need to be able to foster students' creativity through the curriculum in higher education?
- To what extent can teachers' awareness of their teaching practices relating to creativity, be enhanced through a process of self-reflection supported by using a self-assessment tool?

While no formal hypotheses are set out for the research, a number of propositions have been proposed.

The first proposition relates to the implicit theories held by students and teachers as these have been argued to be important as they involve tacit knowledge and guide personal judgments and expectations (Runco, 1999; Sternberg, 1985; 1987). This proposition considers two possibilities, it could be expected that students' and teachers' implicit theories of creativity and of creative teaching will include myths such as those outlined by

Weisberg (1986), for instance, perceiving creativity as limited to those with exceptional talent, accepting that not everyone can be creative, and perceiving that creativity only applies to transformative creations. However, a second possibility is that Mexican Higher education students and teachers may have a more highly developed notion of creativity and awareness of what inhibits or facilitates creativity as set out by more explicit theories (Ekvall, 1991; Isaksen and Lauer, 1998).

The second proposition is that students' and teachers' conceptions of a creative teacher will be similar to those that have been identified as the traits of a creative person including being flexible, open to change, capable of generating multiple and varied ideas and willing to take risks (Stein, 1984; Jackson and Messick, 1965; Runco, 2007; see Table 2.1). Such traits have been identified in studies exploring students' and teachers' views in relation to creative teaching, (e.g. Cromptley, 2001; Urban, 1996; Root-Bernstein & Root-Bernstein, 2000; Runco, 2003; Craft, 2006; Fryer & Collings, 1991; Fryer, 1996; Bramwell et al., 2011). It is also likely that there will be a degree of congruency between students' and teachers' conceptions of creativity, of what are perceived as enablers or obstacles for creativity and their conceptions of a creative teacher.

The third proposition, is that a general description of the knowledge, skills, and attitudes teachers need to enhance students' creativity may be extracted from two sources; 1) through the analysis of students' and teachers' implicit theories of what enhances or obstructs their creativity, as well as from their expectations of what a creative teacher does and, 2) from findings from explicit theories of creativity and creative teaching for creativity, such as: De Souza Fleith's (2000), Bjerstedt and colleagues (1976); Fryer and Collings (1991); (NACCCE, 1999); Lilly & Rejskind (2004); Reid and Petocz (2004); Jeffrey & Craft (2004); Sternberg (1991); Starko (1995); Cromptley, (2001); Urban, (1996); Root-Bernstein & Root-Bernstein, (2000).

The fourth proposition, is that teachers' reflections on and awareness of their teaching practices in relation to how they may enhance or inhibit their students' creativity, may support their motivation and open-mindedness towards making the changes in their daily teaching practices, and their global approach to the teaching-learning approach, required for a more creative teaching approach, (i.e. Schön, 1983; Light & Cox, 2001; Bruch, 1988; Dewey, 1933; Yost, Sentner and Forlenza-Bailey, 2000, amongst others).

The research questions were translated into three aims with specific objectives related to each as follows.

4.3 Aims of the present research

In carrying out this research, there were three main aims.

First aim: to develop a pedagogical model that may provide a theoretical framework for creative teaching for creativity.

The **objectives** related to this aim were:

1. To identify the knowledge, skills and attitudes that teachers need to develop in order to teach creatively and to promote students' creativity. This will be achieved by undertaking a literature review.
2. To explore students' and teachers' implicit theories related to creativity, what enhances or inhibits their creativity in a classroom environment, and what is expected of a creative teacher.

Second aim: To enhance teachers' attitudes towards making changes in their teaching to include more creative teaching practices in their lessons. This will be achieved using an instrument for self-reflection. This aim is based on the supposition that the change process involved in transforming teaching familiar practices is facilitated through the process of reflecting and identifying, understanding the need for such a change, and through awareness of current teaching practice strengths and weaknesses in relation to the goal of promoting students' creativity.

The **objectives** related to this aim were:

1. To develop an instrument that may help higher education teachers to reflect on and analyse their current teaching practices to help them become aware of their strengths and weaknesses in relation to creative teaching.
2. In developing the instrument, to take into account the pedagogical model for teaching creatively and the identified knowledge, skills, and attitudes required by teachers for

enhancing their current teaching practices. Statements relating to different pedagogical strategies, attitudes and behaviours, derive from students' and teachers' implicit theories, as well as from previous research (i.e. Root-Bernstein & Root-Bernstein, 2000; Tan, Ai-Girl, 2000; Isaksen, 1999; Cropley, 2001; Addison, Claydon, & McDowell, 1999, amongst others) The instrument will explore teachers' attitudes, motivation and disposition towards making the required changes in their teaching and towards engaging in an educational process, which would support the development of teaching creatively to promote students' creativity.

Third aim: To analyse if the tool for self-reflection can help teachers to identify the kind of changes that they would need to make in order to improve their abilities to support and promote students' creativity.

The **objectives** related to this aim were:

1. To use a qualitative approach to identify how useful the questionnaire might be for raising teachers' awareness of the importance of introducing creativity through their teaching and motivating them to introduce changes in their teaching.
2. To provide institutions with a tool to gather students' perceptions in relation to teachers' performance and as a tool for teachers' self-assessment. Such a tool may be able to support teachers' continuous improvement and may provide a framework for institutions to facilitate teacher education programmes to promote 'creative teaching for creativity'.

The methodology and procedures selected to address these questions and to achieve the aims of the present research are presented in Chapters 5 (for the initial study) and 8 (for the study oriented to piloting the tool).

Chapter 5

Selection of the methodology and research design

“Every important idea in science sounds strange at first”.

Thomas Kuhn

5.1 Introduction

This research is based on the recognition of the importance of creativity as a valuable asset for individuals in the 21st century, and on the importance of fostering creativity through the educational process.

Cropley (2001) affirms that teachers have the possibility of promoting the development of creative thinking in their students through their teaching. Therefore, it is very important to define how teachers need to behave in the classroom, as well as what kind of knowledge and abilities they require to become advocates and catalysts for their students' creative thinking.

Human beings are able to identify the conditions that allow them to express and develop their creativity in a particular social environment (Isaksen et al., 2001). People's perceptions are relevant because, although subjective, they influence behaviour and expectations in specific contexts (Runco, 1986).

The research design, as will be explained later in this chapter, includes two parts: an initial study and a pilot of the self-assessment tool. The initial study looks to identify the implicit theories held by students and teachers in relation to creativity, as well as what hinders and facilitates creativity in an educational environment.

Findings from the initial study, as well as the contributions of the different studies reviewed and considered in the literature review were a base to design a model for 'creative teaching for creativity'. The thematic analysis of qualitative data from participant students and teachers collected in the initial study, allowed to identify the skills, attitudes

and behaviours that teachers require in order to foster students' creativity. These definitions also took into account the contributions from previous studies that were included in the literature review.

A self-assessment tool was developed to help teachers reflect on their teaching practices and to identify the improvements they needed to make in order to enhance students' creativity. The methodology used to develop and to pilot this tool is described in Chapter 9. In addition, in chapter nine the methodological framework for the evaluation of the self-assessment tool will be presented, as well as the procedures followed and the processes adopted.

In this chapter the methodological approach to the initial study will be presented, the procedures and techniques, as well as the theoretical framework.

5.2 Methodological approach

Social and educational researchers need to select the research methodology that will enable them to find answers to their research questions (Leedy & Ormrod, 2005). The selection of the methodological approach, involves analysing the paradigm through which the researcher is approaching the study of a problem or some phenomenon, and therefore involves making decisions in relation to the procedures and techniques that seem most suitable to achieve the aims of the research (Leedy & Ormrod, 2005; Robson, 2011).

Philosophers of science and social researchers have been involved in debate concerning the differences and merits of the research paradigms that have been used in the natural and social sciences (Gage, 1989; Patton, 1990). A paradigm is "the entire constellation of beliefs, values, and techniques shared by members of a given scientific community" (Kuhn, 1970, p. 75). Paradigms are frameworks of reference that guide scientific communities as to what kind of problems to investigate and which theories, methods and techniques are acceptable within that paradigm.

Research methods are informed by commitments to particular ontologies or worldviews and epistemologies, or ways of knowing that world. "These commitments are always held by the researcher, mostly tacitly. The researcher brings to the research process a "set of

interlocking philosophical assumptions and stances” (Greene & Caracelli, 1997, p. 6). This means, “no method is self-validating, separable from an epistemology and ontology” (Scott & Usher 1996, p. 13).

Quantitative research methodology, identified with logical positivism, uses experimental methods and quantitative measures to test hypothetical generalizations (Scott & Usher, 1996). Phenomenological inquiry, or qualitative research, on the other hand, uses a naturalistic approach that seeks to understand phenomena in context-specific settings. Each methodological approach represents a fundamentally different inquiry paradigm, and the researcher’s actions are based on the underlying assumptions of each paradigm (Hoepfl, 1997).

The positivist/empiricist approach calls for description, prediction and control whereas the qualitative interpretive approach is oriented towards understanding and explanation. (Scott & Usher, 2011). Exponents of the qualitative approach assume that in social research knowledge is concerned with interpretation and meaning and not with generalization, prediction and control (Usher, 1996). Human action is meaningful and hence has to be interpreted and understood within the context of social practices (Scott & Usher, 2011).

Gadamer (1975) argues that within the social sciences understanding an object is always prejudiced in the sense that it can only be approached through an initial projection of meaning that comes from the researcher’s situatedness, his or her standpoint in history, society and culture. In Usher’s words:

“Human action is given meaning by interpretive schemes or frameworks. It follows from this that as researchers (engaged in the human action and social practice of research) we too seek to make sense of what we are researching and we do so through interpretive schemes or frameworks. This process of double sense/making is referred to as the double hermeneutic (...) in social research both the subject (the researcher) and object (other people) of research have the same characteristic of being interpreters or sense/seekers.” (Usher, 1996, p. 19).

Hence, the approach to research for the study and understanding of a phenomenon of the quantitative and the qualitative paradigms differ. For Murray (2003) the division between paradigms tends to disappear in the social sciences, since many studies tend to mix both methods. According to Patton (2002) the paradigm wars are over, since instead of fighting

for the superiority of quantitative versus qualitative approaches, the challenge is to match research method and paradigm to the purposes and questions raised in the research. From Patton's view point, researchers "need to know and use a variety of methods to be responsive to the nuances of particular empirical questions and the idiosyncrasies of specific stakeholder needs" (Patton, 2002, p. 585).

Considering that human phenomena are highly complex, an option, instead of selecting one of these two approaches is to search for certain complementarities between them in order to have a more holistic view of the phenomenon studied. Therefore, within a research methodology a mix of quantitative and qualitative methods can be included. Mixed methods characterize as research that contains elements of both qualitative and quantitative approaches (Brewer & Hunter, 1989; Patton, 1990).

One of the benefits of mixing methods and approaches is that

"Mixing makes room for both the initial inductive process that begins with empirical evidence of the particular and proceeds to a level of abstracting/theorizing/generalizing and the confirmatory deductive process of hypothesis testing of theories". (Rocco et al. 2003, p. 22).

In this way the strengths and weaknesses of both qualitative and quantitative methods can be considered in relation to their possible contribution to research. As stated by Entwistle and Ramsden (1983), both methods may be combined to illuminate the research question in detail.

5.2.1 Selection of research methods

In formulating the design for the present research, a mix of quantitative and qualitative methods was considered adequate to seek for answers to the research questions and to achieve the aim of the study, which was to develop a self-assessment tool that could help teachers to reflect on their teaching practices and thereby foster creativity through their teaching. Using Tashakkori and Teddlie's (1998) typology, the approach followed in this study was a mixed method Type IV using qualitative data, statistical analysis and inference.

In selecting a mixed methodology approach, the goal of the initial study was to understand the experience and perceptions students and teachers have, in relation to the conditions that facilitate or hinder their creativity and the meaning of such experiences for the participants and to use the findings to develop a self-assessment tool grounded in students' and teachers' experiences.

To develop the self-assessment tool, the creative teaching, knowledge, skills and attitudes for 'creative teaching for creativity' needed to be defined. Previous studies have analysed some of these elements (Fryer, 1996; Torrance, 1987).

The research design contains two distinct stages: 1) an initial study, exploring student' and teachers' perceptions of issues relating to creativity and 2) piloting the self-assessment tool developed to enhance teachers' awareness of their teaching practices. This section will present a general description of the procedures and techniques (from the mixed approached selected) on both stages. Further in this chapter a more detailed description of the initial study will be presented and in chapter 9, the methodology used in piloting and evaluating the self-assessment tool.

1) Initial study. Understanding how students and teachers experience the conditions that may hinder or facilitate their creativity in an educational environment was at the centre of the initial study so a qualitative phenomenological approach was the most appropriate.

The aim of the initial study was to identify the implicit theories held by students and teachers (Runco, 1990), as well as to understand their perceptions of what may facilitate or obstruct creativity in the classroom. To collect information from students, a semi-structured interview was used, while a written questionnaire with open questions was used to collect information from teachers. The questionnaire as presented to the Mexican teachers in Spanish is included in Appendix 1. Appendix 3 provides each of the items in the Spanish version, as well as the translation into English. The description and rationale of both procedures is presented in the corresponding section later in this chapter.

A thematic analysis was undertaken with the data collected from the interviews and from the questionnaire to identify emerging categories. Tesch (1990) describes the kind of analysis used in this study as empirical phenomenology; empirical since the theorizing is based on the data collected and phenomenological since it deals with the participants'

accounts and thoughts about their own experiences as data. In an empirical phenomenological approach, the researcher is aware that he or she is not seeking to generalise but to understand and explain. Colaizzi (1973) makes a distinction between researchers who use their own experience as data, which he considers being a reflexive form of phenomenology, and those who use protocols derived from the participants, which he defines as an empirical form of phenomenology, the approach that was used in the initial study. Within the realm of qualitative research, empirical phenomenology as stated by Aspens (2009:9) is based on the assumption that a scientific explanation must be grounded in the meaning structure of those studied. With this approach, “analysis does not start with the objective world out there as is the case in the natural sciences and in much of the social sciences as well, but with ‘mental directedness’, or that which the mental is about, or directed to” (Aspens, 2009, p. 2).

Patton framed the typical phenomenological research question as, “What are the meanings, structure, and essence of the lived experience of this phenomenon for this person or group of people?” (Patton, 2002, p. 104). The intention of this kind of approach is to understand and describe an event from the perspective of the participants.

The findings from the initial study were used as input together with information gathered from other studies to build the self-assessment tool for the teachers.

2) Piloting the reflective tool. The second part of the research involved the development and application of the self-assessment tool in the format of a questionnaire with a five-point Likert scale (always, sometimes, often, rarely, never) based on the categories that emerged from the data collected in the initial study also taking into account findings from research on creative teaching. The procedure used to develop and to apply the self-assessment tool called ‘Crea-Teach’, as well as the findings relating its use will be presented in chapter 9. It is important to stress that the tool was not intended to be a measure of teachers’ creativity but to help them identify which of their current teaching practices promoted or hindered students’ creativity.

5.2.2 Quantifying the qualitative data

Adopting a mixed method perspective, quantification of qualitative data from the thematic analysis was carried out to provide an alternative approach, to support the process of interpreting and extracting meaning from the data. Tashakkori and Teddlie refer to this process as “quantitizing” the qualitative data (Tashakkori and Teddlie, 1998, p. 128).

In the initial study, this quantitizing consisted of a frequency count of the number of responses that fell into each of the categories that emerged from the qualitative analysis of the responses given by students to the semi-structured interview questions and by the teachers to each of the four open-ended questions of the questionnaire. This process made it possible to identify the themes and categories that were more common among the participants (students and teachers) in the initial study. The quantitizing of the qualitative results are presented as percentages of responses. This approach has been adopted by other research exploring the perceptions of creativity of different groups (Aljughaiman & Mowrer-Reynolds, 2005; Spiel & Von Korff, 1998) as already presented in the literature review. It is not intended that the percentages should be interpreted in the same way as statistical analysis but merely as an indication of the relative strength of the responses. The percentages of responses included in each of the categories illustrate which responses were made most frequently by the participants in relation to their perceptions of creativity, what enhances or obstructs it and their perceptions of the characteristics of a creative teacher.

The main purpose of the tool *crea-teach*, as has been stated earlier, was to address research question 5, i.e. to what extent can teachers’ awareness of their teaching practices relating to creativity be enhanced through a process of self-reflection supported by the development of a self-assessment tool? The mixed qualitative and quantitative methodology (type IV as identified in Tashakkori and Teddlie’s, 1998), as mentioned earlier, was selected in order to provide an in depth qualitative analysis of the open-ended questions related to the usefulness of the tool to help teachers reflect on their available teaching strategies for promoting students’ creativity. While the quantitative approach (through statistical analysis), was used to identify participants’ current teaching approaches and to analyse the reliability of the scale to be tested.

5.2.3 Selection of semi-structured interviews to collect data from students

As stated by Kvale and Brinkmann (2009), the purpose of the qualitative research interview is to understand themes from the lived daily world from the subjects' own perspectives. According to Britten (2007), semi-structured interviews are conducted based on open questions that define the area to be explored and where the interviewee may freely express their thoughts in order to pursue an idea in more detail. This type of interview gives an informant the space to express meaning in his or her own words (Britten, 2007).

Powney and Watts (1987) make a basic distinction between respondent interviews and informant interviews. In respondent interviews, the interviewer remains in control (or at least that is the interviewer's intention) throughout the whole process. The interviewer to some extent, necessarily structures all such interviews, since the intention is that interviewers rule; the interviewers' agenda is what matters. According to Powney and Watts (1987) both fully and semi-structured interviews are typically respondent interviews since both are based on a pre-defined schedule.

In the present study, it was decided to use a semi-structured interview as the most effective procedure to collect data from students to give them the opportunity to explore their ideas and conceptions in relation to the questions. The objective was that they would not try to meet the expectations of the interviewer or try to give correct answers but that they would instead feel free to express their thoughts and perceptions related to the topics raised in the interview questions.

Given the conditions in which the interviews were undertaken, as explained later in this chapter, the participants had little time to participate in the interview so the responses given by the students participating in the initial study were very concise. This is reflected in the verbatim examples set out in Chapter 6. However, their responses did provide information about their implicit theories, which enabled the research questions to be answered.

5.2.4 Selection of a written questionnaire for teachers

A decision was made to adopt a written questionnaire with open-ended questions for the teachers who would constitute the sample for the study. Two considerations led to this decision. The first was that many of the teachers working in higher education at the UNAM had a very complicated schedule so it was not easy to collect data from them through an interview. The other consideration was that sometimes when a researcher makes use of a written questionnaire that is sent out or given to the participants to return, not all of the participants return the questionnaire to the researcher. The teachers who participated in the research were attending a creative teaching workshop held by the researcher. This represented an opportunity to have them gathered in the same room at the same time to administer the questionnaire.

The questionnaire was administered before the workshop started, so they had not received any theoretical information about creative teaching or about creativity. The questionnaire was applied to the whole group of teachers at the same time. This made it possible to obtain information from them all. The procedure used to administer the questionnaire is detailed in the next section.

Using teachers attending a training session on creativity could be seen as a limitation of the study in that this convenience sample may not be representative of a general population since they were already interested in the field of creativity. However, as the intention of the questionnaire was to explore their implicit theories of creativity and not to assess their knowledge (depth or breadth) about creativity, it was considered that the information collected in this way would be useful to answer the research questions.

5.2.5 Open-ended questions

The advantage of open-ended questions is that they encourage co-operation (Robson, 2011). Foddy (1993) also argues that open-ended questions allow the participants to say freely what is on their minds. "Unlike closed questions where a limited numbers of alternatives are given, open-ended questions allow the respondent's concerns and interests to surface" (Foddy, 1993, p. 127).

The four open-ended questions used were related to the research questions with the aim of exploring teachers' and students' implicit theories.

The questions used with both samples, namely, teachers and students were: 1) how do you conceptualize creativity? 2) What facilitates your creativity in the classroom? 3) What hinders your creativity in the classroom? 4) Which are, in your opinion, the characteristics of a creative teacher?

These questions had been used previously by the researcher in several creative teaching and creativity workshops, as a teaching strategy with similar populations of higher education teachers and students to stimulate reflection on creative teaching and on ways to promote students' creativity. They had also been used to explore conceptions of creativity and what facilitated and obstructed creativity.

During these courses conducted in the National Autonomous University of Mexico (UNAM) and in other public and private universities, I observed that the questions were easily understood by participants and were useful in generating reflection and for promoting a dialogue and interchange of experiences. Although on these occasions, the purpose of the workshops was to stimulate discussion and reflection and not to undertake research, a decision was made to use them for the present research since they were considered as appropriate and unambiguous.

5.3 Samples of the initial study

A decision was made to focus the research on higher education. The assumption behind this decision was that this was the last stage of formal education when it was possible to make a significant impact on the creative thinking abilities and attitudinal dispositions of the students. This did not mean that later in their lives, they would not be able to develop their creativity, but that future professionals, would have more opportunities for success, in their personal and professional lives, if higher education policy makers and teachers, made the required changes in order to promote the development of creative thinking in formal education.

UNAM is the largest public university in Mexico. At the time of the research, it had 324,413 students at different educational levels (including high school, undergraduate, postgraduate and technical education). There were 187,195 students in higher education. Both samples for the initial study, of students and teachers were selected from this public university in Mexico. (On June 28th, 2007, the main campus of UNAM, was included by UNESCO as part of Humanity Cultural Heritage).

5.3.1 The student sample

The type of sampling (Patton, 1990) selected for this study was a convenience sample. Two procedures were used to recruit convenience samples of students and teachers to collect data about their implicit theories and conceptions of creativity and of creative teaching.

The student sample was set up through a random procedure undertaken by trained volunteer interviewers. They asked students who were in the gardens of the main campus of UNAM if they would voluntarily participate in the research. The total student population completing undergraduate studies in UNAM in 2012 was 19,310. 57% were female and 41% were male. The final sample consisted of 48 students from different undergraduate programmes. The details are set out in Table 5.1.

Table 5.1 Students' distribution by programme and gender

Programme	Female (Number and %)		Male (Number and %)	
Psychology	9	19%	3	6%
Law	5	10%	8	17%
Spanish Philology	2	4%	2	4%
Philosophy	4	8%	7	15%
Pedagogy	2	4%	0	0%
Centre of Languages	2	4%	0	0%
History	1	2%	0	0%
Economy	0	0%	1	2%
Latin American Studies	0	0%	1	2%
English Philology	0	0%	1	2%
Total	25	52%	23	48%

5.3.2 The teacher sample

The Mexican teachers sample was recruited from higher education teachers who taught in UNAM academic programmes who were participating in a creative teaching workshop conducted by the researcher. In UNAM, the general population of teachers for undergraduate programmes, in 2014, consisted of 37,610 teachers, with 43 of female teachers and 57% of male teachers. The teacher sample consisted of by 32 teachers. Table 5.2 shows the characteristics of the teachers participating in the study.

Table 5.2 Teachers' distribution by programme and gender

Programme	Female (Number and %)	Male (Number and %)
Biology	7 (22%)	2 (6%)
Psychology	2 (6%)	1 (3%)
Physical Education	0	1 (3%)
Political Sciences	0	1 (3%)
Chemistry	3 (9%)	1 (3%)
History	3 (9%)	1 (3%)
Pedagogy	5 (21%)	0
Education	1 (3%)	0
Philology		1 (3%)
Creative writing	1 (3%)	0
English Language	1 (3%)	0
Engineering and electronics	1 (3%)	0
Total	24 (75%)	8 (25%)

5.4 Data collection of the initial study

Since the research questions were related to the perceptions and conceptions that students and teachers held in relation to creativity and to the conditions that hindered or facilitated their creativity in a classroom environment, an implicit theories approach was considered appropriate.

5.4.1 Data collection procedures

Different procedures were used to collect data from students and teachers respectively due to the different conditions enabling access to both populations. To explore the implicit theories of students and teachers, the procedures used were a qualitative semi-structured interview to collect data from the students, and a written questionnaire to collect data from teachers. The same open-ended questions were used in both procedures.

5.4.2 Interview procedure

Four students from the School of Psychology of the National Autonomous University of Mexico (UNAM) who were attending a class conducted by the researcher were invited to participate in the research as interviewers. These four volunteer interviewers were two male students ages 20 and 21 and 2 female students, both 20 years old, in the sixth semester of an undergraduate program in Psychology.

The interviewers participated in a training process conducted by the researcher who gave them training in conducting the interviews. They received instructions as to how to conduct the interviews with the students. They were told to ask the students if they would voluntarily participate in the research. The interviewers were also asked to inform the participants that their confidentiality would be at all times protected and that they would not need to give their names since the interview was anonymous.

The interviewers asked students to participate who were in the gardens of the main campus of the National Autonomous University of Mexico (UNAM). The interviewers informed the students that the interview would last on average for 15 minutes. This time limit was not absolute since some of the students took longer depending on the time they had available. Those students interested in being interviewed but who were not able to participate at the time when the researchers approached them were given the opportunity of being interviewed later. The four interviewers undertook 48 interviews.

Making contact with the students under these conditions made it possible for the research to include students from different undergraduate programmes and from different semesters.

The four interviewers using a defined process undertook the interview. The interview guide included the following guidelines:

Present yourself and start by establishing rapport.

Briefly communicate the purpose of the interview: to explore their perceptions and conceptions in relation to creativity and creative teaching.

Inform the student that they are invited to voluntarily participate in this research by giving their answers to four open-ended questions and that their confidentiality will be at all times protected.

There is no need to register students' name.

Once you have approval for participation, read each one of the questions, always in the same order (from 1 to 4), and give time for the participant to think and elaborate his/her answer.

Focus your attention on what the participant is saying. Register his/her answer and ask for clarification if needed, for example, 'let me be sure I really understood'.

The students were able to give their answers freely, using their own words, and sharing their opinions without feeling that they needed to give a correct or expected answer. They were told to take as much time as they needed to answer the questions, so that they would feel free to have enough time to reflect on their answers. The interviewers registered students' answers by making notes and transferred them later to a word processor.

5.4.3 Written questionnaire administration

The teachers who participated in the initial study were invited to attend a workshop on creative teaching conducted by the researcher. They were teaching at that time on different undergraduate programmes at the National Autonomous University of Mexico (UNAM).

The researcher asked the coordinator of the workshop to ask the teachers if they would voluntarily participate in research aiming to explore their conceptions of creativity and perceptions of what facilitates or hinders creativity in the classroom as well as their conception of the characteristics of a creative teacher. This procedure was undertaken before the workshop started and it was designed to avoid two sources of biased responses: one, that the teachers would try to please the researcher, and two, that their answers would be influenced by the content of the workshop.

The coordinator of the workshop delivered a printed questionnaire with the four open-ended questions to each of the participants. The teachers were informed that their confidentiality would be at all times protected during the research process. They were informed that there were no correct answers and that it was important for them to set out their thoughts on the topics raised by the questions. The questionnaire did not require them to state their name, only to mention the program that they were teaching on, their gender and their age.

5.5 Data analysis

A thematic analysis procedure, adopting a qualitative, empirical phenomenological approach was used to extract units of meaning from the answers given by students and teachers. The process followed was an inductive one, where, for instance, Boyatzis (1998) suggests, that the codes are derived bottom-up from the researcher's reading of the data. This means that the codes were derived with no reference to existing theories. He purpose was to identify salient themes of what affected students' creativity in the classroom and to relate these to the skills that teachers needed to develop in order to promote creativity through their teaching.

The central idea of empirical phenomenology is that scientific explanation must be grounded in the first-order construction of the actors, that is, in their own meanings. These constructions are then related to the second order constructions of the researcher (Aspers, 2009).

Heidegger (1962) states that understanding something demands connecting it to something that is already known. In this study, the search for meaning and understanding

consisted of a hermeneutic process in which a word, an example, an idea was understood in relation to a whole, the sentence or the text and vice-versa (Gadamer, 1988). The reference to hermeneutic here is restricted to the notion of it as a method of understanding.

The responses given by students and teachers were transcribed into a data base and an inductive thematic analysis was undertaken based on a recognized process presented by Cooper and McIntyre (1993) which has seven stages:

Reading a random pile of scripts.

Identifying points of similarity and difference among these transcripts in relation to the research questions.

Generating theories based on two, describing emergent answers to the research questions.

Testing theories against a new set of transcripts.

Testing new theories against transcripts that have already been dealt with.

Carrying all existing theories forward to new transcripts.

Repeating the above process until all data have been examined and all theories tested against all data (Cooper and McIntyre, 1993).

Tesch (1990) describes this procedure as empirical phenomenology- empirical since the theorizing is based on the data collected and phenomenological, since it treats the participants' accounts and thoughts about their own experiences as data.

The responses given by students and teachers for each of the open questions used in the initial study (via the semi-structured interviews with students and through the written questionnaire with teachers), were analysed looking for emergent themes that could be grouped within a category. For each of the questions several categories were assigned to capture the central meaning for a set of answers.

The mother tongue of all the participants of the initial study was Spanish. The researcher, whose mother tongue is also Spanish, translated the answers provided into English in order for them to be included in this English language thesis. The researcher is bilingual but a

professional translator reviewed both Spanish and English versions of the interviewees' answers to ensure that they were conceptually equivalent.

In the following chapters, findings relating to the themes that emerged from teachers' and students' responses are presented. The categories identified for each question, based on the themes, will be defined and examples of the students' verbatim responses will be included. The frequency of the answers given will be reported to give an indication of the strength of responses in each category.

5.6 Validity and reliability in analysis of qualitative data

Validity and reliability are terms rooted in positivist enquiry and are common in quantitative research. They have to be redefined for their use in qualitative research (Golafshani, 2003).

Robson (2011) states that there are two main threats to validity in qualitative research, one refers to description and the other to interpretation. The challenge to description consists of the need to provide a valid description of what the researcher has seen or heard in an accurate and complete presentation of the data. The challenge for providing a valid interpretation is that of imposing a framework or meaning relating to what is happening.

In the present research, to address both challenges, given the circumstances in which the data were collected in the initial study, i.e. through a semi-structured interview in the case of the student sample and through a written questionnaire for the teachers, the researcher used different strategies. She developed a protocol for conducting the semi-structured interviews and gave training to the interviewers since she had to rely in the first place on the transcriptions of participants' responses made by the interviewers. This could be a limitation in terms of their accuracy in capturing the exact responses of the participants. As part of the protocol, interviewers confirmed if their transcripts reflected participants' verbatim responses. One option would have been to record the students' replies. However, at the time when data were collected, the researcher could not provide the interviewers with recorders and they did not have mobile phones.

In the case of collecting information from the teachers' sample, the data were analysed based on what teachers had written in the questionnaires, so the description and interpretation of data were based on the exact verbatim responses of the participants.

In relation to providing a valid interpretation, the researcher followed precisely the procedure described earlier in this chapter (see 4.6 Data analysis), to undertake the thematic analysis. A conscious effort was made not to impose any previous knowledge or theoretical framework on students and teachers responses and a reiterative process testing different ways of interpreting and coding responses was undertaken to ensure that the final interpretation accurately reflected the students' and teachers' implicit theories of creativity.

Following Marshal's (1990) suggestion, reflexivity, open inquiry and critical analysis were used as a way to contribute to validity in the context of the qualitative approach of the present research. Evidence of students' and teachers' verbatim responses are presented to illustrate the categories that the researcher extracted from their answers to avoid distortion or conjecture (Maxwell, 1996).

Guba and Lincoln (1982) offer constructs that correspond to the criteria employed by the positivist approach. They use credibility in preference to internal validity; transferability in preference to external validity or generalizability and dependability in preference of reliability. Credibility deals with the question "How congruent are the findings with reality? In the present research, interviewers, as mentioned earlier, were asked to follow a defined protocol to undertake the semi-structured interviews and to record in writing the exact wording adopted by participants. A well-known and tested procedure to undertake the thematic analysis was used. Transferability of the results from the initial study is discussed in the final chapter identifying points of convergence with previous research. In relation to dependability, (reliability from the quantitative perspective), in qualitative studies, the usefulness, value or importance of the findings, are not so much related to the way in which they may be generalized to other populations in a deterministic manner, but for the insights they may provide to explore other similar populations in similar contexts. This is the case in particular in the field of creativity, as in the present research where data is related to the implicit theories of a sample related to a specific context of public Higher Education in Mexico City. The value of such research is given by providing other

researchers with detailed information of how the research was conducted and the kinds of findings obtained in order that it may orient future research.

5.7 Ethical considerations

In the present study, the rights of all of the persons involved in the research, volunteer interviewers, students and teachers who constituted the samples, and the people who supported the administration of the questionnaire of the main study, were at all times respected following the principles and guidelines stated by the British Educational Research Association (BERA, 2011), and the Mexican Society of Psychologists. They were treated with respect, with dignity and sensitively.

The British Educational Research Association (2011) establishes that all educational research should be conducted with ethical respect for the person, knowledge, democratic values, the quality of education research and academic freedom.

The participants in the initial study and in the evaluation of the self-assessment tool were asked to give their informed consent to participate in the study. They received information about the purpose of the study and the way the data would be used. They were informed that their confidentiality would be at all times protected and that they could withdraw from the research at any time.

For the initial study, the researcher asked four students from the School of Psychology to participate in the research as interviewers. By getting the support of students of a similar age and characteristics to the ones who would be invited to participate in the interview, the intention was that the interviewer would not be perceived as a person of authority and that participants would not feel the need to please the interviewer or meet his or her expectations.

For the administration of the questionnaire to the teachers, the coordinator of the workshop gave out the questionnaire to avoid possible biased answers as a result of the teachers trying to meet the expectations of the researcher. Emphasis was made in both procedures, the semi-structured interview and the application of the questionnaire, that there were no correct answers to the open questions, and that the focus of the study was

to establish their conceptions, perceptions and experiences in relation to the topics raised in the questions.

As previously described (see 5.4.2 Data collection procedures), in the initial study, the interviewers asked the students who were invited to participate, to give their informed consent once they had explained to them the aim of the interview and informed them that they did not have to give their names since the data were to be anonymous.

In the same way, the coordinator who helped the researcher to administer the questionnaire to the teachers at the beginning of the creativity workshop invited them to voluntarily participate in the research. She informed them of the aims of the research and made it clear that they were free to withdraw from the study at any time. The questionnaire was also anonymous.

In the evaluation of the self-assessment tool, the teachers responding to the questionnaire received the same information and gave their informed consent. The privacy of all participants was not infringed since all information was treated as confidential.

5.8 Summary and conclusions

The research methodology used in this study was a mix of quantitative and qualitative approaches. The research included an initial study and the development of a self-assessment tool for teachers, which was piloted and evaluated. The first study was oriented to explore students' and teachers' implicit theories in relation to their conceptions of creativity, to what they perceived as obstacles and facilitators of their creativity in the classroom environment and to their conceptions of a creative teacher.

Findings from the initial study were used as input to build a tool to promote teachers' reflection in relation to becoming aware of their skills, attitudes and behaviour to enable them to enhance students' creativity through their teaching.

In the initial study, the quantitative approach was reflected in the way the emerging categories from students' and teachers' answers were 'quantized' (Tashakkori and Teddlie, 1998) in order to reflect the predominant themes emerging from students' and

teachers' implicit theories. The qualitative aspect of the methodology consisted of a thematic analysis of such responses in order to extract units of meaning that were labelled based on students' and teachers' verbatim responses.

In the pilot study oriented to evaluating the self-assessment tool, a mixed method approach was also used. The main purpose of this part of the research was to evaluate whether the self-assessment tool was useful for enhancing teachers' reflections and awareness of their strengths and weaknesses in relation to promoting students' creativity through their teaching. For this purpose, two open-ended questions were used and a qualitative approach was used to analyse participants' answers. A quantitative approach was used to analyse the responses given to the 33 statements with five options (always; often; sometimes; rarely and never). Given the size of the sample a decision was taken to use descriptive statistics (means, standard deviations and correlations between items) to analyse the items used in the questionnaire. A factor analysis was not appropriate given the size of the sample.

Chapters 6 and 7 include findings from the initial study and discussion of these is offered in Chapter 8.

Chapter 6

Mexican students' conceptions of creativity and perceptions of creative teaching

“A hunch is creativity trying to tell you something”

Frank Capra

6.1 Introduction

Forty-eight higher education students were asked to participate in a semi-structured interview consisting of four open ended questions exploring their implicit theories and conceptions related to creativity; their conceptions of the facilitators of creativity, their conceptions of obstacles to their creativity in a classroom environment and their view of the characteristics of a creative teacher. The data were analysed by means of a thematic analysis process described in Chapter 5. This process was undertaken initially identifying the themes that appeared more frequently in the responses. Data were consistently coded into categories and a re-iteration process was undertaken to verify emergent categories.

Students' responses were considered as units of meaning. Sometimes a student contributed a whole paragraph from which several meanings, themes or topics could be extracted. In these cases each meaning was ascribed to the relevant theme. A decision was made to include in the description of each category of meaning, the percentage of responses given by the students that fell into each category. In each section of this chapter an indication of the percentage of responses that fell into each category is included as a way to help the reader to understand which conceptions were predominant among the students' responses. A greater percentage indicates that more responses emerged in relation to that theme or category. This was not intended as a statistical analysis but merely to give an indication of the strength of responses which emerged in each category.

In this chapter, a description of the categories that emerged from the thematic analysis of students' responses to each of the four open ended questions used in the semi-structured interview is presented. The remainder of this chapter will set out how these categories were derived from the data. In Chapter 8 and in Chapter 10 there will be discussion of these findings.

6.2 Mexican students' conceptions of creativity.

For the question relating to conceptions of creativity, six categories emerged, creativity as related to novelty-originality (35%); as a human capability (23%); as idea generation and implementation (17.3%); as idea generation through imagination (9.3%); as improvement (9.3%) and as the expression or communication of ideas or emotions (6.7%).

Novelty-originality

Thirty five percent of responses were related to the quality of ideas or products generated. This category emerged from responses concerned with 'innovation' or 'innovative ideas' ('the capability to create innovative things'; 'the capability to create unedited forms and innovative ones'), what could be understood within the context as 'newness', and as the introduction of new ideas ('to imagine new things'). Table 6.1 gives examples of the responses of the students coded into this category.

Table 6.1 Creativity as related to novelty and originality

<i>To do something that no-one has done before. (Law, male, aged 21)</i>
<i>To innovate, to do different activities in order to stay away from monotony (Law, female, aged 20)</i>
<i>The capability to create innovative things (Philosophy, female, aged 20)</i>
<i>To imagine new things (Pedagogy, female, aged 21)</i>
<i>The capability to create unedited forms and innovative ones. (Philosophy, female, aged 29)</i>
<i>To elaborate new products or model new behaviours (Psychology, female, aged 21)</i>
<i>To do something new, entertaining with effort. (Law, male, aged 21)</i>
<i>The experience to achieve, being new every day, to create, renew ideas, images, etc. (Law, male, aged 18)</i>

Going beyond the normal boundaries. (Psychology, female, aged 21)

Having a big imagination to create things and new ideas. (Law, female, aged 23)

As a human capability

Twenty three percent of students' responses were coded relating to creativity as a capacity of human beings, for instance: 'To have the capacity to imagine', to create, to make, to design'; 'Having the capacity to create something from an emotive or intellectual concept'; 'Capacity of invention or modification through already known elements'. In this category, creativity was conceptualized as the potential human beings have that may be increased or developed by a range of different means, to be able to imagine, design, and generate different and original products. Table 6.2 gives examples of the responses of the students coded into this category.

Table 6.2 Creativity as a human capability

The capacity to create innovative things. (Philosophy, female, aged 20).

To have the capacity to imagine, create, to make, to design, etc. using whatever objects are around, improvising sometimes. (Philosophy, female, 22).

The capability to do something interesting with things (Spanish Language Philology, female, aged 21).

Having the capability to create something from an emotive or intellectual concept (Philosophy, female, aged 21).

The capacity to imagine, to improvise and to make sense of thoughts (Philosophy, male, aged 23)

The capacity to make unconventional and innovative activities (Psychology, male, aged 23)

Idea generation and implementation

The conception of creativity as idea generation and implementation emerged from 17.3% of students' responses, for example: 'To have ideas and to put them into action.' 'to develop something', 'to do something interesting with things', 'the capacity one has to achieve things'.

Within this category, creativity was defined as the process necessary to develop ideas and to turn them into an action or as a product (tangible or intangible).

The answers included two important aspects of creativity: the possibility to generate ideas and to actually develop them and transform ideas into products or action. Table 6.3 gives examples of the responses of the students coded into this category.

Table 6.3 Creativity as idea generation and implementation

<i>To have ideas and to put them into action (Philosophy, male, aged 20)</i>
<i>To develop something (English Literature, male, aged 24)</i>
<i>To do something interesting with things (Spanish Language Philology, female, aged 21)</i>
<i>To put imagination into work and turn ideas into practical facts (Psychology, female, aged 23)</i>
<i>An action through which you can create new things (Pedagogy, female, aged 19)</i>

Creativity as idea generation through imagination

The category of creativity as idea generation through imagination was referred to by 9.3% of the students. Responses included answers such as: 'to have the capability to imagine'; 'to imagine new things', 'having a big imagination to create things and new ideas.' This category was defined as: the generation of new ideas facilitated through imagination. Table 6.4 gives examples of the responses of the students coded into this category.

Table 6.4 Creativity as idea generation through imagination

<i>To have the capability to imagine. (Spanish Language Philology, female, aged 22)</i>
<i>To imagine new things. (Pedagogy, female, aged 21)</i>
<i>Having a big imagination to create things and new ideas. (Law, female, aged 23)</i>
<i>The capacity to enunciate properly the ideas that are previously created in the imagination. (Philosophy, male, aged 22)</i>
<i>The capacity to imagine, improvise and to make sense of thoughts. (Philosophy, male, aged 23)</i>

Improvement

The category labelled as ‘improvement’, with 9.3% of students responding, emerged from answers such as ‘the act of using creativity to improve an existing product or procedure’, ‘the skill that each one has to create, fix or improve certain things’. Table 6.5 gives examples of the responses of the students coded into this category.

Table 6.5 Creativity as improvement

The skill that each one has to create, fix or improve certain things. (Law, female, aged 18)

To invent a good technique to transform things into more pleasant ones. (Psychology, Male, aged 20)

The capacity to think up things in order to give more embodiment to something. (Law, male, aged 18)

Expression or communication of ideas or emotions

6.7% of responses were categorized as defining creativity as a means to express or communicate emotions or ideas to others. Within this category were included answers such as ‘to be sensitive and to be able to express things’; ‘the manifestation of our own emotions and knowledge in some creation’. Table 6.6 gives examples of the responses of the students coded into this category.

Table 6.6 Creativity as the expression or communication of ideas or emotions

To be sensitive and to be able to express things. (Spanish Philology, male, aged 21)

The manifestation of our own emotions and knowledge in some creation. (Psychology, female, aged 23)

The capacity to enunciate properly the ideas that are previously created in the imagination. (Philosophy, male, aged 22)

Summary for the conception of creativity

Table 6.7 sets out the six categories that emerged in relation to conceptions of creativity with example responses for each.

Table 6.7 Mexican students' conceptions of creativity N = 76

Category	Definition	Example of verbatim quotes
Novelty-originality	The quality of being different from the usual or familiar, of an idea or product (tangible or intangible) for the individual or for the group or context in which the idea is presented.	<i>'To do something that no-one has made before.'</i> <i>'Innovate, to make different activities in order to stay away from monotony.'</i>
Human Capability	The potential human beings have, and that may be increased or developed, by different means; none of them being susceptible to a linear causality explanation.	<i>'The capability to create innovative things.'</i> <i>'The capability to do something interesting with things.'</i>
Idea Generation and Implementation	To undertake the process necessary to develop ideas and turned them into an action or product (tangible or intangible).	<i>'To have ideas and to put them into action.'</i> <i>'To develop something.'</i> <i>'To do something interesting with things.'</i>
Idea Generation through Imagination	The generation of new ideas facilitated through imagination.	<i>'To have the capability to imagine.'</i> <i>'To imagine new things.'</i>
Improvement	The act of using creativity to improve an existing product or procedure.	<i>'The skill that each one has to create, fix or improve certain things.'</i> <i>'To invent a good technique to transform things into more pleasant ones.'</i>
Expression or communication of ideas or emotions	The creative process seen as a mean to express and communicate our ideas to others.	<i>'To be sensitive and to be able to express things.'</i> <i>'The manifestation of our own emotions and knowledge in some creation.'</i>

6.3 Mexican students' perceptions of facilitators of creativity in the classroom.

Students were asked about their conceptions of what facilitated creativity in the classroom. Nine categories emerged. These categories were: motivation (14.8%); dynamism (14.8%); teachers' positive attitudes (13%); teaching and learning resources (13%); positive climate (11.1%); teaching abilities (9.3%); novelty (9.3%); participation (7.4%); and challenges (7.4%). As in the preceding sections, each category will be presented with examples of students' responses.

Motivation

One of the categories with most responses in relation to what facilitates creativity in the classroom environment was labelled as motivation and participation (14.8%). This category emerged from answers such as: 'being able and enthusiastic', 'how motivated I may be', 'the mood that the teacher shows inside the classroom', 'interest in the subject'. The definition of this category emerged as: interest in the subject and the course, and the enthusiasm and the energy that a student is willing to put into the learning process in the classroom. Table 6.8 gives examples of the responses of the students coded into this category.

Table 6.8 Motivation as a facilitator of creativity in the classroom

How motivated I may be. (Philosophy, female, aged 22)

Motivation. (Psychology, female, aged 25)

To be always alert, being able and with enthusiasm for the subject. (Law, female, aged 20)

The interest in the subject influences a lot. (Law, female, aged 18)

The mood that the teacher shows inside the class and also if I like the subject, I guess it depends on that, motivation. (Law, female, aged 18)

Dynamism

This category emerged from 14.8% of the students who responded with statements such as: 'the class is dynamic', 'a dynamic approach', 'when classes are dynamic'. Table 6.9 gives examples of the responses of the students coded into this category.

Table 6.9 Dynamism as a facilitator of creativity in the classroom

The class is dynamic. (Psychology, male, aged 20)

Better learning and more attention generated from a dynamic activity. (Philosophy, male, aged 21)

An amusing and dynamic approach. (Law, male, aged 21)

A dynamic class. (Pedagogy, female, aged 21)

When classes are dynamic. (Literature, female, aged 21)

From these and other responses, dynamism may be defined as the amount of energy and activity developed in the classroom. Dynamism is likely to be evident in the amount, variety and pace with which the teacher conducts teaching and learning activities, in such a way that students are continuously engaged and intellectually active.

Teachers' positive attitudes

The category labelled as teachers' positive attitudes (13%) emerged from answers such as: 'positive attitudes from the teacher and her enthusiasm', 'Teacher shows respect and openness to our ideas', 'teachers' sense of humour', 'gives freedom to think'.

As for the other categories, this may be related to other aspects mentioned in students' responses such as classroom climate, since teachers' positive attitudes may influence the generation of a positive climate for creativity.

Table 6.10 gives examples of the responses of the students coded into this category. This category was defined as teachers' attitudes that are perceived by students as facilitating their creativity such as respect, trust, enthusiasm, openness, sense of humour.

Table 6.10 Teachers' positive attitudes as a facilitator of creativity in the classroom

<p><i>Positive attitudes from the teacher and her enthusiasm. (Law, female, aged 23)</i></p> <p><i>Teacher shows respect and openness to our ideas. (Philosophy, male, aged 23)</i></p> <p><i>When the teacher is enthusiastic. (Psychology, female, aged 20)</i></p> <p><i>That the teachers encourage us by developing interesting courses. (Psychology, female, aged 23)</i></p> <p><i>Teachers' sense of humour. (Law, male, aged 18)</i></p>

Some students mentioned the importance of perceiving that the teacher was interested in their learning. This attribute was only mentioned by two students. However it is mentioned here since teachers' enthusiasm for teaching can stimulate students' motivation, which has already been mentioned as enhancing students' creativity.

Teaching and learning resources

A category related to teaching and learning resources (13%) emerged from responses such as: 'the existence of attractive resources, visual stimulation', 'teacher uses a variety of resources', 'attractive teaching materials with illustrations that help understanding'. This category emerged from students' perceptions of the influence and importance that teaching and learning resources may have in their involvement in sessions and as an element that enhances their creativity.

Table 6.11 Teaching and learning resources as a facilitator of creativity in the classroom

<p><i>Attractive teaching materials with illustrations that help understanding. (Languages, female, aged 21)</i></p> <p><i>The existence of attractive resources, visual stimulation. (Psychology, male, aged 23)</i></p> <p><i>Learning resources didactic materials, slides, images. (Psychology, female, aged 21)</i></p> <p><i>Teacher uses a variety of resources. (Philosophy, male, aged 24)</i></p> <p><i>Variety of learning resources. (Law, male, aged 20)</i></p>

This category included not only the existence of teaching resources and materials in the classroom but whether they were seen as attractive for students and were varied in order

to stimulate students' interest and to facilitate students' learning. Table 6.11 gives examples of the responses of the students coded into this category.

Positive climate

A category labelled as positive climate (11.1%) emerged from answers such as: 'a pleasant and enjoyable class', 'a relaxed environment', 'trust'. Table 6.12 gives examples of the responses of the students coded into this category.

Table 6.12 Positive climate as a facilitator of creativity in the classroom

<i>A pleasant class and enjoyable class. (Spanish Language Philology, female, aged 21)</i>
<i>A relaxed environment. (Psychology, female, aged 23)</i>
<i>Trust. (Languages, female, aged 19)</i>
<i>The freedom to express your ideas freely, without following a rigid pattern. (Philosophy, female, aged 20)</i>
<i>A good environment for work in the classroom. (English Philology, male, aged 24)</i>
<i>The pressure to work. (Languages, female, aged 19)</i>

The meaning of climate from the answers given by the students may be defined as a safe and relaxed environment where one can express ideas.

Teaching abilities

A category labelled as teaching abilities (9.3%), emerged from responses such as: 'a teacher who presents information which is so attractive and interesting that we want to get involved', 'the teacher stimulates our participation with examples of what he is explaining', 'knowledge abilities and opinions of the teachers' 'clarity of teacher'. Table 6.13 gives examples of the responses of the students coded into this category.

Table 6.13 Teaching abilities as a facilitator of creativity in the classroom

<p><i>A teacher who presents information which is so attractive and interesting that we want to get involved. (Philosophy, male, aged 23)</i></p> <p><i>That the teacher stimulates our participation with examples of what he is explaining. (Philosophy, male, aged 23)</i></p> <p><i>That the teachers lecture in a clear and interesting way their classes. (Philosophy, male, aged 24)</i></p> <p><i>A good class and a good selection of material to study. (Latin-American studies, male, aged 22)</i></p> <p><i>The knowledge, abilities and opinions of the teachers. (Philosophy, female, aged 29)</i></p>
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This category was defined as: teachers' skills to run courses which may imply knowledge about the teaching procedures useful for planning, organizing activities, sequencing content, and promoting meaningful learning.

Novelty

This category emerged with 9.3% from responses such as: 'break with daily stuff, novelty in the classes', 'Innovating, and creating new ways of learning'. The meaning of novelty in the classroom environment emerged from the students' answers as the introduction of unexpected strategies, elements or activities, going beyond familiar boundaries. Some examples of responses given by students and coded into this category are shown in table 6.14.

Table 6.14 Novelty as a facilitator of creativity in the classroom

<p><i>Innovating, and creating new ways of learning. (Law, male, aged 21)</i></p> <p><i>To do new things, which are unexpected. (Law, male, aged 26)</i></p> <p><i>When teacher introduces new methods. (Literature, female, aged 21)</i></p> <p><i>Break with daily stuff, novelty in the classes. (Psychology, female, aged 21)</i></p>

This category may be related to the categories of dynamism and motivation. This perception of students in relation of the effect of novelty in the classroom is consistent with their conceptions of creativity.

Participation

This category emerged from 7.4% of students' answers and is related to the perception students have of being involved in what is happening in the classroom as opposed to only being a spectator of the teachers' active role. Table 6.15 shows examples of the answers that were coded into this category.

Table 6.15 Participation as a facilitator of creativity in the classroom

<i>A participative group (Philosophy, male, 28)</i>
<i>My participation in class (Psychology, female, 23)</i>
<i>Teacher lets us participate (Languages, female, 19)</i>
<i>Having active participation in class (Psychology, male, 22)</i>

This category was defined as: perception of the involvement teachers and students show in the classroom with the activities to accomplish the purposes of the course.

Challenges

This category emerged from a smaller percentage (7.4%) of responses in comparison to the categories defined earlier. From the answers given by the students, it was defined as: The kind of teaching strategies used to generate students' interest, curiosity and reflexive and creative thinking processes, representing challenges for students. Table 6.16 shows examples of the responses coded in this category.

Table 6.16 Challenges as facilitators of creativity in the classroom

<i>The teacher poses questions that challenge us' (Languages, female, aged 19)</i>
<i>Activities that make us think, that challenge us' (Philosophy, male, aged 22)</i>
<i>We always need to be creative to respond to teachers' challenges' (Psychology, female, aged 20)</i>

Summary of categories relating to the factors that facilitate creativity in the classroom

Table 6.17 sets out the nine categories that emerged in relation to the question ‘what facilitates your creativity in the classroom?’ with example responses for each.

Table 6.17 What facilitates your creativity in the classroom? N = 54

Category	Definition	Example of verbatim quotes
Motivation	Interest in the subject and in the course, the enthusiasm and the energy that a student is willing to put into the learning process in the classroom.	<i>‘Interest in the subject.’</i> <i>‘To be always alert, being able and enthusiastic.’</i>
Dynamism	The energy perceived in the environment that may affect motivation and involvement in the activities developed in the actual context.	<i>‘An amusing and dynamic approach.’</i> <i>‘Better learning and more attention generated from a dynamic activity’</i>
Positive attitudes (on the part of teachers’)	Teachers’ attitudes such as respectful behaviour, openness, and enthusiasm towards their work.	<i>‘A teacher without the need to treat us like students, like persons with no knowledge.’</i> <i>‘When the teacher is enthusiastic.’</i>
Teaching and learning resources	The availability of resources to develop teaching and learning activities.	<i>‘Attractive teaching materials with illustrations that help us to understand’</i> <i>‘Learning resources, teaching materials, slides, images.’</i>
Positive climate	A relaxed climate in the classroom where students may interact and express their ideas.	<i>‘A good environment for work in the classroom.’</i> <i>‘A pleasant and enjoyable class.’</i>

Teaching abilities	Teachers' skills to run the courses which may imply some knowledge of teaching procedures useful for planning, organizing activities, sequencing content, promoting meaningful learning, etc.	'A teacher who presents the information so that it is attractive and interesting for us to deepen it.' 'A good speaker with clear concepts of the subjects.'
Novelty	The perception students may have of different kinds of novelty introduced by the teacher by means of the strategies used, the teaching methods, the use of resources, and the relationships and dynamics introduced in the classroom.	<i>'Innovating, and creating new ways of learning.'</i> <i>'Break with daily stuff, novelty.'</i>
Participation	The perception of the involvement teachers and students show in the classroom with the activities to accomplish the purposes of the course.	<i>'A participative group.'</i> <i>'The knowledge and opinions of the teachers and other classmates in addition of being an active participant.'</i>
Challenges	The kind of teaching strategies used to generate students' interest, curiosity and reflexive and creative thinking processes, representing challenges for students.	<i>'The teacher poses questions that challenge us, let us participate, the images, and the pressure to work.'</i> <i>'The fact that they always ask us for assignments, and we always need to be creative to attract the attention of the teacher.'</i>

The categories with the higher percentage of responses were: motivation (14.8%); dynamism (14.8%); teachers' positive attitudes (14.8%); teaching and learning resources (13%); and positive climate (11.1%). The categories with lower percentages were: teaching abilities (9.3%); novelty (9.3%); participation (7.4%) and challenges (7.4%).

6.4 Mexican students' perceptions of obstacles to their creativity in the classroom.

Most of the responses generated by the students to the question about obstacles to creativity in the classroom, were opposite to those given in relation to what promoted creativity. They emphasized the importance of particular factors that they perceived as being critical to establishing favourable conditions for the development of creativity in the classroom especially classroom climate and the presence of rigidity. The categories emerging from students' responses to this question were: monotony (28%); negative climate (23%); rigid mindset (20%); apathy and lack of motivation (15%); and ineffective teaching strategies (15%). The sections below provide examples of students' answers coded into each category.

Monotony

This category emerged from 28% of students' responses such as 'when classes are boring and make me feel sleepy', 'when teaching is highly predictable', 'monotony in the classes', 'when classes are alike every day, without variation or novelty', 'the teaching method becomes routine'. The definition of this category derived from the responses is, classes are monotonous when they have a fixed routine, and are predictable; not stimulating and generating a feeling of boredom. Table 6.18 gives examples of the responses of the students coded into this category.

Table 6.18 Monotony as an obstacle to students' creativity in the classroom

<p><i>When teaching is very predictable. (Spanish Language Philology, male, aged 25)</i></p> <p><i>When the class follows a routine, without changes from day to day and becomes boring. (Philosophy, male, aged 24)</i></p> <p><i>Classes are alike every day, without variation or novelty. (Law, male, aged 21)</i></p> <p><i>To do things in a monotonous manner, with routine, based on rigid patterns or known strategies that may not be changed. (Law, male, aged 26)</i></p>

Negative climate

This category emerged from 23% of answers and included responses such as: ‘distractions that don’t allow for making progress in the class’; ‘noise’; ‘school atmosphere, poor teacher-student relationships’; ‘lack of teaching resources’; ‘a judgmental atmosphere’.

Table 6.19 gives examples of the responses of the students coded into this category.

Table 6.19 Negative climate as an obstacle to students’ creativity in the classroom

<p><i>A negative environment of work and judgments with no stimulation for my creativity. (English Philology, male, aged 24)</i></p> <p><i>Negative teaching-student relationships. (Law, male, aged 18)</i></p> <p><i>Noise, bad environment. (Psychology, female, aged 21)</i></p> <p><i>Lack of teaching resources. (Pedagogy, female, aged 19)</i></p>
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The category of negative climate is defined as: a classroom environment which is characterized by negative conditions for working and learning: noise, distractions, lack of teaching resources, and a non-respectful environment, judgmental and characterized by negative teacher-student relationships.

Rigid mindset

The category of ‘rigid mindset’ emerged from 20% of the students’ responses such as: ‘teacher is closed to others’ ideas, ‘rigidity’, ‘teachers’ impositions’. This category was defined as: students’ perceptions that the teacher has a rigid mindset which is reflected in a lack of openness to others’ ideas, not allowing students to participate or express their ideas. Table 6.20 gives examples of the responses of the students coded into this category.

Table 6.20 Rigid mindset as an obstacle to students’ creativity in the classroom

<p><i>When the teacher is too rigid and doesn’t allow the student to express his ideas or opinions. (Psychology, female, aged 23)</i></p> <p><i>That sometimes we have to follow rigid patterns and procedures. (Philosophy, female, aged 20)</i></p> <p><i>Teachers’ rigidity. (Spanish Language Philology, female, aged 21)</i></p>

Teachers who use rigid teaching methods. (Spanish Language Philology, male, aged 25)

Teachers' rigidity and authoritarianism. (Pedagogy, female, aged 21)

Teachers' rigidity and lack of empathy. (Law, female, aged 21)

Rigid mindset as expressed by the students' included their perception of teachers' attitudes such as authoritarianism, and lack of empathy in relation to obstacles to their creativity. Some of the responses included in this category were also related to the perception of monotony. The persistent use of the same teaching methods may not only be a sign of rigidity but a lack of didactical knowledge and poor teaching abilities.

Apathy and lack of motivation

This category emerged from 15% of students' responses, for instance, 'that I am not interested in the subject'; 'lack of participation'. The category was defined as: lack of motivation, lack of interest and of engagement in the activities developed in the classroom. Table 6.21 gives examples of the responses of the students coded within this category.

Table 6.21 Apathy and lack of motivation as obstacles to creativity in the classroom

An apathetic group (Philosophy, male, 29)

My lack of motivation (Philosophy, female, 22)

The lack of participation, and interest, from teachers and students (Psychology, female, 23).

That I'm not interested in the subject or that the teacher doesn't have a calling to share. (Philosophy, female, aged 21)

Lack of participation from the students (Philology, female, aged 19)

Ineffective teaching strategies

This category emerged from 15% of students' answers. The category is defined as: the lack of teaching abilities reflected in uni-directional classes, teachers' monologues, and lack of success in engaging students in the activities. Table 6.22 gives examples of the responses of the students coded in this category.

Table 6.22 Ineffective teaching strategies as obstacles to creativity in the classroom

<p><i>The way the teacher teaches the class, lectures are developed poorly (Philosophy, female, aged 29),</i></p> <p><i>Absence of interesting and dynamic classes; with no participation from the students (Language, female, aged 19),</i></p> <p><i>The teacher can be boring (Philosophy, male, aged 23).</i></p> <p><i>Most classes are a monologue and that limits our personal development.(Philosophy, male, aged 22).</i></p> <p><i>One way intervention from the teacher, only he participates (Literature, female, aged 21).</i></p>

Summary of categories for the obstacles to creativity in the classroom

Table 6.23 sets out the six categories that emerged in relation to the question about what hinders creativity in the classroom, with examples of responses coded into each category.

Table 6.23 What hinders your creativity in the classroom? N = 40

Category	Definition	Example of verbatim quotes
Monotony	Class is perceived as monotonous and as routine, predictable, not stimulating for students generating feelings of boredom.	<i>'when classes are boring and make me feel sleepy when teaching is highly predictable'</i> <i>'the teaching method becomes routine'</i>
Negative climate	Characterized by negative conditions for working and learning: noise, distractions, lack of teaching resources, and a non-respectful environment, judgmental and characterized by poor teacher-student relationships.	<i>'School atmosphere, a bad teacher-student relationship'</i> <i>'a judgmental atmosphere'</i>
Rigid mindset	Students' perceptions that the teacher has a rigid mindset which is reflected in a lack of openness	<i>'teachers' rigid position in relation to new ideas'</i>

	to others' ideas, not allowing students to participate or express their ideas.	<i>'Teacher is closed to others' ideas, rigidity. 'Teachers' impositions'</i>
Apathy and lack of motivation	Lack of motivation, lack of interest and engagement in the activities developed in the classroom.	<i>'An apathetic group.' 'My lack of motivation.'</i>
Ineffective teaching strategies	Lack of effective teaching strategies reflected in uni-directional classes, teachers' monologues, and lack of success in engaging students in the activities.	<i>'poor teaching abilities' 'absence of interesting and dynamic classes' 'the teacher can be boring'</i>

Monotony was the category with the higher percentage of answers (28%) followed by 'negative climate' (23%) and rigid mindset (20%) with lower percentages for apathy and lack of motivation (15%) and ineffective teaching strategies (15%).

6.5 Students' conceptions of a creative teacher.

Nine categories emerged from students' responses to the question related to the characteristics of a creative teacher: teacher as an innovator (18 %); enthusiastic and effective teaching (13 %); dynamism (12 %); positive attitudes (11 %); uses a variety of methods and resources (11 %); stimulating (11 %); wide and current knowledge (9 %); has good communication skills (8 %) and enjoys teaching (7 %).

Innovator

The category of teacher as innovator emerged with the highest percentage of responses (18 %) in relation to the characteristics of a creative teacher. Students' perceptions of a creative teacher emphasized his/her capacity to introduce new approaches and novelty to the teaching process as one of the most important issues. Table 6.24 gives examples of the responses of the students coded into this category.

Table 6.24 Innovator as a characteristic of a creative teacher

<p><i>Innovator, open to new things and suggestions (Law, male, 26),</i></p> <p><i>One who innovates (Philosophy, male, 22),</i></p> <p><i>Someone open to try out new things, to innovate (Law, female, 25),</i></p> <p><i>Open to take risks and try new ways (Psychology, female, 21).</i></p>

From students' responses the definition of this category is: the teacher's ability and disposition to take risks and to introduce new ideas or approaches to teaching.

Enthusiastic and effective teaching

From the responses given by the students it can be seen that they view the capacity to give enjoyable and attractive classes as an attribute of a creative teacher. Responses to this category represented the 13 % of students' responses in relation to the characteristics of a creative teacher. Table 6.25 gives examples of the responses of the students coded into this category.

Table 6.25 Enthusiastic and effective teaching as a characteristic of a creative teacher

<p><i>One who is interested in making the student enjoy the class and get interested and curious; adopts a variety of things to reach this goal (Law, male, 21).</i></p> <p><i>Someone who makes the class interesting and makes you want to get involved in the subject of study.(Philosophy, male, 24).</i></p> <p><i>The way he presents the topics, makes classes enjoyable (Law, female, 23).</i></p> <p><i>One who teaches any subject in an imaginative way and shows applications of knowledge; in other words, someone who is able to manage situations relying on imagination (Philosophy, male, 22).</i></p>

From the responses given by the students the following definition was developed: teachers' capability to use a set of resources, methods and strategies to keep students' attention and interest in the class.

Dynamism

This category emerged as an independent category, with 12 %, because of responses that underlined this attribute of a creative teacher such as: ‘someone dynamic’. Some of the responses where dynamism was mentioned also related to the practical approach of the activities as shown in Table 6.26.

Table 6.26 ‘Dynamism’ as a characteristic of a creative teacher

<p><i>Dynamic, uses practical activities (Psychology, female, aged 23),</i></p> <p><i>Dynamic, with less talk, more opportunities for knowledge application (Law, male, aged 21)</i></p> <p><i>Someone who understands the group characteristics and adapts the class dynamics with that approach, it's difficult to limit his creativity. (History, female, aged 25)</i></p> <p><i>He is dynamic (Law, female, aged 18)</i></p>

This category can be defined as students’ perception of the energy and amount of activity fostered by teachers with a practical and applied approach to learning.

Positive attitudes

This category emerged from 11 % of the answers such as: ‘respectful’, ‘with positive attitudes’. From these and other students’ responses this attribute of a creative teacher underlines the importance that students attach to teachers’ attitudes such as being respectful, empathetic, an active listener and kind. Table 6.27 gives examples of the responses of the students coded into this category.

Table 6.27 ‘Positive attitudes’ as a characteristic of a creative teacher

<p><i>‘Flexible, tolerant, respectful’ (Pedagogy, female, 21),</i></p> <p><i>Respectful (Law, female, 23)</i></p> <p><i>Kind, empathic, (Philosophy, male, 22)</i></p> <p><i>Accepts or respects others’ points of view (Psychology, female, 21),</i></p> <p><i>One who gets involved in an empathic way with the students, (Psychology, female, 23).</i></p>

Congruency is found between this category and the one that emerged from responses given by students in relation to what facilitates creativity in the classroom.

Uses a variety of methods and resources

11 % of students' responses referred to the use of a variety of teaching strategies and resources as an attribute of a creative teacher. Responses coded into this category reflect the opposite of those given in relation to obstacles to creativity. Table 6.28 gives examples of the responses of the students coded into this category.

Table 6.28 'Uses a variety of methods and resources' as a characteristic of a creative teacher

Someone who uses a diversity of teaching activities. (Psychology, male, aged 23)
The use of strategies to make class more effective for students' learning (Psychology, male, aged 20),
A creative teacher is one who supports teaching using different methodologies and resources. (Literature, female, aged 21)
Stimulates students' participation through a variety of activities, team dynamics, exercises, activities, oral tests' (Philosophy, male, aged 23)
A teacher that uses visual materials and different resources, based on pedagogical principles; a teacher should have pedagogical skills.(Latin-American, male, aged 22)

Monotony and rigidity were the two categories with the highest percentage of responses to that question. Students expect that a teacher will introduce variety in the classroom environment through the resources or teaching strategies s/he uses.

Stimulating

Students' implicit theories related to a creative teacher included as an attribute his or her capacity to stimulate students' motivation in the classroom. This category emerged from 11 % of students' responses such as 'motivates students to learn'. Table 6.29 gives examples of the responses of the students coded into this category.

Table 6.29 'Stimulating' as a characteristic of a creative teacher

One who knows how to motivate her students to learn' (Philosophy, male, aged 22),
Someone that makes the class interesting making you get involved in the subject' (Philosophy, male, aged 24),
One who has the capacity to stimulate students' interest (Spanish Language Philology, male, aged 21),

Motivates and stimulates (Philosophy, male, aged 22).

Motivation also appeared as an important feature in the responses given in relation to what facilitates creativity in the classroom. So students identified that they needed to be motivated in relation to the topic of study in order to express their creativity but that they also expected that the teacher should be able to stimulate their motivation.

Wide and current knowledge

This category emerged from 9 % of students' responses. The students perceived the level of domain knowledge that teachers demonstrated in the classroom was also a characteristic of a creative teacher. This attribute was also linked with the disposition the teacher shows to keep up to date in his or her field of study. These attributes emerged from responses such as: 'expert'; 'knowledgeable'; 'up to date'. Table 6.30 gives examples of the responses of the students coded into this category.

Table 6.30 'Wide and current knowledge' as a characteristic of a creative teacher

*Breadth, depth and actual knowledge that is used in classes in an innovative way,
(Philosophy, female, aged 29)*
Expert in the subject. (Law, female, aged 23)
With deep knowledge of the subject of the course (Philosophy, male, aged 22)
One who is continuously looking to be up to date (Law, male, aged 26)
With a deep knowledge of the subject. (Law, male, aged 18)

This characteristic of a creative teacher as mentioned by the students may have an impact on students' interest and motivation to attend a class and get involved in the proposed activities.

Good communication skills

8 % of students' responses referred to teachers having good communication skills such as: 'is clear when gives an explanation'; 'good communication skills'. Students identified a creative teacher as someone who is a good communicator, who is clear, is a good listener and also stimulates dialogue. This category can be seen as complementary to the teachers' expertise in relation to his or her subject knowledge. Table 6.31 gives examples of the responses of the students coded into this category.

Table 6.31 ‘Good communication skills’ as a characteristic of a creative teacher

<i>A great speaker, (Law, female, aged 23)</i>
<i>A person who shows the disposition to listen to propositions, has good communication skills, (Pedagogy, female, aged 19)</i>
<i>Is clear when gives explanations.(Psychology, male, aged 23)</i>
<i>A teacher who stimulates participation and dialogue (Languages, female, aged 18)</i>

Enjoys teaching

From 7 % of students’ responses a category emerged labelled as “enjoys teaching” which involved the joy and enthusiasm that the teacher may experience and express for his or her teaching. This category emerged from responses such as: ‘enthusiastic’, ‘enjoys his classes’. Table 6.32 gives examples of the responses of the students coded into this category

Table 6.32 ‘Enjoys teaching’ as a characteristic of a creative teacher

<i>One who is passionate about the subject and transmits it to the students (Philosophy, female, aged 21)</i>
<i>Enjoys his classes (Spanish Language Philology, female, aged 21)</i>
<i>Enthusiastic (Spanish Language Philology, male, aged 25)</i>
<i>Demonstrates enthusiasm (Law, male, aged 18)</i>

This category could be seen as related to ‘gives attractive and enjoyable classes’. If a teacher enjoys his or her work and enjoys teaching they are more likely to design classes in such a way as to be enjoyable for students, although this may not always be the case. Giving enjoyable and attractive classes involves having the ability to use a variety of resources and strategies. It is also related to teachers’ capacities to stimulate students’ motivation.

Summary of the characteristics of a creative teacher

Table 6.33, sets out the nine categories that emerged in relation to the question, ‘which are, in your opinion, the characteristics of a creative teacher?’ With example responses for each one.

Table 6.33 Which are, in your opinion, the characteristics of a creative teacher?

N = 84

Category	Definition	Example of verbatim quotes
Innovator	Teacher's ability to introduce new ideas or approaches to his or her teaching.	<i>'Innovator, open to new things and suggestions.'</i> <i>'The one who innovates'</i> <i>'Someone open to try out new things, to innovate.'</i>
Enthusiastic and effective teaching	Teachers' capability to use a set of resources (methods and strategies) to keep students' attention and interest in the class. Gives attractive and enjoyable classes	<i>'Not a boring class.'</i> <i>'The one who is interested in making the student enjoy the class and get interested and curious; does things to reach this goal.'</i>
Dynamism	Students' perception of the energy and amount of activity fostered by teachers with a practical approach to learning.	<i>'Someone dynamic.'</i> <i>'Dynamic, uses practical activities.'</i>
Positive attitudes	Positive teachers' attitudes: respectful, empathetic and sensitive, disposition to dialogue with students.	<i>'The one who gets involved in an empathic way with the students.'</i> <i>'Fun, respectful.'</i> <i>'Kind, critical.'</i>
Uses a variety of methods and resources	Teacher's ability to use his or her divergent thinking in the introduction of a variety of teaching methods to facilitate meaningful learning, motivation and creative thinking in the students.	<i>'The one who looks out for new methods.'</i> <i>'Makes each class different.'</i> <i>'Someone who uses a diversity of teaching activities.'</i>
Stimulating	Teacher's ability and interest in stimulating students' motivation and participation.	<i>'Stimulates students' participation through a variety of activities.'</i> <i>'One who has the capacity to stimulate students' interest.'</i>

<p>Wide and current knowledge</p>	<p>Students' perception of the level of (depth and breadth) knowledge that the teacher demonstrates, as well as his/her motivation for being permanently up to date.</p>	<p><i>'A deep knowledge on the subject.'</i></p> <p><i>'Expert in the subject.'</i></p> <p><i>'Shows he is up to date in the field'</i></p>
<p>Good communication skills</p>	<p>Students identify a creative teacher as someone who is a good communicator, who is clear, is a good listener and also stimulates dialogue.</p>	<p><i>'Disposition to listen.'</i></p> <p><i>'A great speaker, expert in the subject.'</i></p> <p><i>'Is clear when makes explanations.'</i></p>
<p>Enjoys teaching</p>	<p>The pleasure and enthusiasm that the teacher may experience and express for his or her teaching.</p>	<p><i>'The way she gives her courses, some comments, she is enthusiastic.'</i></p> <p><i>'That he's passionate about the subject.'</i></p>

The three categories with highest percentages of responses were the teacher as innovator (18%), enthusiastic and effective teaching (13 %) and dynamism (12%). Three categories with similar levels of responses were positive attitudes (11%); uses a variety of methods and resources (11%) and stimulating (11%). Students expect that a creative teacher should be one who is able to motivate them, able to make students willing to participate and to get involved in the learning and creative processes in the classroom. The remaining three categories received fewer responses: wide and current knowledge (9%), good communication skills (8%), and enjoys teaching (7%).

6.6 Summary and conclusions.

From the thematic analysis of students' answers a range of categories emerged which have been presented in this chapter in relation to students' conceptions of creativity, of the facilitators and obstacles to creativity in the classroom environment and of the characteristics of a creative teacher.

Table 6.34 shows all the categories that emerged from the responses to the questions that explored students' conceptions of creativity, students' perception of what enhances or hinders their creativity in the classroom environment and the characteristics they identify as being present in a creative teacher.

Table 6.34 Summary of students' responses

Conceptions of creativity	Factors facilitating creativity	Obstacles to creativity	Characteristics of creative teachers
Novelty-originality	Motivation	Monotony	Innovator
Human Capability	Dynamism	Negative climate	Enthusiastic and effective teaching
Idea generation and implementation	Teachers' positive attitudes	Rigid mindset	Dynamism
Idea generation through imagination	Teaching and learning resources	Apathy and lack of motivation	Positive attitudes
Improvement	Positive climate	Ineffective teaching strategies	Uses a variety of methods and resources
Expression of or communication of ideas or emotion	Teaching abilities		Stimulating
	Novelty		Wide and current knowledge
	Participation		Good communication skills
	Challenges		Enjoys teaching

The students related creativity to: novelty-originality; a human capability; idea generation and implementation, idea generation through imagination, improvement, and as the expression or communication of ideas or emotions.

In relation to the factors that facilitated their creativity in a classroom environment, the categories that emerged were: teachers' abilities; teachers' positive attitudes; a positive

climate; dynamism in the sessions; teaching and learning resources; novelty; students' motivation; students' participation; and the existence of challenges.

The categories that emerged in relation to obstacles to creativity were rigid mindset; a poor climate; apathy; and ineffective teaching strategies.

Lastly, the findings of the characteristics of a creative teacher perceived as relevant by Mexican students, were, the teacher as innovator; being an enthusiastic teacher who adopts effective teaching strategies; who uses a variety of methods and resources; who shows dynamism; has positive attitudes; with good communication skills; who possesses wide and current knowledge; who gives attractive and enjoyable classes; and who enjoys teaching.

The next chapter (Chapter 7) presents findings from the responses of the teachers.

Discussion of findings including a comparison between the categories that emerged from students' and teachers' responses will be presented in Chapter 8.

Chapter 7

Mexican teachers' conceptions of creativity and perceptions of creative teaching

*'High achievement always takes place
in the framework of high expectation.'*

Charles Kettering

7.1 Introduction

Thirty six higher education teachers were asked to complete a questionnaire consisting of four open ended questions exploring their implicit theories about and conceptions of creativity including their conceptions of the factors that facilitated their creativity, their conceptions of what constrained their creativity in a classroom environment and their view of the characteristics of a creative teacher.

This chapter includes findings from the thematic analysis of teachers' responses to the four questions. The categories identified for each question, based on emerging themes which were raised more than three times, will be defined and examples quotes will be included. The remainder of this chapter will set out how these categories were derived from the data.

7.2 Mexican teachers' conceptions related to creativity

The first question aimed to explore the conceptions and implicit theories Mexican teachers held in relation to creativity. Following the procedure described in Chapter 5, a thematic analysis was undertaken to identify the themes which were mentioned by teachers. Six categories emerged from teachers' answers in relation to their conceptions of creativity: creativity as innovative solutions to problems (29%); as a life style or integral part of existence (27%); as a way of thinking (24%); as an innate human capacity(14%); and creativity as improvement (6%).

Innovative solutions to problems

Twenty nine percent of teachers' responses were coded in relation to creativity as 'linked to innovative solutions to a problem'. In this category there was a combination of two themes frequently related to creativity: novelty and problem solving. This category emerged from teachers' answers such as: 'finding new ways to do things', 'new solutions and improvement to known problems'; 'to solve problems in an original way'. Table 7.1 gives examples of the responses of the teachers coded into this category.

Table 7.1 Creativity as linked to innovative solutions to a problem

Creativity is the way to solve problems in an original manner (Biology, female, aged 48)

New solutions to known problems (Psychology, male, aged 62)

Ability to find a diversity of solutions to a problem (Biology, female, aged 42)

Asking questions and to solve problems in an original way (Chemistry, male, aged 55)

Is finding new ways to do things (Chemistry, female, aged 40)

It may result in effective options to: solve, move, modify, create, share, learn and to participate in the learning process of another person (Psychology, female, aged 34)

To generate new programmes, new solutions; to do new and different things (English language teaching, female, aged 51)

To search for authentic and original answers to a given situation. (Biology, female, aged 46)

To use innovative elements on a daily base; in a different way from the traditional and familiar (Engineering, male, aged 34)

Is finding new ways to do things, (Chemistry, female, aged 40)

Is the capacity to develop new ideas, that solve problems that have been addressed in only one way without giving the expected results (Pedagogy, female, aged 25)

Is to let your thoughts flow taking into account convergent and divergent issues in order to solve a problem (Chemistry, female, aged 55)

Creativity as a life style or as an integral part of existence

Twenty seven percent of responses related to creativity as a life style, as an integral part of existence. This category emerged from teachers' responses such as: 'a way of living'; 'an original way of being, and acting'. Table 7.2 gives examples of the responses of the teachers coded into this category.

Table 7.2 Creativity as a life style or as an integral part of existence

Creativity is the way... to be more happy in life and helping others (Biology, female, aged 48)

It is a way of being (Biology, male, aged 47)

An original way of being, and acting. (Chemistry, male, aged 55)

A way of living; a way to educate, exploiting all the sensitivity of the individual and accomplishing an objective linked to reality (Chemistry, female, aged 40)

Is how to transform, update and innovate sometimes with love, patience, a joy for living, a way to transcend (History, female, aged 45)

To grow as a person as a human being (Psychology, female, aged 34)

It is a way of conceiving the world as creator and co-creators of the universe, the world, of life. It is a way of being and of acting (Pedagogy, female, aged 44)

It's talent, life, energy, movement, love, light (Education, female, aged 46)

Learning to live in a different manner in all aspects of my life (Chemistry, female, aged 63)

Needs to be cultivated to be transformed into a Philosophy and way of life. we must work to construct and make it a philosophy and way of life (Biology, female, aged 43)

Creativity is a way Living (Chemical Engineering, female, aged 56)

Creativity is "being". (Biology, female, aged 55)

Is life, energy, movement, love, light (Education, female, aged 46)

It is a way of being and of acting. It is a belief, a way of life. It gives joy and strength of self-appreciation. It is love and passion for living (Pedagogy, female, aged 44)

To be and to live every day as if it was the creation of a work of art. (Language, female, aged 45)

As shown by the examples included in table 7.2, teachers linked creativity to a way of acting in the world and as a set of attitudes. A subset of the category of creativity as a life style was the category the type of attitudes needed for creativity. Table 7.3 includes examples of answers coded into this sub-category.

Table 7.3 Set of attitudes

It is a whole set of attitudes, activities, and feelings that respond or make a change (Physical education, male, aged 40)

Is how to transform, update and innovate sometimes with love, patience, a joy for living, a way to transcend (History, female, aged 45)

To accompany the student with empathy to help him reach learning. (Pedagogy, female, aged 31)
Self-confidence, awareness and knowledge are essential for creativity (Biology, female, aged 55)

A way of thinking

This category emerged from 24% of teachers' responses such as: 'a way of thinking and acting', 'a way of thinking and understanding'. Table 7.4 gives examples of the responses of the teachers coded into this category.

Table 7.4 Creativity as a way of thinking

It is a way of thinking and of acting; it is very personal and unique; it involves to innovate, create, to propose ideas (Physics, male, aged 45)
It is a way of being and thinking in order to use all your abilities to produce knowledge and to solve everyday problems (Biology, male aged 47)
It is a way of thinking (pedagogy, female, aged 48)
It is a way of thinking and acting that helps us to improve our activities and our relationships with others (Pedagogy, female, aged 48)
It is way of feeling, of thinking, and understanding (Language, female, aged 45)
Involves letting your thoughts and senses flow in any space or time and with all types of people; in such a way that allows you to communicate and to be. (Information technology, female, aged 40)
Is to let your thoughts flow taking into account convergent and divergent issues in order to solve a problem. (Chemistry, female, aged 55)

Creativity as an innate human capacity

Fourteen percent of the responses were coded into the category of creativity as an innate human capacity. This category emerged from responses such as: 'capacity to generate ideas'; 'it is an inherent process of human beings'. The definition of this category was: the potential human beings have and that may be increased or developed by different means. Table 7.5 gives examples of the teachers' responses coded into this category.

Table 7.5 Creativity as an innate human capacity

Human capacity to do and to act according to our own structures of thought (History, male, aged 41)

It is the human activity that allows us to update all inner potentialities in a real context and to continue creating based on accumulated experience. (Creative writing, female, aged 63)

Is talent; a capacity (Education, female, aged 46)

Capacity to generate ideas, to search authentic answers for a given situation. (Biology, female, aged 46)

It is an inherent process of human being and a characteristic of the species, which, however needs to be cultivated in order to be transformed, into a life philosophy and as a way of living. (Biology, female, aged 43)

Improvement

Six percent of teachers' responses were coded into the category of creativity as the possibility to improve. Table 7.6 gives examples of the responses of the teachers coded into this category.

Table 7.6 Creativity as improvement

It is a way of thinking and acting that helps us to improve our activities and relationships with people (pedagogy, female, aged 48)

Improvement to known problems (Psychology, male, aged 62)

To reflect about the different dimensions and performance areas, with the aim to find ways for improvement; out of fixed and pre-set routines (Language, female, aged 45)

Summary of categories for the conception of creativity

Table 7.7 sets out the five categories that emerged in relation to teachers' conceptions of creativity with example responses for each.

Table 7.7 Mexican teachers' conceptions of creativity N = 51

Category	Definition	Example of verbatim quotes
Innovative solutions to problems	Generating new solutions to problems.	<i>'New solutions to old problems.'</i> <i>'Possibility of combining known elements of unconventional ways, or not tested before.'</i>
As a life style, as an integral part of existence	Creativity is a way of being and of acting.	<i>'It is a way of being and of acting.'</i> <i>'Creativity is being'</i> <i>'It is a whole set of attitudes towards life.'</i>
A way of thinking	Creativity is linked to cognitive processes; it consists of a characteristic way of thinking.	<i>'It is a way of being and thinking.'</i>
An innate human capacity	The potential that human beings have and that may be increased or developed by different means.	<i>'Human capacity to do and to act according to our own structures of thought.'</i>
Improvement	A process which allows improving something that already exists.	<i>'An action that helps us to improve our activities and relationships with people.'</i>

7.3 Teachers' perceptions of factors that facilitate creativity in the classroom.

Six categories emerged from teachers' responses to the question relating to their perception of what facilitates their creativity in the classroom environment. The categories were: Positive climate (25%); teachers' motivation and enthusiasm for teaching(25%); students' motivation and participation (24%); varied and new activities (12 %); teachers'

knowledge domain and experience (8 %) and teachers' self-confidence (6%). The sections below provide examples of teachers' responses coded into each category.

Positive climate

This category emerged from responses such as: 'a climate of trust and respect'; 'pleasant environment'; 'safety and welfare in the classroom'. The category of positive climate had the highest percentage of responses (25%). It was defined as: the perceived conditions of harmony and psychological safety that allow the person to learn and interact in order to develop their potential. Table 7.8 gives examples of the responses of the teachers coded into this category.

Table 7.8 Positive climate as a facilitator of creativity in the classroom

To make a more pleasant environment for learning, together with my students (Biology, female, aged 48)

A climate of trust and respect (History, male aged 41)

Group climate, (Biology, female, aged 42)

Pleasant environments (Education, female, aged 46)

An environment quiet, safety, welfare in the classroom (History, female, aged 55)

A pleasant environment; with trust, relaxed, allows for more creativity (Biology, female, aged 46)

The subject, the students the time of day, any element of the environment (Biology, female aged 50)

When my students feel a climate of trust they become more creative. (chemistry, female, aged 55)

Mexican teachers' motivation and enthusiasm for teaching

This category emerged from 25% of responses, for example, 'the joy of what I do'; 'the topic; the relationship with students'; 'new challenges'; 'interest in the issues involved'. This category was defined as: teachers' joy and commitment to her work. Table 7.9 gives examples of the responses of the teachers coded into this category.

Table 7.9 Teachers' motivation and enthusiasm for teaching

Enjoying my work (Biology, female, aged 48)

My positive disposition; the preparation of the classes; I believe that to give a truly creative class it needs to be planned in advance, but more important is the love that you have for your work and for your students (chemistry, female, aged 40)

My knowledge, experience, motivation to continue to learn from the energy of young students (Creative writing, female, aged 63)

My passion for what I do. My search and my desire to learn and share; my desire to enrich my teaching. (Pedagogy, female, aged 44)

Being confident about what I do, and to enjoy each moment of the class (Chemical engineering, female, aged 56)

Students' motivation and participation

Responses such as: 'involvement of students'; 'students' motivation for change'; 'the attitudes of my students'; were coded into this category which represents 24% of teachers' responses in relation to the conditions that enhance creativity in the classroom. The category was defined as: students' involvement in their learning process. Table 7.10 shows examples of responses coded into this category.

Table 7.10 Students' motivation and participation as a facilitator of creativity in the classroom

To have my students in expectation, to promote their cooperation, and their joy (History, female, aged 45)

The participation of students. (Pedagogy, female, aged 48)

The disposition of the students to work; the compromise agreed upon from the moment they accept share in the classroom with me (Languages, female aged 45)

Involvement of students. (English language, female, aged 51)

That the groups of students may be participative, that they raise questions, and show their interest. (Pedagogy, female, aged 25)

Varied and new activities

This category emerged from responses such as: 'the use of diverse types of strategies', 'several options and types of activities' with a 12% of responses. Table 7.11 shows

examples of responses coded into this category. The definition of this category is: the diversity and innovative use of the teaching and learning resources as well as the variety of teaching and learning strategies used in the classroom.

Table 7.11 ‘Varied and new *activities*’ as a factor that facilitates creativity in the classroom

Prepares the class in advance and thinks of several options and types of activities, even if they may seem crazy. (Chemistry, female, aged 63)

Be different and use resources giving them an innovative application without limitations. (Engineering, male, aged 34)

All those techniques, tools, questions and resources that the teacher can design and use. (Pedagogy, female, aged 31)

‘The use of diverse teaching strategies and fun activities using the actual resources.’ (Biology, male, aged 44).

Teachers’ knowledge domain and experience

Eight percent of Mexican teachers’ responses mentioned teachers’ knowledge and experience as factors facilitating creativity in the classroom. Table 7.12 gives examples of teachers’ responses coded into this category. The category can be defined as the influence of teachers’ level of knowledge and teaching and professional experience as elements that may enhance their creativity in the classroom.

Table 7.12 Mexican teachers’ knowledge domain and experience as a facilitating factor for creativity in the classroom

Knowledge of the subject, prior preparation and the goal not only of the subject itself, but the significance this may have for the student (Psychology, female, aged 34)

The experience of growth and development processes. To have the experience of self-meaningful learning (Education, female, aged 46)

My knowledge, experience, (Creative writing, female, aged 63)

My long experience in teaching (Chemistry, male, aged 55)

Teachers' self-confidence

This category emerged from responses such as: 'being confident in what I do'; 'trust in my capacities'; 'past knowledge and experience'. The answers coded into this category represented 6% of the responses. Table 7.13 shows examples of answers coded into this category.

Table 7.13 Teachers' self-confidence as a facilitating factor for creativity in the classroom

<i>Self-confidence and to know my students and their needs (Physical education, male, aged 40)</i>
<i>Being confident about what I do (Chemical engineering, female, aged 56)</i>
<i>Intuitive confidence (Biology, female, aged 42)</i>

Summary of categories for facilitators for creativity

Two categories emerged with the greatest frequency: positive climate (25%) and teachers' motivation and enthusiasm for teaching (25%). This latter is important from the teachers' perspective since they need to enjoy what they do in order to be motivated to look for different options to stimulate students' learning and creativity.

The category with the next greatest frequency identified by the teachers was students' motivation and participation (24%). The categories mentioned on fewer occasions were: teachers' knowledge domain and experience (8%) and teachers' self-confidence (6%). Table 7.14 provides a synthesis of the categories that emerged in relation to what facilitates creativity in the classroom.

Table 7.14 Factors facilitating creativity N = 51

Category	Definition	Example of verbatim quotes
Positive climate	The perceived conditions of harmony and psychological safety that allow the person to learn and interact in order to develop their potential.	<i>'That in the classroom there is an environment that allows me to learn from them, and help them develop all their skills and potentialities.'</i> <i>'The harmony and consistency between the learning objectives and teaching activities.'</i>
Teachers' motivation and enthusiasm for teaching	Teachers' joy and commitment to her work.	<i>'What encourages my Creativity is that in my class I have the motivation to achieve my goals, to make a more pleasant environment for learning, together with my students.'</i>
Students' motivation and participation	Students' involvement on their learning processes.	<i>'That the groups of students may be participative, that they raise questions, and show their interest'.</i>
Varied and new activities	The diversity and innovative use of the teaching and learning resources as well as the variety of teaching and learning strategies.	<i>'Be different and use resources giving them an innovative application without limitations.'</i>
Teachers' knowledge domain and experience	The influence of teachers' level of knowledge and teaching and professional experience as elements that enhance their creativity in the classroom.	<i>'Knowledge of the subject, prior preparation'</i> <i>'My long experience in teaching'</i>
Teachers' self-confidence	Teachers' self-confidence	<i>'Self confidence and to know my students and their needs'</i> <i>'Being confident about what I do.'</i>

7.4 Mexican teachers' perceptions of obstacles to their creativity in the classroom.

Six categories emerged from teachers' responses to the question relating to what they perceived as obstacles to their creativity in the classroom environment. The categories were lack of time and lack of resources (22%); rigid mindset (19%); negative climate (17%); stress (14%); personal obstacles (14%); and apathy (14%). The sections below provide examples of teachers' responses coded into each category.

Lack of time and lack of resources

This category emerged with the highest percentage of responses (22%) in relation to the obstacles to creativity. It emerged from responses such as: 'lack of time and poor working conditions'; 'the time is sometimes not enough'; 'lack of equipment'. The definition of this category is: Perception of inadequate conditions for creativity such as insufficient time or lack of adequate equipment and resources to support teaching and learning activities.

Table 7.15 Lack of time or lack of resources as obstacles to creativity in the classroom

The time is sometimes not enough (English teaching, female, aged 51)

Lack of an adequate space, restricted time and I even need to take the equipment by myself to the classroom (Communications engineering, male, aged 34)

Teaching time is too short (communications and engineering, female, aged 40)

The lack of time and poor working conditions (Biology, female, aged 50)

Lack of electronic equipment in the institution, to have the minimal resources in the classroom. (Creative writing, female, aged 63)

Rigid mind-set

This category emerged from 19% of answers such as: 'authoritarianism', 'rigid processes', and 'rigid thinking structures'. The category was defined as the perception of authoritarianism and rigid patterns imposed by the institution and the rigid mindset of teachers or students. Table 7.16 gives examples of the responses of the teachers coded into this category.

Table 7.16 Rigid mindset as an obstacle to creativity in the classroom

<i>Rigidity of the system and its structure (Psychology, male, aged 62)</i>
<i>The rigidity of the institution and authorities (Chemistry, male, aged 55)</i>
<i>Mandatory activities, lack of freedom to try new ways (Pedagogy, female, aged 48)</i>
<i>When the academic processes are very rigid. (Psychology, female, aged 34)</i>
<i>Authoritarianism and inflexibility (Biology, female, aged 43)</i>
<i>Everyday life and prejudices (Pedagogy, female, aged 31)</i>
<i>Monotony, the imposition (Physics, male, aged 45)</i>
<i>Students' rigid thinking structures, looking for immediate responses and forgetting that in real life problems are complex. (History, male, aged 41)</i>
<i>Fear of being admonished for doing different activities which may be seen as deviations from the learning objectives. (Creative writing, female, aged 63)</i>

Negative climate

This category emerged from responses such as: 'conflicts', 'lack of harmony'; 'lack of respect'; 'lack of freedom'. The answers coded into this category represented 17% of the total. This category was defined as perception of negative affective conditions. This category involved the influence that other persons' behaviours and attitudes in the classroom environment have on teachers' moods or in the opportunities they have to express and develop their creativity. Table 7.17 gives examples of the responses of the teachers coded into this category.

Table 7.17 Negative climate as an obstacle to creativity in the classroom

<i>Conflicts. (Biology, female, aged 48)</i>
<i>The lack of harmony (Pedagogy, female, aged 48)</i>
<i>A tense atmosphere where there is mistrust, there is no respect for others and for their work (Biology, male, aged 47)</i>
<i>When my students lose attention due to different situations that are distracters, as has happened recently. (Biology, male, aged 44)</i>
<i>Negative conditions that prevent open and productive communication (Languages, female, aged 44)</i>
<i>The main obstacle is the violence that is manifested in many ways by the students (History, female, aged 55)</i>

Lack of recognition of teachers' work. (English teaching, female, aged 51)

The lack of respect, freedom, lack of motivation (Biology, female, aged 55)

Stress

This category emerged from 14% of teachers who responded with statements such as: 'my negative mood', 'depression and stress'. It was defined as, the experience of tension in the classroom environment. Table 7.18 gives examples of the responses of the teachers coded into this category.

Table 7.18 Stress as an obstacle to creativity in the classroom

When I feel too tired (Biology, female, aged 48)

A very extensive syllabus to accomplish, which makes me feel stressed. (Biology, female, aged 42)

My physical exhaustion (Pedagogy, female, aged 44)

My negative mood, depression and stress (Education, female, aged 46)

Being stressed. (Chemistry, female, aged 63)

Fatigue and job stress. (Psychology, female, aged 55)

Personal obstacles

This category emerged from 14% of teachers' responses such as: 'my mind-set', 'fear of the unknown'; 'not knowing what to do to face challenges'. This category related directly to inner, personal conditions for which teachers were responsible and which did not depend on other people's behaviours or attitudes. Table 7.19 gives examples of the responses of the teachers coded into this category

Table 7.19 Personal obstacles to creativity in the classroom

What sometimes hinder my creativity are the challenges. When I feel too tired or when I have to deal with students with serious personal problems that obstruct their learning. Not knowing how to handle certain situations not directly related to learning. (Biology, female, aged 48)

When I do not feel well, or when I am not able to stimulate students' participation (Psychology, male, aged 62)

My mindset. Personal obstacles. (Political Sciences, male, aged 62)

What hinders my creativity the most is when I don't feel well with myself; then I am not able to transmit something positive and creative to the students. (Chemistry, female, aged 40)
Fear of the unknown. (History, female, aged 45)

Apathy

This category emerged from teachers' responses such as: 'my apathy or students' apathy'; 'students don't want to participate in certain learning activities'; 'lack of motivation'. The responses coded into this category represented 14% of the responses to the question relating to the obstacles to creativity. This category was defined as students' or teachers' lack of interest and involvement in the teaching-learning process. Table 7.20 gives examples of the responses of the teachers coded into this category.

Table 7.20 Students' apathy as an obstacle to creativity in the classroom

Apathy, my fatigue. When I have to do things which I don't like or I am not interested in. (Physics, male, aged 45)
Sometimes the irregularity of attendance of students. Their apathy. (History, female, aged 45)
My apathy or the students' apathy. (Pedagogy, female, aged 48)
When students are apathetic, negative. Students don't want to participate in different learning activities (Biology, female, aged 46)
Apathy, lack of motivation (Languages, female, aged 45)

Summary of obstacles to creativity

Table 7.21 provides a synthesis of the categories emerging from teachers' responses to the question relating to obstacles to creativity.

Table 7.21 Factors which hinder creativity in the classroom N = 36

Category	Definition	Example of verbatim quotes
Lack of time and resources	Perception of inadequate conditions for creativity, such as insufficient time or lack of adequate equipment and resources to support teaching and learning activities.	<i>'time is sometimes not enough'</i>
Rigid mindset	Perception of authoritarianism and rigid patterns imposed by the institution and the rigid mindsets of teachers or students.	<i>'Rigidity of the system and its' structure'</i>
Negative climate	Perception of negative affective conditions.	<i>'Conflicts'</i> <i>'A tense atmosphere'</i>
Stress	Experience of tension in the classroom environment.	<i>'Being stressed'</i>
Personal obstacles	Personal conditions that limit creative expression, such as fear, lack of competence, rigid patterns of behaviour.	<i>'when I don't feel positive about myself'</i>
Apathy	Students' or teachers' lack of interest and involvement in the teaching-learning process.	<i>'My apathy or the students' apathy'</i>

7.5 Teachers' conceptions of a creative teacher.

Eleven categories emerged from teachers' responses to the question relating to the characteristics of a creative teacher: openness to novelty (17%); commitment(13%); enthusiasm (13.1%); innovation (9.5%); interest in students' learning (8%); positive attitudes (7.1%); being an active listener (7.1%); positive self-esteem (7.1%); motivator (6%); having imagination (6%); and promoting creative thinking (6%). The sections below provide examples of teachers' responses coded into each category.

Openness to novelty

The category open to novelty emerged with the highest percentage of responses (17%). This category emerged from teachers' responses such as: 'is open and looks for solutions'; 'open to new experiences'. Table 7.22 gives examples of the responses of the teachers coded into this category.

Table 7.22 Open to novelty as a characteristic of a creative teacher

<p><i>Is who is in front of any change or situation, is open and looks for solutions. Is open to criticism. Takes risks and allows others to take risks. (Physical education, male, aged 40)</i></p> <p><i>In permanent search, curious. Open to new experiences. (Biology, female, aged 42)</i></p> <p><i>Openness (Psychology, female, aged 34)</i></p> <p><i>In search for new paths for his teaching. (Biology, female, aged 49)</i></p> <p><i>Willing to discover new things. (History, female, aged 55)</i></p> <p><i>Always looking for new teaching and learning activities. (Chemistry, female, aged 63)</i></p>

Committed

From the responses given by the teachers it can be seen that they view commitment to self-improvement and being well prepared as an important characteristic of a creative teacher. 13% of teachers' responses were coded into this category. It emerged from responses such as: 'an eternal un-conformist'; 'good level of knowledge of the discipline'. Table 7.23 gives examples of the responses of the teachers coded into this category.

Table 7.23 Commitment as a characteristic of a creative teacher

The creative teacher is an eternal nonconformist looking always to improve his way of being and his achievement. (Physics, male aged 45)

Has a good level of knowledge of the discipline. (Biology, male aged 47)

In permanent search, curious. Updated. (Biology, female, aged 42)

Deep knowledge of his discipline. Uses knowledge inter-disciplinarily to enrich her teaching. (History, female, aged 45)

Curious, always in the search, looking how to improve his competencies. (Pedagogy, female, aged 44)

Well prepared. (Biology, female, aged 46)

Committed to their work. (Engineering, female, aged 40)

Committed. Willing to learn from others. Congruent. (Engineering, male aged 34)

Seeks for self-improvement on the cognitive aspects and the spiritual side also. (Biology, male, aged 44)

A person committed to herself and to her work. (Languages, female, aged 45)

The definition of this category, committed to self-improvement and being well prepared was defined as, permanently willing to be involved in a search for opportunities to learn and to improve her skills, to keep up to date.

Enthusiasm

The category of enthusiasm emerged from 13.1% of teachers' responses from responses such as: 'loves his work'; 'enjoys teaching'. Table 7.24 gives examples of the responses of the teachers coded into this category.

Table 7.24 Enthusiasm as a characteristic of a creative teacher

Loves his work. (Chemistry, female, aged 40)

Enjoys teaching, (Engineering, female, aged 40)

Enjoys his work. (Chemistry, female, aged 55)

With joy for his work and for life. Passionate about life and others work. (Pedagogy, female, aged 44)

With good disposition for work. (Education, female, aged 46)

This category is related to the pleasure and enthusiasm that teachers may experience and express for their teaching. This characteristic of the teacher is important since it may

reflect teachers' intrinsic motivation for his or her work and may have the effect of creating positive environmental conditions to facilitate students' creativity. The definition of this category, was enjoys her work and demonstrates enthusiasm.

Innovation

This category emerged from 9.5% of the responses such as: 'takes risks'; 'innovative'; 'challenges own knowledge'. This category and the responses coded into it relates to a common view of the creative person as one who challenges known paradigms and goes beyond the boundaries of what is familiar. Table 7.25 gives examples of the responses of the teachers coded into this category.

Table 7.25 Innovation as a characteristic of a creative teacher

<p><i>Takes risks and allows others to take risks. (Physical education, male, aged 40)</i></p> <p><i>Innovative. (Biology, female, aged 42)</i></p> <p><i>Intelligent, flexible, innovative (Chemistry, male, aged 55)</i></p> <p><i>Questions and challenges his own knowledge and mental schemes. (Creative writing, female, aged 63)</i></p>

The definition of this category was: goes beyond known boundaries, challenging and questioning his knowledge, and is willing to take risks.

Interest in students' learning

The category of interest in students learning emerged from 8% of teachers' responses such as: 'is aware of students needs'; 'interested on facilitating students' integral education'. Table 7.26 gives examples of the responses of the teachers coded into this category.

Table 7.26 Interest in students' learning as a characteristic of a creative teacher

<p><i>Is interested in facilitating students' integral education; (Physicist, male, aged 45)</i></p> <p><i>Is aware of his student's needs. (Biology, female aged 42)</i></p> <p><i>Searches for opportunities to promote different abilities and attitudes in his students.</i></p> <p><i>Acknowledges and stimulates the work of others. (History, female, aged 45)</i></p> <p><i>Tries to influence students' holistic development including an ethical attitude that may grow in parallel with knowledge acquisition. (Languages, female, aged 45)</i></p>
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The definition of this category was 'seeks to promote students' meaningful and holistic learning'.

Positive attitudes

This category emerged from 7.1% of the answers such as 'humble', 'respectful', 'empathetic'. Table 7.27 gives examples of the responses of the teachers coded into this category.

Table 7.27 Positive attitudes as a characteristic of a creative teacher

<p><i>A creative teacher is humble before their students; loving, giving the best of him or herself to the students. (Biology, female, aged 48)</i></p> <p><i>Builds an adequate learning environment; (Biology, male, aged 47)</i></p> <p><i>Is empathetic; has ability to identify others' needs (Psychology, female, aged 34)</i></p> <p><i>Respectful, disciplined, well organized. (Biology, male, aged 44)</i></p> <p><i>Committed, ethic (Biology, female, aged 49)</i></p> <p><i>Artist, communicative, leader, responsible, enthusiastic, collaborative, friendly, willing to share their knowledge (Psychology, female, aged 55)</i></p> <p><i>Agile (intellectually) Positive self-esteem. Humble (Engineering, male, aged 34)</i></p>

Active listener

7.1% of teachers' responses referred to a teacher's ability and disposition to actively listen to students. This is also linked to teachers more general communication skills. This category emerged from responses such as 'interested in listening'. Table 7.28 gives examples of the responses of the teachers coded into this category.

Table 7.28 Active listener as a characteristic of a creative teacher

Is interested in listening. (Biology, female, aged 48)

Has positive and effective communication with students. (Biology, female, aged 48)

To be a creative teacher: he should be a good and active listener; a creative teacher knows his students; addresses diversity (Biology, male, aged 47)

Knows how to listen actively and resists the temptation of giving automatic responses (pedagogy, female, aged 48)

Ability to listen to others (Psychology, female, aged 34)

Willingness to listen to what students have to say (Pedagogy, female, aged 31)

Positive self-esteem

7.1 % of teachers' responses referred to teachers' self-esteem as one trait and attribute of a creative teacher. Table 7.29 gives examples of the responses of the teachers coded into this category.

Table 7.29 Positive self-esteem as a characteristic of a creative teacher

Is aware of his strengths and limitations. Is visionary (Biology, female, aged 48)

Being himself; accepting his light and shadow; is aware that he has potentialities that have not been explored or developed; (Psychology, male, aged 62)

With positive self-esteem and acknowledgement of her own achievements (Political Sciences, male, aged 62)

Motivator

The category of motivates students, emerged from 6 % of teachers' responses. Table 7.30 gives examples of the responses of the teachers coded into this category. Teachers participating in this initial study considered that the creative teacher looks for different ways to stimulate students' motivation.

Table 7.30 Being a motivator as a characteristic of a creative teacher

Gives students' guidance to develop their abilities. Motivates his students with new and original activities. (Biology, female, aged 48)

Motivates his students; (Biology, male, aged 47)

Imagination

Six percent of teachers' responses, mentioned being imaginative as a characteristic of a creative teacher. Table 7.31 gives examples of the responses of the teachers coded into this category.

Table 7.31 Imagination as a characteristic of a creative teacher

<p><i>Imaginative (Biology, female, aged 49)</i></p> <p><i>Imaginative. (Biology, female, aged 46)</i></p> <p><i>imaginatively restless searching for answers and new activities (English language teaching, female, aged 51)</i></p>

Promotes creative thinking

Six percent of the responses referred to the capacity of a creative teacher to promote students' creative thinking. This category relates to the strategies teachers use to challenge their students. Table 7.32 gives examples of the responses of the teachers coded into this category.

Table 7.32 Promotes creative thinking as a characteristic of a creative teacher

<p><i>Promotes students to explore and find a diversity of ways to knowledge and learning. He is able to make reflective closure to the activities. (Pedagogy, female, aged 48)</i></p> <p><i>Stimulates students reasoning, divergent-convergent knowledge of issues. (Psychology, female, aged 34)</i></p> <p><i>Knows how to feedback to his students; challenges students through questions to stimulate their thinking processes (Biology, female, aged 43)</i></p> <p><i>Uses the right questions to promote students' creativity; Stimulates students to find solutions to different types of problems. (Biology, female, aged 50)</i></p>

Summary of categories for the characteristics of a creative teacher

Table 7.33 sets out the eleven categories that emerged in relation to the question Which are, in your opinion, the characteristics of a creative teacher?, with example responses for each one.

Table 7.33 Characteristics of a creative teacher N = 84

Category	Definition	Example of verbatim quotes
Openness to novelty	A positive disposition to try new approaches, to innovate and to take risks.	<i>'Who in front of any change or situation is open and looks for solutions'.</i>
Commitment	Constantly willing to be involved in a search for opportunities to learn and to improve her skills, to keep up to date.	<i>'Questions his own knowledge and mental schemes'</i> <i>'Wiling to learn from others'</i>
Enthusiasm	Enjoys her work and demonstrates her enthusiasm.	<i>'Seeks to give service to others with joy'</i> <i>Shows his joy for living.'</i> <i>'With joy for his work and for life'</i>
Innovation	Goes beyond known boundaries, challenging and questioning his knowledge, and is willing to take risks.	<i>'Intelligent, flexible, innovative'</i>
Interest in students' learning	Seeks to promote students' meaningful and holistic learning.	<i>'Builds an adequate environment for learning'</i> <i>'Does not see himself as someone who has finished with his learning process and personal growth'.</i>
Positive attitudes	Empathetic, respectful, humble, flexible.	<i>'Empathetic, respectful of people and processes'.</i> <i>'Congruent'.</i>
Active listener	Positive disposition and abilities for active listening.	<i>'To be a creative teacher: he should be a</i>

		<i>good and active listener'. 'Knows how to listen actively and resists the temptation of giving automatic responses'</i>
Positive self-esteem	Acknowledges his/her own strengths and weaknesses.	<i>'With a positive self-esteem and acknowledge of her own achievements'</i>
Motivator	Searches out ways to motivate students.	<i>'Motivates his students with new and original activities'</i>
Imagination	Uses imagination in his work.	<i>'Uses imagination and stimulates students' imagination'.</i>
Promotes creative thinking	Uses different strategies to promote students' creativity thinking skills	<i>'Prepares his classes taking into account pedagogy and creativity' 'Uses the right questions to promote students' creativity'.</i>

The categories with the highest percentages of responses were: the teacher being open to novelty (17%), committed (13%), and enthusiastic (13.1%). Also important were the abilities of a creative teacher to motivate students and to promote their creative thinking.

7.6 Summary and conclusions

The analysis of the categories that emerged for the question relating to the characteristics of a creative teacher shows consistency with teachers' conception of creativity as well as with their perception of the conditions that enhance creativity in the classroom environment and what they consider as constraints for creativity. Table 7.34 shows the categories that emerged from teachers' responses.

Table 7.34 Summary of teachers' responses

Conceptions of creativity	Factors facilitating creativity	Obstacles to creativity	Characteristics of creative teachers
As a life style As an integral part of existence	Positive Climate	Lack of time and resources	Openness to novelty
Innovative solutions to problems	Teachers' motivation/enthusiasm for teaching	Rigid mindset	Commitment
An innate human capacity	Students' motivation and participation	Negative climate	Enthusiasm
A way of thinking	Varied and new activities	Stress	Innovation
Improvement	Teachers' self-confidence and knowledge	Apathy	Interest in students' learning
		Personal obstacles	Positive attitudes
			Active listener
			Positive self-esteem
			Motivator
			Imagination
			Promotes creative thinking

The next chapter (Chapter 8) provides a discussion of findings from students' and teachers' responses as well as a comparison between the categories that emerged from students' and teachers' responses.

Chapter 8

Discussion of the results of the initial study

*'A teacher affects eternity;
he can never tell where his influence stops'.*

Henry Adams

8.1 Introduction

The initial study of the present research was undertaken as stated in chapters 4 and 5, to answer the first four research questions.

- What conceptions of creativity do Mexican students and teachers hold?
- What are Mexican students' and teachers' perceptions of the factors that enhance and hinder their creativity in the classroom?
- What conceptions of a creative teacher do Mexican students and teachers hold?
- What specific knowledge, skills and attitudes do teachers need to be able to foster students' creativity through the curriculum in higher education?

It is important to acknowledge that the size of the samples was a limitation of the initial study. The way that the teachers' sample was recruited also has limitations in that the teachers who participated were enrolled in a creative teaching workshop conducted by the researcher. This suggests that the teachers were already interested on creativity and may have been more knowledgeable about it than their peers. These issues are discussed in more detail in Chapter 11.

However, interesting similarities were found amongst Mexican students' and teachers' conceptions of creativity, of the facilitators and constraints to creativity and in relation to the characteristics of a creative teacher. This chapter sets out the emerging similarities and differences and discusses them in relation to the existing literature. The data from the

Mexican students' and teachers' qualitative responses were analyzed and used to identify perceptions of the knowledge, skills and attitudes that teachers need to develop in order to teach creatively and to promote students' creativity. The findings from this analysis were set out in chapters 6 and 7. The findings from the qualitative data relating to student's expectations and perceptions of creativity and of creative teaching provided the basis for the design of the questionnaire, which aimed to support teachers in enhancing their reflections and awareness of the creative skills and those needed to support student creativity. The questionnaire was based on the kind of skills, attitudes and behaviours that the qualitative data had indicated that teachers needed to promote students' creativity in the classroom. In addition to the data derived from the qualitative research the wider literature was drawn on to develop the statements that were included in the questionnaire. The process of developing the questionnaire is explained in Chapter 9.

8.2 Discussion of Mexican students' and teachers' conceptions related to creativity

Students and teachers were asked about their conceptions of creativity. The findings derived from the thematic analysis of the Mexican students' responses in relation to their conceptions of creativity are similar to those reported in research focusing on the implicit theories of lay persons about creativity. These similarities are discussed here in addition to similarities with explicit theories of creativity.

The students related creativity to: novelty-originality; human capability; idea generation and implementation, idea generation through imagination, improvement, and as the expression or communication of ideas or emotions.

Originality and newness or novelty are criteria commonly linked to creative behaviour or used to assess a product as creative. This connection emerged from students' responses and reflects much earlier research. For instance, Jackson and Messick (1965) include as one of the criteria to assess a product as creative, that it is unusual. Jackson and Messick define this originality in terms of norms. "The infrequency of a response is relative to norms, which thus serve as a judgmental standard for evaluating unusualness" (Jackson & Messick, 1965, p. 313). In similar vein, one of the three criteria mentioned by Besemer and O'Quinn

(1999) to assess a product as creative is novelty. They argue that this involves indicators such as the product being original, surprising, and germinal. The perceptions of the Mexican students' conception of creativity as involving novelty and originality supports the findings from earlier research on explicit theories of creativity despite the Mexican context being very different (Cropley & Cropley, 2004).

From the responses given by the students, in the current study, this category was defined as: the quality of being different from the usual or familiar, of an idea or product (tangible or intangible) for the individual or for the group or context in which the idea is presented.

The quality of novelty is very close to the originality category since both involve the characteristic of things being new and different to known or familiar solutions, products or ideas. Cropley (1999a) states that novelty may consist merely of self-expression (for example through writing in any way that pleases the writer), or it may imply the simple production of variability (doing things differently from the usual regardless of accuracy, meaning or sense). For Cropley effective novelty can also satisfy technical, professional, aesthetic or scholarly criteria producing a shock of recognition in observers that generate "effective surprise" (Bruner, 1967). This criterion was repeatedly mentioned by the students in the sample and suggests that their notions of creativity are closely linked to this novelty-originality category.

The students also understood creativity as a human capability. The implication of this conception is that as any human capability, creativity can be developed. This conception of creativity is a developmental one, since it involves the possibility of developing such a capacity (Vernon, 1975; Esquivel, 1995; Craft, 2001; NACCCE, 1999) and is contrary to the conception that has prevailed over many years which viewed creativity as a gift of the gods or as an inherited talent which cannot be developed.

Students conceptualized creativity as the potential human beings have that may be increased or developed, by a range of different means; that will allow them to imagine, design, and generate, different and original products. The answers included involved two important aspects of creativity: the possibility to generate ideas and to actually develop them and transform ideas into products or action (Sternberg, 1988).

The three categories, which had the greatest frequency of responses, provide a framework for what creativity represented for the students. A relational interpretation can also be drawn from the meaning implicit in each of these categories. The fact that novelty is linked with 'putting ideas into action', with implementation, is important since it is a common misconception that a creative person only needs to be able to generate novel ideas without a commitment to ensuring their implementation. Some persons have the ability to generate original ideas, but this does not mean that they are capable of putting them into action. In this sense, Runco (2003) makes a distinction between creative potential and creative performance.

Students' responses also included idea generation through imagination. Imagination is a process that underlies creativity since it allows the visualization or conception of different ideas and options for a given situation. Several researchers have, also mentioned the role of imagination in relation to creativity. Root-Bernstein and Root Bernstein (2000) identified that one of the thirteen tools that used by the most innovative people that they studied was imagining. Imagination for Dewey (1934) explores alternative possibilities for action within a selected context of ongoing activity. According to Hanson (1988), the ability to identify and challenge assumptions implies going outside conventional thinking with the help of imagination. This category, which emerged from the answers given by the Mexican students, is widely recognized as closely related to creativity.

One category that emerged from students' conception of creativity that is not usually associated with creativity was the possibility to improve things. Typically, the meaning that prevails in the implicit theories of lay people links creativity with the generation of things that did not exist before, with invention and with innovation. However, the act of improving something that already exists also requires creativity, as does the generation of new procedures or new approaches to a known problem or situation in order to obtain the required results (Sternberg, et al., 2001). This may also involve different types of change, as outlined by Kirton (2003). One type of change involves improving and elaborating on something that already exists leading to radical transformation or even inventing a new product or procedure.

The category least mentioned by the students in the sample was expression or communication of emotions or ideas. This conception usually occurs in relation to artistic creativity and found in the literature on humanistic approaches to creativity as in Rogers

(1975). Creativity has also been related to sensitivity (Gardner, 1993). In the current research, this was defined as the possibility through creativity, to express emotions and to communicate ideas to others.

8.2.1 Teachers' conceptions of creativity

Six categories emerged from teachers' responses in relation to their conceptions of creativity: creativity as innovative solutions to problems; as a life style, as an integral part of existence; as a way of thinking; as an innate capacity and as improvement.

Linking creativity to innovative problem solving was the category with the highest percentage of responses given by Mexican teachers. This approach supports one of the strong trends emerging in studies of creativity that has been evident when different methodological approaches have been adopted, promoting the development of the required skills and attitudes for creative problem solving (Weisberg, 2006; Treffinger et al., 2003). This conception indicates that well-known procedures or algorithms cannot solve some types of problems; creativity is required to solve ill-defined problems, and those that are unstructured and unfamiliar.

Creativity as a life style was the second category with a high number of responses given by Mexican teachers. This involves an attitudinal approach to reality that allows the individual to perceive problems or obstacles as challenges that need to be faced. This conception of creativity is congruent with previous research findings, for instance Rogers (1962) and Landau (1987) established that one view of creativity was as a way of acting in the world and as a set of attitudes (e.g. Landau, 1987; Rogers, 1962).

A subset of the category of creativity as a life style was teachers' responses in relation to the kind of attitudes involved in creativity. Their responses underlined the importance of certain attitudes in relation to creativity such as self-confidence, patience and joy of living. These and other attitudes have been emphasized as an aspect of the personal attributes necessary for creativity (e.g. Basadur and Hasdorf, 1996; Goldsmith and Matherly, 1988).

Responses given in relation to the factors that facilitate creativity, included attitudes in relation to the attributes of a creative teacher.

Teachers related creativity to innovative solving problem. Not all types of problems require novel solutions. Problem solving from a creative perspective involves offering new perspectives to solve a well-known or familiar problem or identifying an unprecedented situation, which demands solutions different from those considered as 'textbook solutions' (e.g. Kaufmann, 2003).

Creativity as an innate human capacity also emerged from the teachers' responses. This conception is particularly important since if teachers hold it, they are likely to consider that creativity may be improved in the same way as other human capacities (e.g. Guilford, 1975). Mexican teachers participating in the initial study related creativity to a way of thinking. This conception is important since creativity involves a set of thinking skills that can be learned and developed. Creative teaching would involve fostering the ability to think creatively (Guilford, 1975; Runco, 1995). Teachers' conception of creativity as an innate human capacity and as linked to ways of thinking is important from an educational perspective. Both conceptions suggest that creativity can be developed and improved. Skills relating to the creative process can be stimulated and learned as other skills. These conceptions, congruent with previous research, indicate that teachers need to understand and learn which processes are required to "think creatively" and how these can be fostered through the teaching-learning process (e.g. Guilford, 1975; Jackson and Sinclair, 2006).

The category with the least responses linked creativity to improvement. This conception tends to be less frequent in the implicit theories of lay people since creativity is strongly associated with novelty and radical transformation. Some researchers have analysed different styles of being creative (Kirton, 1994), for instance, an innovator style, more oriented towards changing paradigms or going beyond the boundaries of a known situation, and an adaptor style which is more oriented towards improvement, refining details of a solution. The conception of creativity related to improvement is linked to the adaptor style. This can involve incremental change as opposed to transformational change.

Teachers' conceptions of creativity as linked to originality and newness may challenge the cultural values in higher education, which demand rigorous procedures for knowledge acquisition, standardization and accountability (Tosey, 2006). However, it is important to understand that constraints and boundaries also have a role in the creative process (Tosey, 2006). For Kirton (2003) this represents the paradox of structure; too much structure

inhibits creative expression and development, while the total absence of structure is also a constraint. Overall, Mexican teachers' conceptions of creativity are similar to those which have been established in the existing literature.

8.2.2 Mexican students' and teachers' conceptions related to creativity: discussion of similarities.

To support the discussion of similarities and differences between teachers' and students' perceptions of creativity a series of tables are presented. These set out the categories derived from the students' responses alongside those which relate to those from the teachers. Some categories emerged in the students' interviews which did not emerge from the teachers' responses and vice versa. Where this is the case, the cells in the table have been left blank.

Mexican students' and teachers' implicit theories of creativity which received the highest level of responses related to novelty, newness and originality. Table 8.1 sets out the categories that were similar and emerged from students' and teachers' responses in relation to their conceptions of creativity.

Table 8.1 Mexican students' and teachers' conceptions related to creativity: similarities

Categories from Students' answers	Categories from Teachers' answers
Novelty-originality	Innovative solutions to problems
Human capability	Innate human capacity
Improvement	Improvement

Teachers also included creativity as it related to innovative solutions to problem. Teachers and students also shared a conception of creativity as a human capacity. Creativity as the possibility to improve things also emerged from the responses. Historically, creativity was only perceived as relating to transformative change. Now it appears that there is increased acceptance that creativity also includes improving something that already exists. This conception increases the opportunities that students and teachers have for expressing their creativity.

Students' and teachers' conceptions of creativity contradicted the first part of proposition one, included in Chapter 4, this is, that Mexican students' and teachers' conceptions of creativity could include some of the myths of creativity mentioned by Weisberg (1986). On the contrary, they related positively to the second part of this proposition one of the proposition, that it could be possible that Mexican Higher education students and teachers might have a more highly developed notion of creativity and awareness of what inhibits or facilitates creativity. Overall, students' and teachers' implicit theories of creativity indicated that they believed that creativity was a human capacity that could be developed.

8.2.3 Mexican students' and teachers' conceptions related to creativity: discussion of differences

Two categories emerged from the students' responses, which did not emerge from the teachers' responses. These were creativity as idea generation through imagination and as the expression or communication of ideas or emotions. Students linked creativity with the use of imagination as the capacity to visualize or think about an idea or a solution before putting it into practice, what is sometimes known as possibility thinking (Craft, 2002; Craft, 2012). Students also viewed creativity as the expression of ideas or emotions a notion which might be linked to a common perception of the relationship between creativity and art. Students seemed to give more importance to the role of imagination in the creative process, as well as to creativity being a means of expression than teachers. Table 8.2 sets out the emerging categories that differed between students and teachers.

Table 8.2 Mexican students' and teachers' conceptions related to creativity: differences

Students' Categories	Teachers' Categories
Idea generation through imagination	(no equivalent category)
Expression or communication of ideas or emotions	(no equivalent category)
(no equivalent category)	As a life style
(no equivalent category)	A way of thinking

Two categories emerged from the teachers' responses with no equivalents from the students: creativity as a life style and as a way of thinking. This may be because of the maturity of the teachers in comparison with the students and their greater life experiences which may have enabled them to realize these in their everyday lives. These conceptions may be grounded in teachers' understanding of creativity in terms of its complexity, as including affective and intellectual or cognitive aspects. Students may not share this perspective, since they gave a more important role to creativity as a means of self-expression rather than acknowledging it as a way of thinking.

8.3 Discussion of perceptions of the facilitators of creativity

8.3.1 Discussion of Mexican students' perceptions of the facilitators of creativity

Students were asked about their conceptions of what facilitated creativity in the classroom. Nine categories emerged: motivation; dynamism; teachers' positive attitudes; teaching and learning resources; positive climate; teaching abilities; novelty; participation; and challenges. The categories with the highest percentage of responses were: motivation (14.8%); dynamism (14.8%); teachers' positive attitudes (13%); teaching and learning

resources (13%); and positive climate (11.1%). The categories with lower percentages were: teaching abilities (9.3%); novelty (9.3%); participation (7.4%) and challenges (7.4%).

The student references to motivation suggested that they viewed it as a complex psychological phenomenon involving several aspects such as interest in a subject ('with enthusiasm for the subject'), feeling that one is capable ('being able'), and the influence of others on personal motivation ('the mood that teacher shows'). In the context of the classroom an influential element promoting students' creativity is the teachers' ability to motivate them. Teachers may use a variety of strategies to promote students' motivation, such as using problem based learning or presenting challenges, which require students to go beyond simply memorizing what is required to be learned.

In relation to teachers' attitudes, two students mentioned the importance of the teacher being interested in their learning. Despite the relatively low number of responses in this category, it is mentioned here since teachers' enthusiasm for teaching and commitment with their role can stimulate students' motivation, which has already been mentioned as enhancing students' creativity.

The category of teaching and learning resources, involved not only the existence of teaching resources and materials in the classroom but whether they were perceived by the students as attractive and if they were varied in order to stimulate students' interest and to facilitate their learning. The students indicated that it was not sufficient for resources to be available but that staff needed to know how to use them in a novel and useful manner in order to stimulate creativity.

The category of 'positive climate' has been studied by several researchers (e.g. Torrance, 1965; Isaksen et al. 1999; Raina, 1989), and is generally defined as a complex of variables and conditions which influence a persons' creativity in a social context. The responses given by the Mexican students aligned with the findings from explicit theories research underline the need for teachers to develop the skills and attitudes required to purposefully generate such conditions in the classroom.

The category related to teaching abilities that emerged from students' responses, has also been studied by several researchers (e.g. Rinkevich, 2011; Wisdom, 2006), and is generally

defined as a complex of variables and conditions which influence a persons' creativity in a social context.

One of the categories that emerged as being a facilitator of creativity was novelty. This category may be related to the categories of dynamism and motivation. This perception of students in relation to the effect of novelty in the classroom is consistent with students' conceptions of creativity discussed earlier in this chapter.

What facilitates creativity seemed to be conceptualized by the students as a complex phenomenon where several factors interact. Motivation was related to students' and teachers' motivation and to the teachers' ability to stimulate students' motivation and involvement with the learning activities. The importance of motivation has been raised by much previous research (Amabile, 1985; Craft, 2000; Csíkszentmihályi, 1988). Motivation (intrinsic and extrinsic) influences the creative process. In the classroom, interest in the subject being taught is an important element for the student to become involved, as is the intrinsic motivation derived from the satisfaction of learning itself. External factors including teachers' attitudes, teachers' abilities, colleagues' and teachers' participation, and the resources available, may also influence students' motivation.

Some of the students mentioned the importance of openness and the teachers' ability to actively listen and support new ideas. These attributes are embedded within a larger category identified as 'positive attitudes'. As referred to in the literature review, these attitudes may contribute to generating an appropriate climate for creativity. As with other categories, classroom climate is related to several factors (internal or external) that influence the persons' perceptions. Isaksen and Lauer (1999) defined climate as the behaviours, feelings and attitudes relating to the everyday life of the organization or of a human group. They underline the influence of factors such as resources, values, and the structure of the organization. The category of climate as it emerged from the students' responses is closely related to other categories, such as dynamism, teaching and learning resources, participation and challenges.

Teachers' skills and attitudes may be related to the ability to create an environment that students perceive as positive for the expression of their creativity. In the studies of climate mentioned above and developed by other researchers such as Ekvall (1996), Amabile, and Gryskiewicz (1989) dynamism is included as a dimension of climate.

In respect to the category of challenge, as described by Piaget (1964), challenge may relate to the experience of a cognitive disequilibrium, which has an effect on students' motivation to develop certain action in order to solve a problem or to find a new state of cognitive equilibrium through learning or understanding. Challenge may also be related to the kind of teaching strategies used to stimulate students' interest, curiosity and reflexive and creative thinking processes, for example, the kind of questions or problems presented to the students.

Overall, it can be concluded from the categories that emerged in relation to what facilitates students' creativity in the classroom, that students give most importance to a highly motivating and dynamic class within a climate permeated by positive teachers' attitudes and with the support of attractive and useful resources to facilitate learning. However, categories that emerged with a smaller percentage of responses were also perceived as influential for students' creativity, such as the possibility to actively participate, the challenges posed by the teacher through their teaching and introducing novelty in the day to day experiences of the classroom environment.

8.3.2 Discussion of Mexican teachers' perceptions of facilitators of creativity

Five categories emerged from Mexican teachers' responses to the question relating to their perception of what facilitates their creativity in the classroom environment. The categories were, positive climate; teachers' motivation and enthusiasm for teaching; students' motivation and participation; varied and new activities; and teachers' self-confidence and knowledge.

The two categories mentioned with the greatest frequency were positive climate (25%) and teachers' motivation and enthusiasm for teaching (25%). Teachers' responses were consistent with the proposition stated in Chapter 4. It mentions that teachers may have a more highly developed notion of creativity and awareness of what inhibits or facilitates creativity, and are congruent with the research focusing on the climate needed for creativity identifying the conditions that enhance creativity such as the studies of Ekvall (1996), Isaksen and Lauer (1998) and Dabdoub (2003a).

The high percentage of responses in the category of ‘teachers’ motivation and enthusiasm for teaching’ in comparison to other categories reflects the importance given by teachers to their interest and passion in relation to their work which they feel is an important element in expressing their creativity (Shaw & Runco, 1994; Csíkszentmihályi, 1996).

The category with the next greatest frequency identified by the teachers was students’ motivation and participation (24%). It seems that the interrelation between students’ and teachers’ motivation is an important ingredient for creativity in the classroom. A positive climate and teachers’ motivation and enthusiasm influence the climate in the classroom. In turn, students’ participation and motivation influence the perception of climate since they generate conditions for positive and productive interactions in the classroom environment. This reciprocal effect supports research which takes into account the social context and its influence on creativity (Jeffrey & Craft, 2001).

Teachers’ self-confidence (6%) and teachers’ knowledge domain and experience (8%), may also affect climate and the way he or she relates and communicates with students, although these categories emerged less frequently in the responses. This emerging category supports the research of Beghetto, (2006b) who argues that, “Creative expression, like other forms of behaviour, seems to be influenced by self-judgements of one’s ability to generate novel and useful outcomes” (Beghetto, 2006b, p.447).

8.3.3 Mexican students’ and teachers’ perceptions of the facilitators of creativity in the classroom: discussion of similarities.

Mexican students and teachers shared some perceptions of what might facilitate their creativity in the classroom, such as motivation, dynamism, the presence of novelty and teachers’ attitudes. Students and teachers shared the same perceptions of the importance and role of motivation and participation as positive conditions for creativity. There may be a reciprocal effect of motivation, since students are affected by the motivation, enthusiasm and passion a teacher may demonstrate. Teachers, in turn, are also influenced by their perception of students’ motivation, participation and engagement in learning activities. Mexican students’ perceptions of the level of dynamism and novelty in classroom were reported as facilitating their creativity. This perception relates to teachers’

perception of the importance and effect of using a variety of activities. The introduction of novelty in the classroom, for example, through the use of new teaching strategies, may require students to change their expectations of teachers' behaviours, and would also involve teachers changing their behaviours moving away from those that have become automated. This is not always easy to do (Clark, 2008). However, in order to promote students' motivation and creativity, teachers need to be positive about trying new ways of teaching, different ways of engaging students in the learning experience while creating the conditions for maintaining a safe, attractive and enjoyable learning environment for the students.

Original and new ideas are not always easily recognized or accepted, so it is important that the person who is introducing something new trusts in herself and has the courage to face criticism (Damasio, 2001). Mexican teachers participating in the study were aware of the importance of self-confidence and subject knowledge expertise, their sense of self-efficacy and willingness to experiment with new approaches in relation to developing their teaching to support creativity.

Both, students and teachers, mentioned the importance of classroom climate in facilitating creativity. Climate involves many interrelated aspects such as attitudes, resources, challenges and novelty. In this sense, climate can be understood as a macro-category.

Table 8.3 sets out the categories that were similar in the students' and teachers' responses. The three most relevant facilitators for students were motivation (14.8%), dynamism (14.8%), and teachers' positive attitudes (13%). While for teachers the most relevant facilitators were their own motivation and enthusiasm for teaching (25%), a positive climate (25%) and students' motivation and participation (24%).

Table 8.3 Mexican students' and teachers' conceptions related to facilitators for creativity: similarities

Students' Categories	Teachers' Categories
Motivation	Teachers' motivation enthusiasm for teaching
Dynamism Novelty	Varied and new activities
Teachers' positive attitudes	Teachers' self-confidence and knowledge
Positive climate	Positive climate
Participation	Students' motivation and participation

8.3.4 Mexican students' and teachers' perceptions of facilitators of creativity in the classroom: discussion of differences

Three categories emerged from the students' responses in relation to their perception of what facilitated their creativity in the classroom, which teachers didn't mentioned, these were, teaching and learning resources, teaching abilities and challenges. It seems that for students it is important to have access to adequate resources to facilitate their learning and stimulate their creativity. However, having resources is not on its own sufficient as they also identified the need for the teacher to have the necessary skills to facilitate learning and use those resources to introduce novelty and to challenge students. Table 8.4 sets out the categories that emerged from the students' responses.

Table 8.4 Mexican students' and teachers' conceptions related to facilitators for Creativity: differences

Students' Categories	Teachers' Categories
Teaching and learning resources	(no equivalent category)
Teaching abilities	(no equivalent category)
Challenges	(no equivalent category)

The absence of the categories that emerged from Mexican students' responses in the responses of the Mexican teachers suggests that teachers attach importance to other areas, which they perceive may be more relevant, or have more impact on their daily teaching practice. Creativity, creative learning and creative teaching are complex phenomena, which involve several interconnected variables. Inadequate teaching or learning resources and lack of challenge from the student perspective may be important as they influence students' involvement in the learning process. Creative teaching, involves the use of appropriate materials, and the creation of a learning environment that encourages students to see the essence as well as the detail of the subject. It involves as well enhancing students' abilities to formulate and to solve problems, to see the connectedness between areas, amongst other aspects. Creative teaching implies the use of learning methods that address important affective dimensions of creativity (Reid & Petocz, 2004). For Kiely (2004), creative teaching involves teaching skills, which are related to how the teacher design, organizes, plans, conducts and evaluates the teaching experience. This includes teacher practices such as questioning, stimulating imagination, and presenting challenges (Cropley, 2001; Isaksen, 1999).

Jaskyte Taylor and Smariga (2009), from the University of Georgia, in a study undertaken with 48 faculty and 52 students at a southeastern university, were asked to freely list the characteristics of innovative teaching. They found that some items were ranked differently by students and teachers. One such item referred to using variety of teaching methods and materials. Although the staff indicated that this was an integral part of innovative teaching,

students did not rank it as highly as the teachers. The differences between the students participating in this study and Mexican students may be due to the differing cultural and economic contexts. In Mexico, in public education, there are limited resources for teaching and learning. This may influence Mexican students' perceptions leading them to believe that the accessibility of adequate teaching and learning resources is crucial for facilitating creativity in the classroom.

In relation to the role of the perception of challenge, as a facilitator for creativity, it is interesting to consider a study undertaken by a group of teachers and educational developers, within the Learning and Teaching Support Network of the UK (LTSN), who conducted a knowledge transfer experiment aimed at developing the creative capacity of 15 academics in a residential workshop (Baillie, 2006). The objective was to help academics to become aware of how employing specific techniques could help their colleagues and students develop their creative potential. Amongst the key lessons learned from this experience was the role of internal or external barriers. One internal barrier was holding back and avoiding taking risks. This inhibits creativity as do fear and lack of self-confidence. In this sense, creative teaching involves developing an optimal tension zone and presenting challenges to the students in a way that reduces fear of taking risks as well as gaining self-confidence to embrace new possibilities in the future.

In summary, findings from the present research are relevant for creative teaching development programmes. Teachers need to take into account the areas that students have identified as facilitators for their creativity and include them as part of their teaching practices. They need to use of a variety of teaching and learning resources, demonstrate creativity in their teaching and include challenging activities, which support students in taking risks and exploring new experiences within a psychologically safe environment.

8.4 Discussion of perceptions of obstacles to creativity

8.4.1 Discussion of Mexican students' perceptions of obstacles to their creativity in the classroom.

Most of the responses generated by the students relating to obstacles to creativity in the classroom were opposite to those given in relation to what they perceived promoted creativity. They emphasized the importance of particular factors as being critical to establishing favourable conditions for the development of creativity in the classroom especially classroom climate and the presence of rigidity. The categories emerging from the students' responses were monotony; negative climate; rigid mindset; apathy and lack of motivation; and ineffective teaching strategies. Monotony was the category with the higher percentage of responses (28%) followed by negative climate (23%) and rigid mindset (20%) with lower percentages for apathy and lack of motivation (15%) and ineffective teaching strategies (15%).

Relating to monotony, it appears that when students refer to monotony as an obstacle for their involvement and for their creativity, it is because they expect, and feel that they require more variety and dynamism in the teaching learning process. Several studies have underlined the role of introducing novelty and a variety of teaching strategies, activities and materials in order to enhance creativity (see Copley, 1997).

Lack of motivation and apathy may be seen as cause or effect, since the use of ineffective teaching strategies, without stimulating challenges can create monotony for the students leading to lack of interest in the subject or course, and low involvement that is reflected in a lack of participation. This supports previous research, for instance, Jeffrey & Craft (2001).

A rigid mindset as expressed by the students as a factor that hinders creativity, includes their perception of teachers' attitudes such as authoritarianism, and lack of empathy. The persistent use of the same teaching methods may not only be a sign of a rigid mindset but of a lack of pedagogical knowledge and ineffective teaching strategies. Creativity involves divergent thinking and novelty (Runco, 2003), so it is not surprising that students identify a rigid mindset as a factor that can hinder their creativity. Rigidity in this context may be related to the teacher following the same teaching practices or requiring the students to carry out repetitive procedures which they may perceive as useless or boring. Particular strategies and procedures

may not in themselves be obstacles to creativity as the teacher may have pedagogical reasons for implementing them, possibly because students need to master a technique. However, if the teacher does not use appropriate teaching strategies to motivate the students to use these procedures they may experience them as obstacles to their creativity or interpret their use as the teacher's rigidity. Kirton (2003) emphasizes the paradox of teaching structures where too much structure hinders creativity but a lack of a minimum structure or boundaries can also be an obstacle for creativity.

Classroom climate has frequently been mentioned as key to facilitating creativity. However, each individual may perceive the prevailing conditions in the classroom differently, although studies undertaken to understand developing optimal climates for creativity (e.g. Ekvall, 1996; Isaksen & Lauer, 1998) have identified general dimensions such as trust, freedom to decide, and a playful environment.

The categories derived from the Mexican students' implicit theories in relation to the obstacles for developing their creativity have strong relationships with each other. Monotony may result in apathy and in a lack of motivation to engage with classroom activities. Teachers' rigid mindset and attitudes may influence students' perceptions of the atmosphere in the classroom, while ineffective teaching strategies can affect students' motivation.

8.4.2 Discussion of Mexican teachers' perceptions of obstacles to their creativity in the classroom

As set out in Chapter 7, six categories emerged from Mexican teachers' responses as to what they perceived as obstacles to their creativity in the classroom environment. The categories were lack of time and lack of resources; rigid mindset; negative climate; stress; personal obstacles; and apathy.

The responses coded into the category lack of time and resources focused on external conditions which teachers perceived as necessary to support their creativity. This category emerged with the highest percentage of responses (21%) indicating the importance that teachers attached to it. These external factors depended on the institutions' facilities and

resources. Without these, the teachers perceived that it would be difficult to express their creativity through teaching. These findings support those of Baillie (2006) and Fryer (1989).

The category of negative climate (17%) focused on the influence that other persons' behaviours and attitudes in the classroom environment have on teachers' moods and the opportunities they have to express and develop their creativity. Ekvall (1996) and Isaksen and Lauer (1998), for instance, include in the definition of the climate for creativity other factors such as freedom, the possibility of taking risks, and the provision of resources. Many of these factors have emerged in the current study.

Teachers emphasized inner conditions related to stress, which inhibited creativity, such as fear, tension, and tiredness. These conditions may be consequences of external conditions such as negative climate, rigidity and lack of time or lack of resources. Teachers identified 'personal obstacles', for instance, apathy in the classroom environment and lack of energy, interest or motivation from teachers or students.

The categories identified by teachers' relating to the obstacles to creativity can be represented as organized in a continuum where external conditions (not under teachers' control) are at one extreme and internal conditions (more related to teachers' mood, personality or affective conditions) are at the other extreme. Teachers, perhaps indicating that they feel helpless within the Mexican educational environment to promote creativity, mentioned external conditions more frequently. This is supported by their responses indicating their stress. Baillie (2006) also argues that one of the important lessons learned about constraints to creativity from a study undertaken in the context of Learning and Teaching Support Network of the UK was in relation to the role of internal conditions, such as fear or lack of self-confidence, and external conditions, such as pressure and lack of time.

8.4.3 Mexican students' and teachers' perceptions of obstacles to their creativity in the classroom: discussion of similarities

Students and teachers shared some perceptions of the possible constraints for their creativity in the classroom such as a negative climate, rigid mindset and apathy. A negative climate involved aspects such as a high level of conflict, lack of motivation or negative

attitudes from teachers or students. Both teachers and students mentioned this as having a negative influence on their creativity. Rigid mindset related to the presence of rigid procedures or norms, which teachers and students perceived as having a constraining or limiting effect on their creativity. Table 8.5 sets out the similar categories that emerged from students' and teachers' responses.

Table 8.5 Mexican students' and teachers' conceptions related to obstacles to creativity: similarities

Students' Categories	Teachers' Categories
Negative climate	Negative climate
Rigid mindset	Rigid mindset
Apathy and lack of motivation	Apathy

Conditions for creativity have been widely studied and in general categorized under the label of climate for creativity (Ekvall, 1996; Isaksen & Lauer, 1998). In such a climate persons perceive trust, open communication, support for ideas, time for ideation, the possibility of taking risks and trying new things, the absence of criticism, and norms which recognize innovation and tolerate mistakes (Amabile & Grysiewicz, 1989). The obstacles mentioned by Mexican students and teachers identify conditions that do not support a "climate for creativity". However, Amabile (1988) considers that not all forms of pressure have a negative influence on creativity. One form of pressure may be an adequate level of challenge that could support creativity. However, pressure in the form of excessive workload, stress, rigid mindset and rigid norms may negatively affect. However, each individual may react differently in response to constraining conditions depending on personal characteristics as well as previous experiences (Runco, 2007; Bandura, 1997).

8.4.4 Mexican students' and teachers' perceptions of obstacles for their creativity in the classroom: discussion of differences

Two categories emerged from students' responses, which did not have an equivalent response from teachers. These categories were monotony and ineffective teaching strategies. They also perceived as a constraint teachers not having adequate teaching skills. Table 8.6 sets out the categories that emerged only from students' or teachers' responses.

Table 8.6 Students' and teachers' conceptions related to obstacles to creativity: differences

Students' Categories	Teachers' Categories
Monotony	(no equivalent category)
Ineffective teaching strategies	(no equivalent category)
(no equivalent category)	Lack of time and resources
(no equivalent category)	Stress
(no equivalent category)	Personal obstacles

From the teachers' responses three categories emerged which did not have equivalent categories in the students' responses. It seems that for teachers not having adequate resources including the lack of time is a constraint for their creativity. They also mentioned stress and personal obstacles such as fear and lack of self-confidence. These factors reflect the findings from research focused on the personality traits deemed important for creativity such as a tendency to risk-taking and being self-efficacious and having self-confidence (Runco, 2007; Bandura, 1997).

8.5 Discussion of conceptions of a creative teacher

8.5.1 Discussion of Mexican students' conceptions of a creative teacher

Nine categories emerged from Mexican students' responses to the question related to the characteristics of a creative teacher: teacher as an innovator; being enthusiastic and having

effective teaching strategies; showing dynamism; having positive attitudes; using a variety of methods and resources; possessing wide and current knowledge; being stimulating; having good communication skills; and enjoying teaching. The three categories with the highest percentages of responses were the teacher as innovator (18%), enthusiastic and having effective teaching strategies (13%) and dynamism (12%).

Such categories are congruent with proposition 2 made in Chapter 4, i.e. that the characteristics of a creative teacher are related to the general traits of a creative person and to those of a creative teacher, as set out by explicit theories such as being an innovator, having positive attitudes and being inclined to use a variety of methods and resources (Stein, 1984; Jackson and Messick, 1965; Runco, 2007; Cropley, 2001; Urban, 1996; Root-Bernstein & Root-Bernstein, 2000; Runco, 2003; Craft, 2006; Fryer & Collings, 1991; Fryer, 1996; Bramwell et al., 2011).

The Mexican students' views of a creative teacher as an innovator were congruent with Torrance's conceptualization (1979), the emphasis being on motives such as curiosity, willingness to take risks, and persistence. Being an innovator involves being open to taking risks and trying out new approaches or experiences. The category referring to the use of a variety of methods and resources relates as well to this disposition since it involves applying divergent thinking to the introduction of variety and novelty in the use of teaching methods and resources. Taking risks is a characteristic, which often mentioned in studies of the personality characteristics of highly creative persons (Sternberg & Lubart, 1996). To innovate, a person needs to take risks to go beyond the boundaries of a familiar situation (Torrance, 1979).

Three categories with similar levels of responses were, having a positive attitude (11%); uses a variety of methods and resources (11%) and stimulating (11%). Students expect that a creative teacher is able to motivate them and persuade them to participate and be involved in the learning and creative processes in the classroom. These characteristics are congruent with explicit theories such as the work of Hickey (1999) and Esquivel (1995). A teacher can be considered as a leader of his/her students.

The remaining three categories received fewer responses: wide and current knowledge (9%), good communication skills (8%), and enjoys teaching (7%). Several researchers have highlighted the importance of the level of knowledge in a field (Csíkszentmihályi, 1988), a

willingness to grow and develop (Sternberg & Lubart, 1996) and curiosity and wide interests (Runco, 2007) as important elements of a creative personality. The characteristic of a creative teacher as possessing wide and current knowledge as mentioned by the students, may have an impact on students' interest and motivation to attend a class and be involved in the proposed activities.

Mexican students reported as a characteristic of a creative teacher that s/he should enjoy his/her work. This relates to motivation, in particular intrinsic motivation. This aspect of creativity has been evidenced as an important element of creativity by a number of researchers (e.g. Sternberg and Lubart, 1995a; Amabile, 1985; Csíkszentmihályi 1996). Mexican students perceived that a creative teacher should be enthusiastic about his/her work, as well as being able to 'give attractive and enjoyable classes'. If a teacher enjoys his or her work and enjoys teaching, they are more likely to design classes in such a way as to be enjoyable for students, although this may not always be the case. Giving enjoyable and attractive classes involves having the ability to use a variety of resources and strategies. It also related to teachers' capacity to stimulate students' motivation.

8.5.2 Discussion of Mexican teachers' conceptions of a creative teacher.

As stated in Chapter 7, eleven categories emerged from teachers' responses to the question relating to the characteristics of a creative teacher: openness to novelty; commitment; enthusiasm; innovation; interest in students' learning; positive attitudes; being an active listener; positive self-esteem; motivator; having imagination; and promoting creative thinking (6%). The sections below provide examples of teachers' responses coded into each category.

The categories with the highest percentages of responses were the teacher as open to novelty (17%), commitment (13.1%) and enthusiasm (13.1%). These reflect the findings of much earlier research, for instance, commitment with self-improvement and developing deep knowledge (Albert, 1990; Csíkszentmihályi, 1988; Sternberg, 1988). The importance of a certain level of domain knowledge in a disciplinary field, has been raised by some authors (Csíkszentmihályi, 1988), as desirable in creative persons. In addition, the disposition towards continuous improvement and growth, related to strong self-motivation

and self-determination to accomplish goals (Perkins, 1992). The category of enthusiasm emerged from responses such as: 'loves his work'; 'enjoys teaching'. This reveals the pleasure and enthusiasm that teachers may experience and express for their teaching and reflects teachers' intrinsic motivation for their work, which may lead to them creating positive environmental conditions to facilitate students' creativity (Sternberg, 1988).

It is important that teachers' believed that a creative teacher is an innovator, although it is difficult to know from their responses to what extent they were willing to go beyond the boundaries of their traditional and familiar teaching strategies to become innovators.

The role of attitudes and their effects on enhancing creativity have already been mentioned in previous sections in relation to teachers' conceptions of what facilitates creativity. Attitudes mentioned, as being exhibited by a creative teacher, were being enthusiastic, interested in students' learning, and being an active listener. These attitudes are well established in previous research, e.g. Fryer & Collings (1991) and Cropley (2001). Attitudes have an influence on the creation of a positive environment for creativity (e.g. Isaksen, 1985). Teachers' attitudes provide the basis for the development of the conditions required to facilitate students' creativity, such as the experience of psychological safety which is associated with three processes: the acceptance of the individual, a lack of external evaluation, and empathetic understanding (Starko, 2005). The findings from the Mexican teachers' responses reflect the findings from this earlier research also that relating to motivation (e.g. Amabile, 1985). A further characteristic raised was having imagination (6%). The role and relationship of imagination with creativity has been extensively studied (Sternberg, 1988; Damasio, 2001), the current findings supporting this work.

8.5.3 Mexican students' and teachers' conceptions of a creative teacher: discussion of similarities.

The students' responses relating to the characteristics of a creative teacher stressed three important aspects: innovator, having a positive attitude, and providing attractive and enjoyable classes. For Mexican teachers, the three categories, which had the highest percentage of responses, were having positive attitudes, being interested in students'

learning, and being stimulating. Six categories from the students' and teachers' responses showed similarities. These were teacher as an innovator, with positive attitudes, who was stimulating, who possesses wide and current knowledge; has good communication skills and is an active listener; and who enjoys teaching and is enthusiastic. Table 8.7 below, sets out the categories that were similar.

For Mexican students and teachers a creative teacher was identified as having a positive set of attitudes. From the students' perspective, this includes being respectful, empathetic, flexible, and sensitive. The category "positive attitudes" based on teachers' responses included being humble, flexible, respectful and demonstrating openness. Openness referred to being open to change, to criticism and, to new ideas. This perception reflects the findings from previous research on the traits related to a creative personality (Barron, 1961; MacKinnon, 1975). Students and teachers agreed that 'positive attitudes' were important. These underpinned the ability of the teacher to promote a classroom climate perceived as positive with no emotional or psychological threats.

Although students and teachers included the characteristic of being an innovator as part of their conception of a creative teacher, a higher percentage of students referred to this than other characteristics. For students the category of innovator emerged with a highest frequency of responses (18%) as opposed to teachers where only 9.5% referred to it. Teachers gave more importance to openness to novelty (17%), to commitment (13%) and being enthusiastic (13.1%). For students it seems it is more important that a teacher is an innovator and able to stimulate students' motivation. This is consistent with students' responses in relation to their conception of creativity, which they linked with novelty and originality. Teachers also mentioned this trait as characteristic of a creative teacher (innovator, 9.5%).

Table 8.7 Mexican students' and teachers' conceptions of a creative teacher: similarities

Students' Categories	Teachers' Categories
Innovator	Innovator
Positive attitudes	Positive attitudes
Stimulating	Motivator
Wide and current knowledge	Committed
Good communication skills	Active listener
Enjoys teaching	Enthusiastic

The capacity of a teacher to motivate students was a recurring theme emerging from student and teacher responses. However, the percentages of their responses differed. In the case of teachers 6%, and in the case of students 11%.

8.5.4 Mexican students' and teachers' conceptions of a creative teacher: discussion of differences.

Three categories emerged from the students' responses in relation to the characteristics of a creative teacher not mentioned by the teachers. Mexican students identified a creative teacher as someone who gave attractive and enjoyable classes, who was dynamic and used a variety of methods and resources.

Three categories from the teachers emerged which were not mentioned by the students. Mexican teachers considered that a creative teacher promoted students' creative thinking, was interested in their learning and was imaginative. Table 8.8 sets out categories that emerged only from students' or teachers' responses.

Table 8.8 Mexican students' and teachers' conceptions of a creative teacher: differences

Students' Categories	Teachers' Categories
Enthusiastic and effective teaching	(no equivalent category)
Dynamism	(no equivalent category)
Uses variety of methods and resources	(no equivalent category)
(no equivalent category)	Promotes students' creative thinking
(no equivalent category)	Interested for students' learning
(no equivalent category)	Imaginative

From these differences, it is possible to identify what seems to be more relevant for students and teachers in relation to what they expect from a creative teacher. Students expect that a creative teacher give enjoyable and attractive classes. This is likely to influence students' motivation as well as having an impact in creating a positive climate for creativity in the classroom. For the participating teachers, a creative teacher should be imaginative, interested in the students' learning and most of all would intentionally promote students' creative thinking. The categories that emerged from Mexican students' answers, such as dynamism, use of variety of methods and resources and enthusiasm, interest in being permanently up-to-date amongst others, are congruent with contributions of previous research (Stein, 1984; Runco, 2007; Sternberg, 1988).

8.6 Summary and conclusions

Mexican students and teachers shared a conception of creativity as a human capacity linked to newness, originality, problem solving and improving things. They differed in respect to the importance given to the role of imagination as well as of creativity as a means for the expression of emotions and communication of ideas. Teachers understood creativity as a life style or integral part of existence and as a way of thinking. The students did not share this conception.

Conclusions can be drawn from students' conceptions of what facilitated or was an obstacle to their creativity, as well as from their conception of a creative teacher, in relation to what they would expect from a classroom environment one that will enable them to develop their creative potential. Students expected from a positive classroom environment, one where they may be engaged; with adequate resources for teaching and learning, and where they would perceived high degrees of motivation, dynamism, novelty, challenge, participation and involvement. They expected that teachers would show high levels of domain knowledge and a disposition to be continuously up to date. Mexican students participating in the study, perceived as important teachers' positive attitudes, such as being empathetic, respectful and enthusiastic. They expected that teachers would have good communication skills and be active listeners. They expected that teachers would demonstrate effective teaching skills and they would be able to give dynamic and enjoyable classes. Students' conceptions of a creative teacher included them being innovators. This expectation indicates that they expect creative teachers to be role models, applying their creativity in the way that they teach, by using various and original teaching strategies to stimulate students' creative thinking skills. Table 8.9 sets out a synthesis of the categories that emerged from students' and teachers' responses that were similar.

Table 8.9 Synthesis of similarities between categories from Mexican students' and teachers' answers

Conception of creativity		Factors facilitating creativity		Obstacles to creativity		Conception of creative teacher	
Students' categories	Teachers' Categories	Students' categories	Teachers' Categories	Students' categories	Teachers' Categories	Students' categories	Teachers' Categories
Novelty- originality	Innovative solutions to problems	Motivation	Teachers' motivation enthusiasm for teaching	Negative climate	Negative climate	Innovator	Innovator
Human capability	An innate human capacity	Dynamism Novelty	Varied and new activities	Rigid mindset	Rigid mindset	Positive attitudes	Positive attitudes
Improvement	Improvement	Teachers' positive attitudes	Teachers' self- confidence and knowledge	Apathy and lack of motivation	Apathy	Stimulating	Motivates students' Promotes students' creative thinking
		Positive climate	Positive climate			Wide and current knowledge	Commitment
		Participation	Students' motivation and participation			Good communication skills	Active listener
						Enjoys teaching	Enthusiasm

Where teachers' and students' perceptions were different it is important to underline what students considered as important or influential for their creativity. Mexican students

included as one of the facilitators for their creativity in the classroom perceiving a certain degree of challenge. Challenge plays an important role in learning and creativity, so it is important that teachers recognize that this can act as an antidote to apathy, lack of motivation and engagement, all of which were mentioned by students as obstacles to their creativity. In order to challenge students, teachers need to identify the prior learning levels of the students and their prior experiences in order to generate situations that require students to go beyond their comfort zone. This is a necessary skill for a creative teacher. Motivation and curiosity are boosted by challenge which requires students to stretch themselves, to progress beyond what they already know, to look for new ideas, solutions or approaches. Teachers need to include strategies that may generate curiosity and the drive to look for answers or solutions.

Mexican teachers identified as constraints for creativity in the classroom the lack of resources including lack of time, stress, and personal obstacles such as fear and lack of self-confidence. These categories are consistent with the importance teachers gave to being knowledgeable and self-confident as facilitating their creativity. Teachers also included as characteristics of creative teachers interest in students' learning and imagination. Table 8.10 sets out a synthesis of differences in the categories that emerged from students' and teachers' responses.

Table 8.10 Synthesis of differences between categories from Mexican students' and teachers' answers

Conception of creativity		Factors facilitating creativity		Obstacles to creativity		Conception of creative teacher	
Students' categories	Teachers' Categories	Students' categories	Teachers' Categories	Students' categories	Teachers' Categories	Students' categories	Teachers' Categories
Idea generation through imagination	No equivalent response	Teaching and learning resources	No equivalent response	Monotony	No equivalent response	Enthusiastic and effective teaching	No equivalent response
Expression or communication of ideas or emotions	No equivalent response	Teaching abilities	No equivalent response	Ineffective teaching strategies	No equivalent response	Dynamism	No equivalent response
No equivalent response	As a life style, as integral part of existence	Challenges	No equivalent response	No equivalent response	Lack of time and resources	Uses variety of methods and resources	No equivalent response
No equivalent response	A way of thinking			No equivalent response	Stress	No equivalent response	Interested for students learning
				No equivalent response	Personal obstacles	No equivalent response	Promotes students' creative thinking
						No equivalent response	Imaginative

The conceptions of creativity held by the participants are important as they reflect the needs of students in enhancing their creativity. Interventions looking to promote teachers' capacities to stimulate students' creativity need to take into account these perceptions.

Teachers' and students' responses provided a frame of reference derived from their implicit theories of what is required in a classroom environment to enhance creativity. This information can be compared to the conceptions, attributes and characteristics offered by explicit theories (e.g. Cropley, 2001; Root-Bernstein and Root-Bernstein, 2000; Runco, 2003; Craft, 2006; Fryer and Collings, 1991; Fryer, 1996). Students' expectations of creative teachers involved a teacher constituting a role model of creative behaviour. If a teacher expects creativity from students s/he should put his/her creativity into action. Students participating in the study considered that a creative teacher innovates, takes risks, is open to change, experiments with different teaching methods and strategies and uses resources in a variety of ways. Students perceived that through their dynamic approach to teaching, creative teachers motivated students' participation and challenged them. They create a positive climate based on their communication skills, their willingness to listen actively to students and their positive attitudes.

In relation to proposition 2, stated in Chapter 4, the categories emerging from the research with Mexican students and teachers were highly congruent with the findings from other studies in relation to conceptions of creativity, of what may facilitate or hinder creativity and the characterisation of a creative teacher.

Chapter 9, sets out how Mexican students' and teachers' conceptions were used to develop a tool to facilitate teachers' reflections on their teaching practice and to help them identify the kinds of changes they needed to make in order to improve their knowledge, skills and attitudes to enable them to enhance students' creativity in the classroom.

Chapter 9

Developing and piloting the self-evaluation tool: Crea-teach

‘The only way to discover the limits of the possible
is to go beyond them into the impossible.’

Arthur C. Clarke

9.1 Introduction

The aim of this research, as outlined in earlier chapters, was to enhance teachers’ awareness of the kinds of changes that they would need to make in order to approach their teaching in a way that would be more positive for promoting students’ creativity. The proposal was to develop a tool to facilitate teachers’ reflection in relation to what they actually needed to do to promote students’ creativity and to help them in identifying the kinds of changes they could make to improve their teaching to support students’ creativity. This chapter includes a description of the procedures followed to develop such a tool called Crea-teach. This takes the form of a questionnaire based on a pedagogical model for ‘creative teaching for creativity’.

The chapter begins by setting out a pedagogical model based mainly on two sources: findings from the research with the students and teachers presented in previous chapters and conceptions derived from explicit theories of creativity set out in the literature review. This chapter also describes the methodology of the pilot study of Crea-teach to assess the potential of the self-assessment tool to achieve its intended goal.

9.2 A model for ‘creative teaching for creativity’

In Chapter 4, a third proposition stated that a general description of the knowledge, skills, and attitudes teachers need to enhance students’ creativity, may be extracted from two

sources: 1) through the analysis of students' and teachers' implicit theories of what enhances or obstructs their creativity, as well as from their expectations of what a creative teacher does and, 2) from findings from explicit theories of creativity and creative teaching for creativity, such as: De Souza Fleith's (2000), Bjerstedt and colleagues (1976); Fryer and Collings (1991); (NACCCE, 1999); Lilly & Rejskind (2004); Reid and Petocz (2004); Jeffrey & Craft (2004); Sternberg (1991); Starko (1995); Cropley, (2001); Urban, (1996); Root-Bernstein & Root-Bernstein, (2000).

In this section, the framework for the development of the self-assessment tool to promote teachers' reflection in relation to their teaching practices is presented based on findings from the initial study presented on Chapters 6, 7 and 8 and on contributions from relevant research presented in the literature review and responds to the proposition mentioned.

The importance of including creativity as an integral part of the curriculum, as discussed in previous chapters, has been argued by education policy makers as important and set out as an essential educational aim in different countries. For instance, the research of the European Commission Joint Research Centre, undertaken in several countries of the European Union (Ferrari, et al., 2009); initiatives in Australia to promote creative teaching (White, 2006); and initiatives in the UK to introduce creativity in the national curriculum (NACCCE, 1999). To achieve the aim of promoting students' creativity through education, two strands of research are required: 1) to understand the conditions that enable or hinder creativity in education, 2) finding ways to promote the transformation of teachers' practices towards developing 'creative teaching for creativity'.

The findings reported in chapters 6, 7 and 8 addressed the first of these research aims, exploring teachers' and students' conceptions of creativity, perceptions of enablers or obstacles to creativity, perceptions of the characteristics of creative teachers; and identifying the knowledge, behaviours, skills and attitudes a teacher should have to promote 'creative teaching for creativity'. As set out in chapters 5, 6, 7 and 8, an initial study was undertaken to identify Mexican students' and teachers' conceptions of creativity, their implicit theories related to creativity and to creative teaching. A literature review was also undertaken to identify salient conceptions from explicit theories related to creative teaching. Previous studies have identified what Runco (2011) describes as explicit theories of creativity. Literature review, included the theories and research related to the characteristics of creative teachers (Davies, 2006); to teaching creatively and teaching for

creativity (Jeffrey, 2006; Dillon, 2006; Runco, 2003; Craft, 2000; Sternberg, 2003; Fryer, 2000; Fryer, 1989; Copley, 2001; Jackson, 2006; HMIE report, 2006; NACCCE report). It included as well, research related to instruments for assessing creative teaching such as those developed by Horng et al. (2005); and the one developed by Addison, Claydon and McDowell (1999) and Soh, (2000).

In relation to the second research approach required to support the aim of fostering creativity through education, this chapter describes the development of a tool to enhance teachers' reflection on their teaching practices based on an educational model for creative teaching derived from the findings from the initial study (implicit theories) and explicit theories of creativity and creative teaching. The self-assessment tool is proposed as an initial step for promoting teachers' motivation for change towards a more creative approach to teaching.

The model for 'creative teaching for creativity' is based on:

Understanding what is required to promote creativity in the classroom taking into account input from teachers' and students' implicit theories and from explicit theories of creativity and creative teaching, i.e. "What" is required, for creative teaching?

Understanding how to transform teaching practices and attitudes recognizing the importance of reflective learning for practitioners' professional development, i.e. "How" creative teaching can be enhanced.

9.2.1 Understanding what is required to promote creativity in the classroom

Findings from the research on Mexican students' and teachers' implicit theories and findings from the literature review of explicit theories in relation to creativity and to creative teaching were taken into account to identify the knowledge, behaviours, skills and attitudes a teacher needs to develop for promoting creativity in the classroom.

'Creative teaching for creativity' in the context of this study is viewed as a creative process, since teachers' creativity is put into action from the moment when he/she is designing a course or a study unit, during its development and through the whole teaching and

learning process . If a teacher expects creativity from his or her students, she needs to put her own creativity into action and needs to be a role model during the whole learning process.

In this study, 'creative teaching for creativity' involves the essence of effective teaching (Shulman, 1986) including subject matter knowledge, pedagogical content knowledge, curricular knowledge, and knowledge of self or what Darling-Hammond (2005) suggests as elements of effective teaching including good communication and interrelationship skills and a relevant psycho-pedagogical knowledge base.

Adopting a more specific approach for creative teaching, in order to promote students' creativity, the model proposed here, identifies three dimensions which organize the knowledge, skills and attitudes teachers need to develop: Planning with creativity in mind; Teaching with creativity in mind; and Being creative. These dimensions were developed based on the categories that emerged from students' and teachers' conceptions of creativity, of what enables or hinders their creativity in the classroom and of their conceptions of a creative teacher. Indicators of creative teaching and of a creative teacher identified from previous research were also taken into account and are aligned with Jackson's (2006) proposal of the kind of activities that may be used to promote a Personal Development Plan as will be explained in the next section.

Planning with creativity in mind requires understanding of the complexity of all of the factors related to the nature of creativity and of the creative process that may lead to the generation of novel and useful products, as well as of the conditions of the context or climate required to make creativity more likely to emerge. This dimension requires that teachers' knowledge and understanding of creativity is applied to course planning, designing the learning sessions to include creative activities taking account of students' motivation and participation. Teacher's understanding of creativity involves knowing that creativity implies novelty, innovation and presenting challenges to students. The teacher needs to understand that introducing variety into the teaching process with different resources and teaching strategies promotes students' interest and motivation. Understanding creativity as an integral part of the learning process and of the students' learning experience involves linking knowledge to real life problems and stimulating a reflective process. Teachers also need to be dynamic and include challenges and variety of

methods and resources, when planning and designing their courses. This involves thinking ahead and deciding what to do (Jackson, 2006).

Teaching with creativity in mind involves doing or producing things in line with planned intentions (Jackson, 2006); it involves having the knowledge and skills for using relevant technology to support the creative process when implementing teaching strategies. It involves the capacity to design learning situations, which may stimulate students' motivation and curiosity, and challenging them in order to devise a creative learning experience that may stimulate the development of their creative skills. It also involves giving opportunities to students to put their imagination and creativity into action; taking risks; responding with novelty to specific and unexpected situations or to specific needs; and presenting information in different and varied ways.

Being creative involves the knowledge, skills and attitudes, required by the teacher in order to become a role model for the student, to enhance a positive climate and to establish the conditions to facilitate students' creativity. These skills involve being able to face uncertainty or ambiguity, being willing to take risks by experimenting or exploring new possibilities in teaching, knowing how to handle mistakes productively, dealing with fear of change and the unknown; and having the attitudes that enhance creativity. This includes openness to new ideas, curiosity, and tolerance for ambiguity and frustration, being willing to stimulate students' questioning attitudes and respecting their ideas without feeling threatened. This dimension requires that the teacher is a role model to promote students creative skills and attitudes by supporting the development of their self-confidence and self-esteem and recognizing and rewarding their creativity. Being creative demands that teachers are able to self-observe and record what they have done in order to be able to reflect and learn from their experiences (Jackson, 2006).

9.2.2 Understanding how to enhance the transformational process of teaching practices and attitudes

How could be fostered or facilitated the process of transforming teachers' practices towards a more creative teaching approach? One approach that developed to promote creativity in education has been to introduce teachers to the use of the tools and the

techniques of creative thinking. Several of the initiatives mentioned earlier in the Mexican context have made emphasis on teaching creativity techniques to promote teachers' creativity. However, the mechanical use of these techniques is not enough to ensure long term effects. The most effective programmes have been those, which adopted a holistic approach including different elements of creativity such as: cognition, personality, attitudes, behaviour, interpersonal elements, affect, and the environment (Scott, Leritz, & Mumford, 2004; Karkockiene, 2005).

The implementation of relevant strategies and techniques needs to be a highly conscious and purposeful procedure. Creativity is a complex phenomenon and although certain general conditions that enable or hinder creativity have been identified the specific circumstances of groups and idiosyncratic situations need to be taken into account to use whatever strategies, techniques or tools may be useful for that particular situation.

Teacher development programmes in Higher Education in Mexico in the context of public education tend to be oriented towards acquiring general teaching strategies, assessment strategies and pedagogical knowledge. Other courses are oriented to up-date teachers' knowledge in specific domain areas. For instance, in the Autonomous National University of Mexico (Universidad Nacional Autónoma de México) there is a central Directorate responsible for providing Higher Education teachers development programmes, the Direction of General Affairs of Faculty (Dirección General de Asuntos del Personal Académico, DGAPA). Each school also offers teaching courses based on their particular needs.

Teachers' development and approach to including creativity as an aim of the educational process involves a transformational process, which cannot only be understood as the mechanical acquisition of technical knowledge. To enhance the transformational process for teachers it is necessary to enhance their reflective and observational capacities. Transformation begins with raising awareness of the kinds of teaching practices that enhance students' creativity and those that have not yet been learned or implemented.

As argued by Wisdom (2006), the purpose of using a self-assessment tool as the one developed in the current research, is to make tacit knowledge explicit. "At the same time, the development of professional knowledge and competence is seen to emerge within a

social and communal context and by such processes as making tacit knowledge explicit and developing knowledge and understanding through use” (Wisdom, 2006, p. 184).

Although some basic principles and foundations may exist, as Sharpe (2004) argues, “there is not yet an accepted model for the professional development of teachers in higher education” (Sharpe, 2004, p. 185). She locates the changes necessary as being part of the dynamic processes of development.

The role of reflection and awareness in such transformational learning has frequently been stressed (Schön, 1983; Light & Cox, 2001). Initial teacher education programmes as well as continuing professional development programmes need to include the development of competencies for teaching creatively by stimulating reflexive thought for continuous improvement.

Self-observation is required in order to recognize the personal attributes, skills, attitudes and emotional processes that may influence the creative process and how it successfully flows under certain circumstances and is hindered under other conditions. Meta-creativity (Bruch, 1988), can support this reflective process. Meta-creativity is defined as a process that allows the person to become aware of the subjective processes and factors involved in his or her creative processes and to be able to self-regulate those processes. This involves a constant internal dialogue. The understanding derived from this meta-creativity should enable the person to increase or develop his or her creative potential; to be more focused when engaging with a creative process; to better handle obstacles (internal or external) to creativity; and to be able to generate conditions to support creativity.

Several researchers have identified critical reflection as essential for teacher education programmes (e.g. Dewey, 1933; Yost, Sentner and Forlenza-Bailey, 2000). Dewey (1933) mentions three attributes of reflective individuals: open-mindedness, responsibility, and wholeheartedness. Open-mindedness refers to a desire to listen to more than one side of an argument and to recognize that one can question beliefs. Responsibility relates to the inclination to actively search for truth and apply information gained to problem solving. Wholeheartedness implies that one be involved in making meaningful changes, critically evaluating oneself or others, overcoming fears and uncertainties.

Van Manen (1977) offers a framework for reflection explaining it as a progression of three stages. The first involves the effective application of skills and technical knowledge in classroom settings. Reflection allows the person to analyse the effects of strategies used. The second stage relates to reflection about the assumptions underlying specific classroom practices and their consequences for student learning. Teachers at this stage reflect on the implications of their actions and beliefs. The third stage involves questioning the moral and ethical elements of decisions related to the classroom situation. At this stage, teachers make connections between situations they face in the classroom with broader social, political and economic forces influencing those events.

Schön's (1987) conception of reflection involves three different modes of reflection: reflection-on-action, reflection-in-action and reflection-for-action. The first mode is reflection on one's actions and thoughts after actions are completed. Reflection-in-action takes place during action. Reflection for action allows the teacher to use reflection for guiding future actions. The questionnaire used in the present research aligns with the first mode of reflection proposed by Schön. The use of the tool Crea-teach, was designed to enhance reflecting on the teaching practices used in order to raise teachers' awareness of the required changes for creative teaching. The third mode of reflection, reflecting-for-action, is related to the notion of the teacher as decision maker (Reagan, 1993). This notion relates to the dimension of planning with creativity in mind as proposed in the pedagogical model for creative teaching.

Critical reflection involves thinking and problem solving (Yost, Sentner, & Forlenza-Bailey, 2000). The process of problem solving involves identifying challenging situations and areas of practice, which require scrutiny, and identification of options for change and improvement. As these authors stress, the outcome of problem solving is reconstruction of knowledge.

Critical reflection is the highest level of reflectivity (Yost, Sentner, & Forlenza-Bailey, 2000) of the different modes and stages of reflection described earlier. It involves practical experience as well as a knowledge base:

"a reflective/analytic teacher is one who makes teaching decisions on the basis of a conscious awareness and careful consideration of the assumptions on which the decisions are based, and the

technical, educational, and ethical consequences of those decisions. The end result of critical reflection for the individual is cognitive change” (Yost, Sentner, & Forlenza-Bailey, 2000, p. 41).

Teacher education programmes designed to promote creative teaching may also benefit from consideration of Kolb’s experiential learning cycle which integrates two dialectically related modes of grasping experience—Concrete Experience (CE) and Abstract Conceptualization (AC) -- and two dialectically related modes of transforming experience— Reflective Observation (RO) and Active Experimentation (AE) (Kolb & Kolb, 2008). The learning process involves experiencing, reflecting, thinking and acting. Concrete experiences are the basis for observation and reflection. As explained earlier, reflection constitutes an important element towards meaningful transformation. In the educational model proposed for creative teaching enhancing teachers’ reflection and awareness is essential for facilitating teachers’ change process.

Meta-creativity links to self-assessment and conscientious observation, which allows the teacher to become aware of the cognitive and affective processes involved in the creative process. The awareness and learning derived from it enhances self-regulation, which allows the teacher to be strategic about the strategies and tools she chooses to use with particular students, in certain conditions, to meet specific aims (Bruch, 1988; Dabdoub, 2008).

Highly skillful teachers are good observers and are able to read situations and the needs of the moment to make the required adjustments to their teaching strategies. If a teacher is able to observe and reflect on his or her own processes (cognitive and affective), he or she will be able to understand what works and what is unsuccessful for her or for her students, becoming more strategic about the what, the how and the when to use particular strategies, techniques and tools.

Jackson’s (2006) approach has been useful in helping to build a theoretical framework for the pedagogical model to support the enhancement of creative teaching. Jackson outlines the set of interconnected activities, experiences and relationships for the development of a Personal Development Plan (PDP). Although he is mainly referring to promoting PDP in Higher Education students, this can also apply to what would be required for teachers’ professional development for creative teaching. Below are set out the activities outlined by Jackson:

- **thinking ahead and deciding what to do** analysing tasks, identifying goals, creating strategies to achieve objectives;
- **doing / producing things broadly in line with planned intentions** but being responsive to the effects of actions and changing plans if appropriate; learning through the experience of doing with greater self-awareness;
- **self-observing and recording** thoughts, ideas, experiences, actions and their effects, and experiences, to develop a record of learning and to evidence the process and results of learning and support the enterprise of ‘learning about learning;’
- **thinking about what was done and what was achieved in order to learn including** reflecting, reviewing and evaluating; making sense of experience; making judgements about self and the effects of personal action and determining what needs to be done to develop/improve/move on. This enterprise also supports the process of learning about learning.

Jackson’s approach relates to the dimensions presented earlier as supporting a creative teaching model. The dimension named as planning with creativity in mind relates to what Jackson calls ‘thinking ahead and deciding what to do’. The dimension of teaching with creativity in mind relates to ‘doing/producing things broadly in line with planned intentions’. Self-observing and recording is related to a more attitudinal, reflective and affective dimension, here called Being creative. Jackson’s activities concerning ‘thinking about what was done and what was achieved in order to learn’ is related to reflection and developing self-awareness.

The instrument Crea-teach was developed as an initial stage to support teachers’ professional development towards being better equipped to support their students’ creativity. It was developed with the aim of supporting teachers’ reflections on their teaching practices; expecting that responding to the instrument would help them to identify, as a first step of this transformational process, the kinds of changes that they would need to make or would be willing to make as desirable, to increase their creativity and to foster students’ creativity. It is important to emphasize that the self-assessment tool is not designed to assess teachers’ creativity. It should be considered as the initial

stage of a more systemic and holistic program of teachers' professional development to promote teaching for creativity.

The theoretical model for 'creative teaching for creativity' presented in this section was used as a framework to develop the self-assessment tool to support teachers' in the transformational process towards creative teaching. The next section sets out the process by which this framework was used to develop the tool.

9.3 Procedures adopted to develop the self-assessment tool: Crea-teach

The purpose of the self-assessment tool developed in this study was to facilitate teachers' reflection on their teaching regarding their current practices, which may have promoted or hindered students' creativity. The expectation was that the statements included in the instrument would suggest activities or strategies that teachers could include in their teaching and the kinds of changes or improvements that they could make in order to 'teach creatively for creativity'. The instrument was not intended to be exhaustive in relation to all of the behaviours, attitudes or strategies that may foster creativity in the classroom but to act as an initial catalyst to promote reflection.

Several items were created for each of the three dimensions: Planning with creativity in mind, Teaching with creativity in mind and Being creative. Each statement described particular behaviours and attitudes derived from the Mexican students' and teachers' implicit theories as well as from contributions from previous research.

From general literature review (presented in Chapter 2), the following salient points were taken into account when writing the statements for the tool:

Creativity is important for human beings in a globalized and complex world such as the one in which we are now living (Seltzer & Bentley, 1999).

Some beliefs about creativity are "myths" (Weisberg, 1986), and can create obstacles to the development of a comprehensive understanding of the construct and hence to finding ways of promoting creativity.

Creativity requires a set of abilities (Guilford, 1975) which can be developed in human beings, as can other abilities.

Creativity involves cognitive (attention, associative thinking, divergent and convergent thought) and affective (motivation, joy, anxiety) aspects (Runco, 1995).

Creativity is characterized by the production of novel and useful ideas (Sternberg, 1988; Weinsberg, 1986). Novel is understood as original productions (that may be tangible or not).

All individuals have the potential for creativity;

Creativity may be expressed in different ways and contexts, generating different degrees of impact. By understanding what is involved in the creative process, the individual may have a more active role in managing the process and generating the conditions and use of appropriate cognitive skills that will lead to better creative outcomes. Defocused attention and sudden insight may facilitate creativity, but creativity commonly occurs after a period of time dedicated to conscious work.

Effort, time, and intentional attention are important for creative performance (Csíkszentmihályi, 1988).

Different levels of creativity have been distinguished. The creative process involves several stages that are not developed in a linear way. Each one of the stages of the process involves different thinking process and affective states that may influence the process as well as the results. Society has an influential role in the recognition and assessment of creative products, which can be tangible or intangible, i.e. physical objects, ideas, procedures, etc. (Torrance, 1967).

An environment that enables creativity is characterized by: trust, openness to risk, the possibility of learning from mistakes, time to think, challenges (Isaksen et al., 1999).

A creative product may be evaluated in relation to the context where it has been created. Three criteria may work as a general framework: novelty, resolution and elaboration and synthesis (Besemer & O'Quin, 1999).

Other salient points from the literature (presented in Chapter 3) related to creative teaching, creative teachers and conditions that enhance creativity taken into account when developing the tool were:

In the report 'All our futures' (NACCCE, 1999), 'creative teaching' is argued to be related to the capacity of teachers to use imaginative approaches to make learning more interesting, exciting and effective.

The quality of creativity refers to the kind of teaching which is characterized by novelty in the use of a wide variety of methodologies, strategies and resources in order to stimulate learning.

Creative teaching involves the student perceiving that there are certain conditions that enhance the expression of their creativity, the climate or environment involves affective dimensions of creativity.

Teaching for creativity may be guided by the principles proposed by NACCCE (1999): encouraging young people to believe in their creative identity; identifying young people's creative abilities and fostering creativity by developing some of the common capacities and sensitivities of creativity such as curiosity; recognizing and becoming more knowledgeable about the creative processes that help fostering creativity development, and providing opportunities to be creative, a hands on approach; and understanding the development of creative thinking skills and attitudes.

According to Sternberg (1991) an educational environment supportive of creativity should include the following components: allowing time for creative thinking; rewarding creative thinking; rewarding creative ideas and products; encouraging sensible risks; allowing mistakes; imagining other viewpoints; exploring the environment; and questioning assumptions.

The main aspects that may help to foster students' creativity mentioned by teachers participating in Fryers' (1989) research were: building confidence, encouraging pupils to ask questions, having a creative teacher, having some free choice at home and choice of tasks and of learning methods, having an involved and supportive family, asking provocative questions, setting un-assessed tasks, emphasizing success, setting goals and making expectations clear.

From Cropley (2001) other salient points can be extracted. This author underlines that teachers should seek to foster in students: a concept of creativity and a positive attitude to it; curiosity; willingness to risk being wrong; drive to experiment; task commitment, persistence and determination; willingness to try difficult tasks; desire for novelty; freedom from domination by external rewards (intrinsic motivation); readiness to accept challenge; readiness for risk taking.

Appendix 3 includes a matrix that provides examples of the sources for each statement of the questionnaire. Some are identified as coming from the categories that emerged from the Mexican students' and teachers' responses to the initial study. Others are derived from the findings of other research and explicit theories. The matrix is not exhaustive, but provides examples of the sources that were taken into account in generating the statements for the self-assessment tool.

9.3.1 Development of items for the measurement tool

Items were developed taking into account the three dimensions proposed in the model. For each dimension, several items were elaborated. Items were written as statements, in the first person, to generate teachers' reflection in relation to their professional practice in the classroom. Items were written taking into account general recommendations such as the ones suggested by Robson (2011) in order for them to be clear and understandable for the teachers: the set of fixed alternative responses should be accurate, exhaustive, and mutually exclusive and on a single dimension (Robson, 2011, p. 244). Open-ended questions should be kept to a minimum. Language should be simple, questions short, double-barrelled questions, leading questions and negative questions should be avoided. All ambiguity should be removed and personal terminology should be used if respondents' own feelings are required (Robson, 2011, p.246, adapted from de Vaus, 1991, pp.83-6).

The affirmative statements were oriented to stimulate teachers' reflection of practices they may not have been including in their teaching thus indicating the kind of changes that they may need to make.

Items were developed in order for the teacher to reflect on how he/she was actually teaching with creativity in mind during the teaching-learning process, and how he or she

was promoting and facilitating the students' creativity taking into account the three dimensions of the model for creative teaching. Other similar instruments such as the one developed by Addison, Claydon, and McDowell, at the University of Northumbria (1999) and by Soh (2000) were also taken into account.

The initial list included 50 statements. A revision of those items was undertaken to identify possible ambiguities and repetitions. It was considered important that the teachers perceived the instrument as attractive, interesting and not too time consuming to complete (Robson, 2011). The revision process involved eliminating items with overlapping content and ambiguous or confusing items. Preference was given to statements that were clear, used direct language, with terminology, which was familiar for higher education teachers. Previous experience of the researcher with similar population, as well as with the type of statements used in instruments such as that used by Addison, Claydon, and McDowell (1999), and Soh (2000); and that were aligned with the implicit theories emerging from the Mexican students and teachers participating in the initial study.

Because teachers were going to be asked to voluntarily participate, it was essential that the instrument should be short so that teachers could easily see that it would only take 10 to 15 minutes to complete.

The tool was organized into three sections. In the first teachers were asked to include the following information: gender, age, number of years of teaching experience, the name of their educational institution and the undergraduate programme on which they were working.

The second section consisted of 33 affirmative statements (shown in Table 9.1). These were not organized according to the three dimensions but were randomly ordered.

The third section included two statements to be completed:

I found that this instrument was useful as it:

From my reflection following completion of this instrument I would like to make the following changes in order to promote students' creativity:

For the 33 statements, a rating scale with 5 options was used. The options were always; often; sometimes; rarely and never. A rating scale is useful when a behaviour, attitude or

other phenomenon of interest needs to be evaluated on a continuum (Leedy, 1993). Using a rating scale with 5 options was considered to be suitable for this study as it provided teachers with the opportunity to think about their current teaching practices and the extent to which they implemented each. Teachers were asked to identify the option which better reflected their teaching practices. The self-assessment tool was not presented as a measure of teaching achievement or as an assessment of teaching but merely to establish the nature of current practice.

It was expected that the answers would elicit a subtle response pattern showing what practices teachers more or less frequently used. Table 9.1 shows the items in each of the three dimensions defined in the model. The items were derived from the categories that emerged from the Mexican students' and teachers' responses in relation to what facilitated or hindered their creativity in the classroom, as well as from their conceptions of a creative teacher. Items also reflected the findings from the research discussed in the literature review.

In the dimension 'Planning with creativity in mind', statements included were such as: 'when designing classes I take into account students' interests as a way to generate motivation'. This was included as students and teachers indicated that motivation was a key facilitator of creativity. The Mexican students identified challenge as facilitating their creativity, hence, the statement 'I relate knowledge to real life challenges' was included in the tool to promote teachers' reflection on the role of challenge in the teaching-learning process. Teachers and students mentioned the availability and the use of a variety of resources as facilitators to their creativity, so a statement was included in relation to this: 'I use a variety of resources to support learning'.

In the dimension 'Teaching with creativity in mind' statements such as: 'I use different teaching strategies to promote students' participation and involvement in the learning process' and 'I present challenges to students which require creativity to be solved, problems for which there are no current solutions' were included. These were derived from students' and teachers' responses. This dimension also included statements relating to different indirect teaching methods to stimulate teachers' reflections on the use of the types of methods that may enhance creativity, such as: the use of games, projects and problem solving.

In the dimension of being creative several statements were included which related to what teachers and students identified as behaviours and attitudes that characterize a creative teacher such as: 'I respect students' opinions'; 'I change teaching strategies and teaching methods from time to time in order to introduce novelty'.

Other sources to enhance the items in the tool came from other measurement tools designed by researchers for different purposes, such as the one designed by Addison, Claydon, and McDowell (1999) and Soh (2000).

The complete self-assessment tool can be found in Appendix 2. This is the Spanish version as was completed by the teachers through survey-monkey. Table 9.1 sets out the English version of the statements organized under each of the theoretical dimensions included in the pedagogical model for creative teaching. The items in the instrument were organized randomly when presented to participants.

Table 9.1 Dimensions and Items of the self-assessment tool Crea-Teach

Planning with creativity in mind	Teaching with creativity in mind	Being creative
<ul style="list-style-type: none"> • I plan the course with the facilitation of creativity in mind. • When designing classes I take into account students' interests as a way to generate motivation • I use innovative strategies to get students' attention • My classes are interactive, since they include students' participation. • I explicitly ask for creativity in students' work and assignments. • I relate knowledge to real life challenges. • I provide opportunities for students to experiment with ideas. • I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation. • I promote learning through reflection. • I try to develop ways of assessing work which require independent thought and not only the use of memory. • I use a variety of resources to support learning. 	<ul style="list-style-type: none"> • I create opportunities to stimulate the use of students' imagination. • I organize my classes presenting information in interesting and attractive ways. • I use different teaching strategies to promote students' participation and involvement in the learning process. • I present challenges to students which require creativity to be solved, problems for which there are no current solutions. • I use problem based learning as a means of enabling students to be more innovative. • At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood. • I use creative teaching strategies to promote students' curiosity. • I try to implement meaningful activities that allow students to apply their knowledge. • I use educational games to stimulate students' imagination. • I include creative teaching techniques in my courses • I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving. 	<ul style="list-style-type: none"> • I am willing to try new ways of teaching. • I change teaching strategies and teaching methods from time to time in order to introduce novelty. • I encourage students' curiosity. • I foster a questioning attitude in students. • I encourage students to take initiatives. • I promote learning from mistakes. • I help students to develop their confidence and self-esteem. • I am willing to experiment with new teaching methods and strategies to foster students' creativity. • I respect students' opinions. • A good sense of humour is important as a means of creating a relaxed environment in my classes. • I recognize and reward students' creativity.

In summary, the procedure to develop the questionnaire included the following steps:

A literature review to identify the explicit theories related to conceptions of creativity, of teaching creatively and teaching for creativity including the characteristics of a creative teacher.

The completion of an initial study to identify the implicit theories of a sample of Mexican higher education students and teachers.

The development of a theoretical framework for creative teaching and teaching for creativity taking into account the findings from steps 1 and 2.

The establishment of a definition of the elements related to the promotion of students' creativity which it was desirable for teachers to promote in the classroom (based on the model developed).

Developing items to stimulate teachers' reflection on their teaching practices in relation to 'creative teaching for creativity'.

Selection of the type of scale to be used and the approach for writing the items.

Selection of the technological tool to distribute the questionnaire through the internet.

9.4 Pilot application of the questionnaire: procedure

A pilot study was undertaken to assess whether the tool could accomplish the aim for which it was created. The aim of the pilot study was to evaluate whether the tool "Crea-teach" would be useful for the purpose of stimulating teachers' reflections on their teaching and for developing their awareness of the way they actually promoted their students' creativity and of the changes they would need to make to improve their practice in this respect.

An open-source survey tool was selected for the distribution of the instrument. The tool selected was Survey-monkey, which is an online survey tool. It was selected, since it has several advantages: it is accessible for users; once the tool has been developed a url link can be created and sent to the participants so they can respond to the survey through the internet; users do not need to install anything on their computers; the researcher can easily follow up the number of persons that have responded and can easily access the responses. This survey tool has a privacy policy which protects users and ensures research privacy.

The tool was published on-line using survey-monkey and an invitation was sent to teachers teaching in public higher education institutions in Mexico. The researcher asked four persons who worked in the academic departments of different public universities and who were in touch with teachers, to send an email to the teachers in their institutions inviting them to participate in the research.

9.4.1 Ethical considerations

Following ethical guidelines, the researcher provided a text that was sent to the teachers by email inviting them to participate voluntarily and informing them that data would only be used for research. They were not asked to state their names so total confidentiality was assured. Data were collected through the web using survey monkey.

The text that was sent to teachers was as follows:

Dear Teacher,

Currently I am undertaking research on teaching practices for my doctoral dissertation. Your response to the statements in the questionnaire in relation to the way you undertake your teaching in lessons will be most useful for me.

Your participation is anonymous. The information you provide will only be used for research purposes and your identity will be at all times protected.

To access to the questionnaire please follow the link bellow.

<http://surveymonkey.com/s/createach2013>

Thanks in advance for your valuable collaboration.

Kind regards,

Lilian Dabdoub

Doctoral Student

Institute of Education

University of London, UK

9.4.2 Sample

With the support of four colleagues working in different public universities, the invitation to teachers to participate was sent by email, to 100 teachers. The percentage return rate was 25%. For the purpose of this research which was to pilot the self-assessment tool, and assess if it was fit for purpose this was considered adequate. However, this precluded the validation of the tool and the undertaking of a factor analysis to establish if the three dimensions provided a valid pedagogical model.

Twenty-five teachers completed the survey. There was some missing data as some of the teachers did not respond to all of the items in the instrument.

The sample included 11 male teachers and 11 female teachers (with 3 missing values). Table 9.2 shows the age distribution and table 9.3 presents the teaching experience of teachers in the sample.

Table 9.2 Age distribution of teachers in the sample

Age	Number	%
25-30	2	9
31-40	9	41
41-50	7	32
51-60	3	14
61-70	1	4
total	22	100

Table 9.3 Years of teaching experience of teachers in the sample

Number of years	Number of persons	%
1-5	2	10
6-10	3	16
11-15	0	0
16-20	2	10
21-25	5	26
26-30	2	10
31-35	1	6
36-40	2	10
41-45	1	6
46-50	1	6
TOTAL	19	100

Missing values = 5

9.5 Summary and conclusions

In this chapter, the pedagogical model for teaching creatively for creativity was described. This model provided the framework for developing a self-assessment tool to support teachers' professional development towards a more creative approach to education that would include 'teaching creatively for creativity'. The model was developed based on what Mexican students' and teachers' identified as the conditions required to enhance their creativity in a classroom environment, as well their conceptions of creativity and their expectations of the characteristics, attitudes and behaviours of a creative teacher. It also drew on findings from the wider literature including existing questionnaires.

The procedure to develop the self-assessment tool, 'Crea-teach' was presented. The instrument was designed to be useful for teachers to enhance their teaching reflecting on their teaching practices.

The following Chapter (10) presents findings from the piloting of the self-assessment tool. General discussion of the research and final conclusions is presented in Chapter 11.

Chapter 10

Results of the piloting of the self-assessment tool: Crea-teach

‘The only way to discover the limits of the possible
is to go beyond them into the impossible.’

Arthur C. Clarke

10.1 Introduction

This chapter presents findings from the pilot study of the self-assessment tool ‘Crea-teach’. As presented in Chapter 5, a decision was made to use a mixed methods approach within the tool using qualitative and quantitative methodology.

In this chapter the qualitative findings from the teachers’ responses to the two open ended questions included in the self-assessment tool are presented in addition to the responses to the 33 five point Likert scale statements. These are presented using descriptive statistics to identify patterns of responses which would indicate what kind of teaching activities were being adopted related to creativity enhancement. Correlation analyses were also undertaken to explore the relationships amongst the statements.

10.2 Qualitative analysis of the open-ended statements evaluating the usefulness of ‘Crea-teach’

The aim of the pilot study was to evaluate whether the self-assessment tool was able to support Mexican teachers in reflecting on the teaching practices that they adopted which would facilitate creativity in their students. A qualitative analysis was undertaken of the responses made by the teachers to the open ended statements. The purpose of these questions was to assess if the instrument was useful to teachers in identifying areas that they needed to change.

The process followed for the qualitative analysis was the one adopted by Cooper and McIntyre (1993) which was outlined in Chapter 5.

Overall, only four categories emerged from the qualitative analysis. These are set out in Table 10.1 along with the number of responses made in each category. Table 10.2 provides example responses for each category.

Table 10.1 Categories emerging from the open questions

'I found that the items of this instrument are useful for me since they...'	Number of responses in each category
Enable me to reflect on my teaching	12
Raise awareness of the importance of introducing creativity in classes	5
Help me to become aware of my strengths and weaknesses	3
Identify how to improve teaching for creativity	2
Total	22

Table 10.2 gives examples of the responses given by teachers to the first open ended question in relation to their perception of the usefulness of the instrument.

Table 10.2 Example of statements for completion of the sentence ‘I found that the items of this questionnaire are useful for me since they...’

<p>Categories</p> <p>‘I found that the items of this instrument are useful for me since they...’</p>	<p>Statements</p>
<p>Enable me to reflect on my teaching</p>	<ul style="list-style-type: none"> • <i>‘To find aspects on which I have never reflected before which I will take into account from now on.’</i> • <i>‘To reflect on my teaching; to relate it to the needs of the subject and its contents (formal and historical).’</i> • <i>‘To reflect on the importance of planning my classes including creative strategies since they promote the development of my students' competencies</i> • <i>They allow me to reflect on my teaching</i> • <i>To self-assess my teaching practices</i> • <i>To analyse my teaching practice and review some of the strategies I use to propose some changes.’</i> • <i>‘To confirm that courses in formal education may be richer and more creative.’</i> • <i>‘To remind myself that my work and endeavour as a teacher is centred on my students' progress’</i> • <i>‘To analyse my way of teaching in light of several of these questions.’</i> • <i>‘To re-validate my professional teaching practice.’</i> • <i>‘To reflect about my teaching methods’</i> • <i>‘To reflect about my teaching practice’</i>
<p>Raise awareness of the importance to introduce creativity in the classes</p>	<ul style="list-style-type: none"> • <i>‘To become aware that I need to promote my students' creativity more.’</i> • <i>‘They made me reflect about the importance of several factors usually unrecognized, such as creativity, innovation, good sense of humour, respect, and socio-cultural context amongst other things.</i> • <i>To become aware of the creative side of learning</i> • <i>To express my own way of conducting classes and recognizing some needs in relation to themes such as creativity and imagination.,</i>
<p>Become aware of self-strengths and weaknesses</p>	<ul style="list-style-type: none"> • <i>To analyse myself and to find out if I am ready to renew myself;</i> • <i>To identify my own weaknesses and the aspects of my teaching I can improve and strengthen</i>

<p>Identify how to improve teaching for creativity</p>	<ul style="list-style-type: none"> • <i>To learn new teaching methods to promote creativity</i> • <i>I understand that I need to put give greater attention to creativity in my classes.</i> • <i>I understand that I already have a starting point. In my courses there is room for freedom and respect for divergent ideas and I promote open learning to the whole world and to knowledge. However, I need to give more emphasis to creativity.</i> • <i>To make more explicit topics in which I have paid less attention in the past.</i>
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The categories derived from the teachers' responses to this statement, suggested that the tool 'Crea-teach' was useful, since it allowed teachers to reflect on their teaching practices, made them aware of the importance of introducing creativity in their teaching; and helped them to analyse their strengths and weaknesses in relation to their teaching and to identify ways of improving their teaching in order to enhance students' creativity.

The second open question asked teachers to indicate any changes that they might make to their teaching having completed Crea-teach. The analysis of these responses was related to the theoretical dimensions of the proposed pedagogical model for creative teaching. The number of responses given that could be categorized under each dimension is shown in Table 10.3.

Table 10.3 Number of responses given about possible changes to be made to teaching

From my reflection on these items some of the changes I would like to make in order to promote students' creativity are:	Number of responses in each category
Planning with creativity in mind: To learn more about creativity and creative techniques	5
Teaching with creativity in mind: to use new teaching strategies or practices	9
Being creative: to make changes to my personal approach to teaching	4

Table 10.4 shows examples of statements given by teachers in relation to the kind of changes they would be willing to make. These are grouped under each dimension of the pedagogical model. Under the dimension of Planning with creativity in mind, responses were included which related to changes which implied learning more about creativity and creative techniques. Under the dimension of teaching with creativity in mind responses were included that mentioned using new teaching strategies or applying different teaching practices. Under the dimension of 'Being creative' were included statements related to changes that involved transforming the teachers' personal approaches to teaching.

Table 10.4 Examples of responses to the statement: ‘From my reflection on these items, some of the changes I would like to make in order to promote students’ creativity are:

<p>Planning with creativity in mind: To learn more about creativity and creative techniques</p>	<ul style="list-style-type: none"> • <i>To learn new teaching methods to promote creativity.</i> • <i>To study a book where I can get more information and guidance on how to promote creativity.</i> • <i>To develop my creative competencies for my teaching and the competencies to facilitate students' creativity.</i> • <i>To stimulate curiosity, use techniques to stimulate creativity</i>
<p>Teaching with creativity in mind Use new teaching strategies or practices</p>	<ul style="list-style-type: none"> • <i>To stimulate students' participation more and use more practical study cases.</i> • <i>To have classes out-doors</i> • <i>To search for teaching techniques that may help students to improve their learning outcomes</i> • <i>To put into practice some of the suggestions mentioned in this questionnaire.</i> • <i>To promote an initiative to elaborate projects in my classes.</i> • <i>To develop more productive projects that may have more internal and external impact on the community.</i> • <i>To work with more techniques oriented towards facilitating learning.</i> • <i>To use problem based learning and dilemmas more frequently.</i> • <i>To use new teaching strategies</i>
<p>Being creative: make changes on personal approach to teaching</p>	<ul style="list-style-type: none"> • <i>To promote students' critical and creative thinking about their professional development now and in the future.</i> • <i>To insist on the importance of always looking for new ways to improve things in order to derive more social and environmental benefits.</i> • <i>To change the approach of “giving classes” or “lecturing” and think more in terms of collaborative and group work sessions where teachers’ play a different role: one that is more engaged in supporting students towards the development of their being and towards their understanding of the world.</i> • <i>To promote my own creativity and students' creativity</i>

10.3 Conclusions of the qualitative analysis

The two open-ended statements from the second section of the self-assessment tool 'Crea-teach', were designed to assess teachers' perceptions of their experiences of completing Crea-teach. They were designed and included to establish whether the tool could accomplish the aim for which it was developed, i.e. to enhance teachers' reflection on their teaching practices in relation to adopting a 'creative teaching for creativity' approach, and to identify the changes they were willing to make to strengthen this approach in their teaching.

Although there were only a relatively small number of responses the findings suggest that the tool has promise in relation to the aim for which it was created since teachers' reported that the tool helped them to reflect on their teaching as well as to identify some of the changes they could make to promote students' creativity.

However, as mentioned earlier, the use of such a self-assessment tool should be included as part of a holistic teacher professional development program. The self-assessment tool was conceived as a means of enhancing teachers' attitudes towards becoming involved in a process of changing their teaching practices with the aim of promoting students' creativity.

The fourth proposition made in Chapter 4, stated that teachers' reflections on, and awareness of their teaching practices in relation to how they may enhance or inhibit their students' creativity, may support their motivation and open-mindedness towards making the changes in their daily teaching practices, and their global approach to the teaching-learning approach, required for a more creative teaching approach. In congruence with this statement, the tool is useful to promote self-observing and reflecting, enhancing teachers' self-awareness in order to get involved in a transformational process of their teaching practices towards teaching for creativity.

10.4 Quantitative analysis

The following sections present the quantitative analysis undertaken with responses to the 33 items of the questionnaire using a five point Likert scale. The main purpose of piloting the tool was, as has been said earlier, was to assess if it could be useful to enhance teachers' reflection of their current teaching practices and on the kind of changes they would require to make for a more creative teaching approach. However, a decision was made to use the data extracted from teachers' answers to the first part of the questionnaire as a means to assess the tool itself. Given the size of the sample, two types of quantitative analysis were undertaken: a descriptive statistics of responses given to the items included under each one of the three dimensions proposed on the pedagogical model for creative teaching; and a correlation analysis to understand the degree in which the items under each dimension were related amongst each other, as measuring the same construct as well as a correlation analysis amongst the items under each one of the three dimensions.

Descriptive statistics for the Likert scale items grouped under each of the three dimensions and correlations between the items in each dimension and correlations between the three dimensions are included.

10.4.1 Planning with creativity in mind: descriptive statistics

A descriptive statistical analysis was undertaken for each response to each statement. Table 10.5 shows the percentages obtained for each of the response options. The number of responses is also given.

Table 10.5 Planning with creativity in mind: descriptive statistics for each item of the dimension

	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Missing values
1. I plan the course with the facilitation of creativity in mind.	33.3% 8	50.0% 12	16.7% 4	0% 0	0% 0	0
2. When designing classes I take into account students' interests as a way to generate motivation	57.1% 12	23.8% 5	14.3% 3	4.8% 1	0% 0	3
3. I use innovative strategies to get students' attention	16.7% 4	62.5% 15	12.5% 3	4.2% 1	4.2% 1	0
4. My classes are interactive, since they include students' participation.	66.7% 16	16.7% 4	12.5% 3	0	4.2% 1	0
5. I explicitly ask for creativity in students' work and assignments	33.3% 8	50.0% 12	16.7% 4	0% 0	0% 0	0
6. I relate knowledge to real life challenges.	66.7% 16	16.7% 4	16.7% 4	0% 0	0% 0	0
7. I provide opportunities for students to experiment with ideas.	50.0% 12	29.2% 7	20.8% 5	0% 0	0% 0	0
8. I promote a balance between direct lecture teaching and teaching strategies centered on	40.9% 9	40.9% 9	18.2% 4	0% 0	0% 0	2

students' active participation.						
9. I promote learning through reflection.	60.9% 14	30.4% 7	8.7% 2	0% 0	0% 0	0
10. I try to develop ways of assessing work which require independent thought and not only the use of memory.	65.2% 15	26.1% 6	8.7% 2	0% 0	0% 0	0
11. I use a variety of resources to support learning.	30.4% 7	47.8% 11	17.4% 4	4.3% 1	0% 0	0

As shown in Table 10.5, the items with a higher percentage of responses in the category always (66.7% in both cases) were: 'My classes are interactive, since they include students' participation'; and 'I relate knowledge to real life challenges'. These responses suggest that teachers' behaviours are congruent with a student centred approach to education, as well as to an approach which gives importance to the application of knowledge.

10.4.1.1 Planning with creativity in mind: correlations

A correlation analysis among the items of the dimension 'Planning with creativity in mind' was undertaken (see Table 10.6).

The item that presented the strongest and most statistically significant correlation with other items was: 'I promote learning through reflection' ($p = 0.01$). It correlated moderately with, 'I plan the course with the facilitation of creativity in mind' ($r = .535$); 'I relate knowledge to real life challenges' ($r = .541$); 'I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation' ($r = .612$); and 'I try to develop ways of assessing work which require independent thought and not only the use of memory' ($r = .538$).

These correlations suggest congruency between teaching strategies and objectives through the teaching learning process, from the process of planning, the use of real world challenges, through to the teaching process not only by using direct teaching strategies but also including student centred teaching strategies and the way learning is assessed.

The item, 'I provide opportunities for students to experiment with ideas', was significantly correlated at the 0.01 level (2-tailed) with 'I try to develop ways of assessing work which require independent thought and not only the use of memory' ($r = .645$); and 'I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation' ($r = .613$). These correlations suggest that allowing students to experiment with ideas relates to teachers' general approach to teaching through the development of a balance between a direct teaching approach and a more student centred approach. This is supported by the means of assessment, which encourages students to think independently.

The item 'I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation' showed a moderate correlation at the 0.01 level (2-tailed) with 'I try to develop ways of assessing work which require independent thought and not only the use of memory' ($r = .592$). This is important since it shows a congruency between the teaching strategies that a teacher is inclined to select and the assessment of learning which is not only focused on the demonstration of recall of information but on giving students' the opportunity to think independently.

The correlations between, 'I use a variety of resources to support learning' ($p = 0.05$), 'When designing classes I take into account students' interests as a way to generate motivation' ($r = .499$), and 'I explicitly ask for creativity in students' work and assignments' ($r = .466$) suggest that when teachers use a variety of resources for learning they tend to take into account students' interest and motivation and may ask students to put their creativity into action when completing assignments.

Moderate correlations between 'I relate knowledge to real life challenges' ($p = 0.05$) and 'I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation' ($r = .514$) and 'I try to develop ways of assessing work which require independent thought and not only the use of memory' ($r = .415$) indicate that when teachers use more student centred teaching strategies they promote knowledge application

through including real world challenges and include in the learning assessment process evidence of students' independent thought.

Table 10.6 ‘Planning with creativity in mind’: correlations between items

		I plan the course with the facilitation of creativity in mind.	When designing classes I take into account students’ interests as a way to generate motivation	I use innovative strategies to get students’ attention.	My classes are interactive, since they include students’ participation.	I explicitly ask for creativity in students’ work and assignments	I relate knowledge to real life challenges.	I provide opportunities for students to experiment with ideas.	I promote a balance between direct lecture teaching and teaching strategies centred on students’	I promote learning through reflection.	I try to develop ways of assessing work which require independent thought and not only the use of resources.	I use a variety of resources to support learning.
I plan the course with the facilitation of creativity in mind.	Pearson Correlation	1	-.052	-.023	.081	.206	.238	.218	.236	.535**	.228	.148
	Sig. (2-tailed)		.822	.917	.706	.334	.262	.307	.291	.009	.296	.499
	N	24	21	24	24	24	24	24	22	23	23	23
When designing classes I take into account students’ interests as a way to generate motivation	Pearson Correlation		1	.395	.137	-.052	.405	.194	.098	.430	.248	.499*
	Sig. (2-tailed)			.077	.553	.822	.068	.398	.680	.052	.279	.021
	N		21	21	21	21	21	21	20	21	21	21
I use innovative strategies to get students’ attention.	Pearson Correlation			1	-.109	-.158	-.243	-.108	.042	.147	.055	.550**
	Sig. (2-tailed)				.613	.462	.252	.616	.852	.502	.803	.007
	N			24	24	24	24	24	22	23	23	23
My classes are interactive, since they include students’ participation.	Pearson Correlation				1	.142	.438*	.216	.367	.152	.260	.193
	Sig. (2-tailed)					.508	.032	.310	.093	.488	.231	.379
	N				24	24	24	24	22	23	23	23
I explicitly ask for creativity in students’ work and assignments	Pearson Correlation					1	.238	.371	.296	.338	.228	.466*
	Sig. (2-tailed)						.262	.074	.181	.115	.296	.025
	N					24	24	24	22	23	23	23

I relate knowledge to real life challenges.	Pearson Correlation						1	.587**	.514*	.541**	.415*	.246
	Sig. (2-tailed)							.003	.014	.008	.049	.259
	N						24	24	22	23	23	23
I provide opportunities for students to experiment with ideas.	Pearson Correlation							1	.613**	.411	.645**	.254
	Sig. (2-tailed)								.002	.052	.001	.241
	N							24	22	23	23	23
I promote a balance between direct lecture teaching and teaching strategies centered on students' active participation.	Pearson Correlation								1	.612**	.592**	.133
	Sig. (2-tailed)									.002	.004	.555
	N									22	22	22
I promote learning through reflection.	Pearson Correlation									1	.538**	.205
	Sig. (2-tailed)										.008	.347
	N									23	23	23
I try to develop ways of assessing work which require independent thought and not only the use of memory.	Pearson Correlation										1	.203
	Sig. (2-tailed)											.354
	N											23
I use a variety of resources to support learning.	Pearson Correlation											1
	Sig. (2-tailed)											
	N											23

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

A Cronbach's Alpha was calculated for the dimension 'Planning with creativity in mind'. The Cronbach's Alpha was .834 which represents a high level of reliability. Table 10.7 shows the item-total statistics. The maximum score for each item was 5 giving a maximum for the whole dimension of 55. The table also sets out how the Cronbach's Alpha might be improved through item deletion. The only item where deletion would improve consistency was 'I use innovative strategies to get students' attention' ($r = .842$ if item is deleted).

Table 10.7 Planning with creativity in mind: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I plan the course with the facilitation of creativity in mind.	42.8	23.39	.383	.830
When designing classes I take into account students' interests as a way to generate motivation	42.5	22.15	.385	.835
I use innovative strategies to get students' attention.	43.0	24.21	.238	.842
My classes are interactive, since they include students' participation.	42.4	21.83	.563	.816
I explicitly ask for creativity in students' work and assignments	42.8	23.64	.323	.835
I relate knowledge to real life challenges.	42.4	21.10	.610	.811
I provide opportunities for students to experiment with ideas.	42.6	20.66	.650	.807

I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation.	42.6	21.81	.610	.812
I promote learning through reflection.	42.4	21.51	.692	.806
I try to develop ways of assessing work which require independent thought and not only the use of memory.	42.3	22.01	.720	.807
I use a variety of resources to support learning.	42.9	21.73	.519	.820

10.4.2 Teaching with creativity in mind: descriptive statistics

Table 10.8 shows the percentages obtained for each of the response options. The number of responses is also given. The items in the dimension of 'Teaching with creativity in mind' with a higher percentage of responses in the category of always were 'I use different teaching strategies to promote students' participation and involvement in the learning process' (54.5%); and 'I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving' (39.5%).

Table 10.8 Teaching with creativity in mind: descriptive statistics for each item of the dimension

	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Missing values
1. I create opportunities to stimulate the use of students' imagination.	39.1% 9	26.1% 6	34.8% 8	0% 0	0% 0	1
2. I organize my classes presenting information in interesting and attractive ways.	31.8% 4	50% 11	18.2% 4	0% 0	0% 0	2
3. I use different teaching strategies to promote students' participation and involvement in the learning process.	54.5% 12	18.2% 4	4.5% 1	0% 0	0% 0	5
4. I present challenges to students which require creativity to be solved, problems for which there are no current solutions.	36.4% 8	22.7% 5	36.4% 8	4.5% 1	0% 0	2
5. I use problem based learning as a means of enabling students to be more innovative.	25.0% 5	45.0% 9	30.0% 6	0% 0	0% 0	4
6. At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	13.6% 3	45.5% 10	22.7% 5	13.6% 3	4.5% 1	2

7. I use creative teaching strategies to promote students' curiosity.	4.5% 1	40.9% 9	50.0% 11	4.5% 1	0% 0	2
8. I try to implement meaningful activities that allow students to apply their knowledge.	33.3% 8	45.8% 11	16.7% 4	0.0% 0	4.2% 1	8
9. I use educational games to stimulate students' imagination.	9.1% 2	31.8% 7	45.5% 10	4.5% 1	9.1% 2	2
10. I include creative teaching techniques in my courses	27.3% 6	31.8% 7	27.3% 6	13.6% 3	0% 0	2
11. I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.	39.1% 9	30.4% 7	26.1% 6	0% 0	4.3% 1	1

10.4.2.1 Teaching with creativity in mind: correlations

A correlation analysis was undertaken for the items included in the dimension 'Teaching with creativity in mind'. Table 10.11 shows the correlations for each statement included under the dimension 'teaching with creativity in mind'.

As shown in Table 10.9, three items showed a higher number of significant correlations with other items than most others. The items were: 'I present challenges to students which require creativity to be solved, problems for which there are no current solutions'; 'I use different teaching strategies to promote students' participation and involvement in the learning process'; and 'I include creative teaching techniques in my courses'

The item: 'I present challenges to students which require creativity to be solved, problems for which there are no current solutions' showed moderate statistically significant correlations

with five items: 'I include creative teaching techniques in my courses' ($r=.592$, $p = 0.01$); 'I create opportunities to stimulate the use of students' imagination. ($r=.449$, $p = 0.05$); 'I use problem based learning as a means of enabling students to be more innovative' ($r=.481$, $p = 0.05$); 'I use creative teaching strategies to promote students' curiosity' ($r=.432$, $p = 0.05$); and 'I try to implement meaningful activities that allow students to apply their knowledge' ($r=.433$, $p = 0.05$).

These correlations suggest that when teachers present challenges to students which require Teaching with creativity in mind to be solved, they tend to use problem based learning; teaching strategies that promote students' curiosity and imagination and that promote students' knowledge application through meaningful activities.

Statistically significant correlations at the 0.01 level were found between the item 'I use different teaching strategies to promote students' participation and involvement in the learning process' and 'At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood' ($r = .544$); 'I use creative teaching strategies to promote students' curiosity' ($r = .674$); and 'I use educational games to stimulate students' imagination' ($r = .604$). There was also a moderate correlation at the 0.05 level of significance with 'I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving' ($r = .461$).

The correlations between these items suggest that when teachers look to promote students' participation and involvement in the learning process, they are inclined to use different types of strategies that may promote a creative mood, stimulate students' curiosity and imagination and include activities that require students to get involved in a creative process.

The item 'I include creative teaching techniques in my courses' had strong correlations with 'I present challenges to students which require creativity to be solved, problems for which there are no current solutions. ($r = .592$, $p = .01$); and 'I use problem based learning as a means of enabling students to be more innovative. ($r = .719$, $p = .01$). The statement also had moderate correlations with 'I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving ($r = .518$, $p = .05$) and 'I create opportunities to stimulate the use of students' imagination ($r= .529$, $p = .05$).

These correlations suggest that when teachers adopt creative teaching techniques in their classes they are inclined to stimulate students' imagination, present challenges and use different teaching strategies such as problem based learning to facilitate students' getting involved in a creative process and to stimulate students' capacity to innovate.

Table 10.9 Teaching with creativity in mind: correlation among items

		I create opportunities to stimulate the use of students' imagination.	I organize my classes presenting information in interesting and attractive ways.	I use different teaching strategies to promote students' participation and involvement in the learning process.	I present challenges to students which require creativity to be solved, problems for which there are no current solutions.	I use problem based learning as a means of enabling students to be more innovative.	At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	I use creative teaching strategies to promote students' curiosity.	. I try to implement meaningful activities that allow students to apply their knowledge.	I use educational games to stimulate students' imagination.	I include creative teaching techniques in my courses	I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.
I create opportunities to stimulate the use of students' imagination.	Pearson Correlation	1	.538**	.278	.449*	.387	.155	.407	.349	.159	.529*	.297
	Sig. (2-tailed)		.010	.211	.036	.092	.492	.060	.103	.481	.011	.168
	N	23	22	22	22	20	22	22	23	22	22	23
I organize my classes presenting information in interesting and attractive ways.	Pearson Correlation		1	.182	.088	.203	.222	.164	-.133	-.118	.378	.137
	Sig. (2-tailed)			.417	.697	.391	.321	.467	.555	.601	.083	.543
	N		22	22	22	20	22	22	22	22	22	22
I use different teaching strategies to promote students' participation and involvement in the learning process.	Pearson Correlation			1	.306	.079	.544**	.674**	.353	.604**	.219	.461*
	Sig. (2-tailed)				.166	.740	.009	.001	.107	.003	.328	.031
	N			22	22	20	22	22	22	22	22	22
I present challenges to students which require creativity to be solved, problems for which there are no current solutions.	Pearson Correlation				1	.481*	.185	.432*	.433*	.358	.592**	.418
	Sig. (2-tailed)					.032	.409	.045	.044	.101	.004	.053
	N				22	20	22	22	22	22	22	22
I use problem based learning as a means of enabling students to be more innovative.	Pearson Correlation					1	.218	.244	.106	-.249	.719**	.447*
	Sig. (2-tailed)						.357	.299	.656	.289	.000	.048
	N					20	20	20	20	20	20	20

At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	Pearson Correlation	1	.537*	-.032	.393	.393	.022
	Sig. (2-tailed)		.010	.889	.071	.071	.924
	N	22	22	22	22	22	22
I use creative teaching strategies to promote students' curiosity.	Pearson Correlation		1	.263	.638**	.394	.438*
	Sig. (2-tailed)			.236	.001	.070	.041
	N		22	22	22	22	22
I try to implement meaningful activities that allow students to apply their knowledge.	Pearson Correlation			1	.337	.183	.486*
	Sig. (2-tailed)				.125	.415	.019
	N			24	22	22	23
I use educational games to stimulate students' imagination.	Pearson Correlation				1	.073	.277
	Sig. (2-tailed)					.746	.212
	N				22	22	22
I include creative teaching techniques in my courses	Pearson Correlation					1	.518*
	Sig. (2-tailed)						.014
	N					22	22
I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.	Pearson Correlation						1
	Sig. (2-tailed)						
	N						23

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The other statistically significant correlations showed in Table 10.9 indicate that:

- when teachers look to promote students' imagination they tend to organize information in interesting and attractive ways and to present challenges which require Teaching with creativity in mind, such as unstructured problems.
- Teachers who look to promote students' participation, involvement and curiosity tend to use different teaching strategies to accomplish these objectives.
- When teachers are interested in providing opportunities for students to apply their knowledge they use challenges which to be solved, require Teaching with creativity in mind, such as problems for which there are no current solutions or the generation of new projects.
- When teachers use educational games to stimulate students' imagination, they may also use teaching strategies to promote students' curiosity and present challenges through problems which no have current solutions.
- When teachers use generative activities that require the students to get involved in the creative process, for example, project work, problem solving, they promote students' participation and involvement in the learning process.

A Cronbach's Alpha was calculated for the dimension 'thinking with creativity in mind'. This was .970, which represents a very high level of internal cohesion. Table 10.10 shows that any deletion of items would not improve on the Cronbach's Alpha.

Table 10.10 Teaching with creativity in mind: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I create opportunities to stimulate the use of students' imagination.	37.5	29.10	.512	.798
I organize my classes presenting information in interesting and attractive ways.	37.4	31.93	.288	.816
I use different teaching strategies to promote students' participation and involvement in the learning process.	37.6	29.20	.583	.793
I present challenges to students which require creativity to be solved, problems for which there are no current solutions.	37.6	27.71	.586	.790
I use problem based learning as a means of enabling students to be more innovative.	37.5	30.47	.446	.804
At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	38.0	28.89	.397	.812
I use creative teaching strategies to promote students' curiosity.	38.1	29.14	.705	.786
. I try to implement meaningful activities that allow students to apply their knowledge.	37.4	31.62	.328	.813
I use educational games to stimulate students' imagination.	38.3	29.48	.365	.814
I include creative teaching techniques in my courses	37.8	26.69	.660	.781

I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.	37.6	27.83	.514	.798
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10.4.3 Being creative: descriptive statistics

Table 10.11 sets out the descriptive statistics relating to responses to the statements in the dimension 'Being Creative'.

Table 10.11 Being creative: descriptive statistics

	Always (5)	Often (4)	Sometimes (3)	Rarely (2)	Never (1)	Missing values
1. I am willing to try new ways of teaching.	68.2% 15	13.6% 3	13.6 3	4.5% 1	0% 0	2
2. I change teaching strategies and teaching methods from time to time in order to introduce novelty.	13.6% 3	40.9% 9	40.9% 9	0% 0	4.5% 1	2
3. I encourage students' curiosity.	52.4% 11	33.3% 7	14.3% 3	0% 0	0% 0	3
4. I foster a questioning attitude in students.	63.6% 14	27.3% 6	9.1% 2	0% 0	0% 0	2

5. I encourage students to take initiatives.	57.1% 12	23.8% 5	14.3% 3	4.8% 1	0% 0	3
6. I promote learning from mistakes.	47.6% 10	38.1% 8	14.3% 3	0% 0	0% 0	0
7. I help students to develop their confidence and self-esteem.	71.4% 15	23.8% 5	4.8% 1	0% 0	0% 0	3
8. I am willing to experiment with new teaching methods and strategies to foster students' creativity.	52.4% 11	33.3% 7	14.3% 3	0% 0	0% 0	3
9. I respect students' opinions.	90.0% 18	5.0% 1	5.0% 1	0% 0	0% 0	4
10. A good sense of humour is important as a means of creating a relaxed environment in my classes.	39.1% 9	34.8% 8	26.1% 6	0% 0	0% 0	1

11. I recognize and reward students' creativity.	38.1%	38.1%	19.0%	4.8%	0%	3
	8	8	3	1	0	

As shown in Table 10.11, the items with the highest percentage of responses in the category always were 'I respect students opinions' (90%); and 'I help students to develop their confidence and self-esteem' (71.4%). The responses given to these items suggest that teachers' show a positive disposition to support students' overall development. Respecting students' opinions as well as supporting students' self-esteem are two essential elements of an environment favourable for creativity.

Another item which had a high percentage of responses in the category of always was 'I am willing to try new ways of teaching' (68.2%). This indicates a positive disposition towards introducing novelty in teaching. This is important for creative teaching.

10.4.3.1 Being creative: correlations

A correlation analysis was undertaken for the items included in the dimension 'Being creative'. The section that follows presents the results of this analysis and includes findings derived from the resulting correlations between items. Table 10.12 shows correlations for each of the statements.

As shown in Table 10.12, three items within the dimension of 'Being creative', showed a high number of significant correlations with other items. These were: 'I encourage students to take initiatives'; 'I foster a questioning attitude in students'; and 'I am willing to try new ways of teaching'.

The item: 'I encourage students to take initiatives' showed high statistically significant correlations at the 0.01 level with the following items: 'I encourage students' curiosity' ($r = .617$); 'I foster a questioning attitude in students' ($r = .672$); 'I promote learning from mistakes'

($r = .771$); and 'I help students to develop their confidence and self-esteem' ($r = .668$). These correlations suggest that teachers who are interested in encouraging students to take the initiative are inclined to foster a questioning attitude in their students, promote learning from mistakes and are supportive of students' self-confidence. They are also inclined to recognize and reward students' creativity.

There were also several high correlations with the item: 'I foster a questioning attitude in students. This had statistically significant correlations at the 0.01 level with 'I encourage students' curiosity' ($r = .776$) and 'I encourage students to take initiatives' ($r = .672$). It also had a statistically significant correlation at the 0.05 level with 'I recognize and reward students' creativity' ($r = .487$). The correlation between these items suggests that when teachers are inclined to promote a questioning attitude in their students, they look for ways to encourage students' curiosity, taking the initiative and recognizing and rewarding creativity.

There were also strong correlations between 'I am willing to try new ways of teaching 'with 'I change teaching strategies and teaching methods from time to time in order to introduce novelty' ($r = .638, p = .01$) and 'I am willing to experiment with new teaching methods and strategies to foster students' creativity' ($r = .605, p = .01$); suggesting that when teachers want to try new ways of teaching they tend to introduce novelty through changing teaching strategies and methods from time to time and to experiment with new ways of teaching to promote students' creativity.

Two items 'I respect students' opinions' and 'A good sense of humour is important as a means of creating a relaxed environment in my classes' showed no correlations with any other items. The lack of correlations suggests that these items are measuring different constructs from the other items. These behaviours seem to be independent of the others.

Table 10.12 Being creative: correlations between items

		I am willing to try new ways of teaching.	I change teaching strategies and teaching methods from time to time in order to introduce novelty.	I encourage students' curiosity.	I foster a questioning attitude in students.	I encourage students to take initiatives.	I promote learning from mistakes.	I help students to develop their confidence and self-esteem.	I am willing to experiment with new teaching methods and strategies to foster students' creativity.	I respect students' opinions.	A good sense of humour is important as a means of creating a relaxed environment in my classes.	I recognize and reward students' creativity.
I am willing to try new ways of teaching.	Pearson Correlation	1	.638**	.188	.276	.237	-.131	-.132	.605**	-.147	.334	.130
	Sig. (2-tailed)		.001	.415	.214	.302	.572	.568	.004	.537	.139	.574
	N	22	22	21	22	21	21	21	21	20	21	21
I change teaching strategies and teaching methods from time to time in order to introduce novelty.	Pearson Correlation		1	.077	.149	.159	.050	-.063	.517*	-.356	.251	-.259
	Sig. (2-tailed)			.740	.508	.492	.831	.787	.016	.123	.273	.257
	N		22	21	22	21	21	21	21	20	21	21
I encourage students' curiosity.	Pearson Correlation			1	.776**	.617**	.383	.094	.087	-.133	.241	.598**
	Sig. (2-tailed)				.000	.003	.095	.694	.714	.587	.307	.005
	N				21	21	20	20	20	19	20	20
I foster a questioning attitude in students.	Pearson Correlation				1	.672**	.310	.049	.120	-.172	.084	.487*
	Sig. (2-tailed)					.001	.172	.833	.604	.468	.716	.025
	N					21	21	21	21	20	21	21
I encourage students to take initiatives.	Pearson Correlation					1	.771**	.668**	.256	-.115	.066	.623**
	Sig. (2-tailed)						.000	.001	.276	.638	.782	.003
	N						20	20	20	19	20	20
I promote learning from mistakes.	Pearson Correlation						1	.632**	-.154	-.170	.169	.254
	Sig. (2-tailed)							.002	.505	.474	.475	.279
	N							21	21	21	20	20

I help students to develop their confidence and self-esteem.	Pearson Correlation						.632**	1	-.039	-.074	.102	.415
	Sig. (2-tailed)						.002		.867	.757	.669	.069
	N						21	21	21	20	20	20
I am willing to experiment with new teaching methods and strategies to foster students' creativity.	Pearson Correlation								1	-.153	-.017	.238
	Sig. (2-tailed)									.519	.943	.312
	N								21	20	20	20
I respect students' opinions.	Pearson Correlation									1	-.244	.119
	Sig. (2-tailed)										.313	.629
	N									20	19	19
A good sense of humour is important as a means of creating a relaxed environment in my classes.	Pearson Correlation										1	.062
	Sig. (2-tailed)											.795
	N										23	20
I recognize and reward students' creativity.	Pearson Correlation											1
	Sig. (2-tailed)											
	N											21

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The Cronbach's Alpha for 'Being creative' was .616. This was the lowest of the three dimensions. Unsurprisingly deleting the statements relating to taking account of students' opinions and having a sense of humour would have increased the Cronbach's Alpha (see Table 10.13).

Table 10.13 Being creative: Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am willing to try new ways of teaching.	44.0588	12.809	.362	.572
I change teaching strategies and teaching methods from time to time in order to introduce novelty.	44.8235	13.779	.190	.617
I encourage students' curiosity.	43.9412	13.809	.424	.570
I foster a questioning attitude in students.	43.8824	13.360	.544	.551
I encourage students to take initiatives.	44.0588	11.434	.666	.495
I promote learning from mistakes.	44.0588	14.309	.305	.590
I help students to develop their confidence and self-esteem.	43.8235	14.029	.401	.576
I am willing to experiment with new teaching methods and strategies to foster students' creativity.	44.1765	13.529	.345	.579
I respect students' opinions.	43.7647	17.816	-.320	.727

A good sense of humour is important as a means of creating a relaxed environment in my classes.	44.3529	15.118	.058	.637
I recognize and reward students' creativity.	44.3529	12.368	.482	.543

10.5 Comparisons and relationships between the three dimensions

Measures of central tendency were computed for each dimension. The maximum possible score for each was 55. Measures of dispersion were also computed to understand the variability of scores. Table 10.14 shows the results.

Table 10.14 Descriptive statistics for the three theoretical dimensions of 'Crea-Teach'

	N	Minimum	Maximum	Mean	Std. Deviation
Planning with creativity in mind dimension	20	35	53	46.9	5.14
Teaching with creativity in mind dimension	20	32	53	41.5	5.89
Being creative dimension	17	32	49	43.8	3.75

The three dimensions had different means and standard deviations. Overall, the mean responses showed that teachers responded positively to the statements recognizing that they often achieved some of activities, strategies or attitudes suggested by the statements in the instrument. However, based on the large Standard Deviations it seems that teachers' practices varied quite considerably. Table 8.27 sets out the correlations between the three dimensions.

The correlation between the dimension 'Planning with creativity in mind' and 'Teaching with creativity in mind' was significant at the 0.01 level (2-tailed) $r = .825$ and with the dimension of 'Being creative' was also significant at the 0.01 level (2-tailed) with $r = .706$.

The high correlation amongst 'Planning with creativity in mind' and 'Teaching with creativity in mind' suggests that items considered under each one of these dimensions are highly related. However they still may be considered as two separate dimensions as proposed on the pedagogical model. The first one, taking Jackson's frame of reference (Jackson, 2006) is related to thinking ahead and deciding what to do and the second one is doing / producing things broadly in line with planned intention. The high correlation between 'Planning with creativity in mind' and 'Being creative' could mean that there is an attitudinal component related to having intention and disposition to teach creatively for creativity when thinking ahead about the kind of teaching strategies and conditions that need to be put into practice in order to enhance students' motivation, involvement and creative thinking. The correlation between 'Teaching with creativity in mind' and 'Being creative' was statistically significant at the 0.05 level (2-tailed) $r = .519$. This suggests that the statements in each of these dimensions are measuring different phenomena. Planning with creativity in mind is concerned with planning, designing and being aware of what needs to be included in a course in order to promote creativity. Being creative is a dimension which includes statements related to attitudinal dispositions towards change, experimentation and to teacher-student relationships. Because of the small size of the sample the outcome of these correlations needs to be interpreted with caution. A factor analysis with a much larger sample is needed to establish the nature of the dimensions and their relationships with each other.

Table 8.27 Correlation between each of the three dimensions in Crea-teach

		Planning with creativity in mind dimension	Teaching with creativity in mind dimension	Being dimension
	Pearson Correlation		.825**	.706**
	Sig. (2-tailed)		.0001	.002

Planning with creativity in mind dimension	N	20	18	17
Teaching with creativity in mind	Pearson Correlation	.825**		.519*
	Sig. (2-tailed)	.0001		.047
	N	18	20	15
Being creative	Pearson Correlation	.706**	.519*	
	Sig. (2-tailed)	.002	.047	
	N	17	15	17
**. Correlation is significant at the 0.01 level (2-tailed).				
*. Correlation is significant at the 0.05 level (2-tailed).				

A Cronbach Alpha was computed for the whole instrument and was .886.

Table 10.15 shows the item total statistics. A slight improvement could be made to the internal consistency by deleting the item 'A good sense of humour is important as a means of creating a relaxed'. If this was carried out the Cronbach's Alpha would be .891.

Table 10.15 Item-total statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
I am willing to try new ways of teaching.	134.73	146.06	.315	.885
I change teaching strategies and teaching methods from time to time in order to introduce novelty.	135.53	146.41	.301	.885
I encourage students' curiosity.	134.53	147.26	.449	.882
I foster a questioning attitude in students.	134.46	144.55	.648	.879
I encourage students to take initiatives.	134.66	140.52	.608	.878
I promote learning from mistakes.	134.66	146.66	.482	.881
I help students to develop their confidence and self-esteem.	134.46	149.41	.316	.884
I am willing to experiment with new teaching methods and strategies to foster students' creativity.	134.86	146.26	.396	.883
I respect students' opinions.	134.13	154.55	.000	.886
A good sense of humour is important as a means of creating a relaxed environment in my classes.	135.06	154.92	-.051	.891
I recognize and reward students' creativity.	134.93	143.35	.458	.881

I plan the course with the facilitation of creativity in mind.	135.00	148.42	.366	.883
When designing classes I take into account students' interests as a way to generate motivation	134.66	140.95	.537	.880
I use innovative strategies to get students' attention.	135.13	151.26	.177	.886
My classes are interactive, since they include students' participation.	134.53	152.12	.130	.887
I explicitly ask for creativity in students' work and assignments	135.00	147.85	.340	.884
I relate knowledge to real life challenges.	134.66	140.66	.667	.877
I provide opportunities for students to experiment with ideas.	134.80	143.17	.548	.880
I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation.	134.73	147.49	.433	.882
I promote learning through reflection.	134.53	146.41	.506	.881
I try to develop ways of assessing work which require independent thought and not only the use of memory.	134.40	147.11	.651	.880
I use a variety of resources to support learning.	135.13	141.26	.626	.878

I create opportunities to stimulate the use of students' imagination.	135.06	142.78	.520	.880
I organize my classes presenting information in interesting and attractive ways.	134.80	153.88	.019	.888
I use different teaching strategies to promote students' participation and involvement in the learning process.	135.0667	142.92	.575	.879
I present challenges to students which require creativity to be solved, problems for which there are no current solutions.	135.06	140.06	.549	.879
I use problem based learning as a means of enabling students to be more innovative.	135.20	146.17	.401	.883
At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	135.60	144.97	.286	.887
I use creative teaching strategies to promote students' curiosity.	135.66	141.238	.722	.877
. I try to implement meaningful activities that allow students to apply their knowledge.	134.93	148.35	.349	.883

I use educational games to stimulate students' imagination.	135.86	141.55	.421	.883
I include creative teaching techniques in my courses	135.26	144.06	.439	.882
I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.	135.06	140.21	.472	.881

10.6 Summary and conclusions

A model for 'creative teaching for creativity' was developed using findings from the initial study undertaken to identify the implicit theories of students and teachers in relation to their conceptions of creativity, of what facilitated or hindered their creativity in the classroom and their conception of a creative teacher. To design the model, salient indicators of creative teaching and creative teachers from previous research and explicit theories were also taken into account.

The model included three theoretical dimensions of 'creative teaching for creativity' which integrated the knowledge, skills and attitudes teachers require for promoting students' creativity in the classroom. These dimensions are: 'Planning with creativity in mind', 'Teaching with creativity in mind' and 'Being creative'. A pilot study to assess whether the tool could accomplish the aim for which it was created, was undertaken and in this chapter the findings from this pilot study were presented. Results from the quantitative analysis and correlations within and between dimensions led to the following conclusions.

The items in each dimension showed statistically significant correlations between them, forming clusters of items. These correlations indicated a strong internal consistency within each dimension. Only two items in the dimension of being creative showed no correlations

with other items and the deletion of only one item relating to the use of humour in the classroom would have improved the overall Cronbach's Alpha.

While it would have been preferable to undertake a factor analysis of the items this was not possible because of the relatively small sample size. Preliminary analysis of the data suggest that the measure does assess three constructs as proposed in the theoretical model. Further study with a larger sample is required before any strong conclusions can be drawn in this regard. However, the qualitative analysis shows that in terms of supporting teachers' reflection on their practice it would appear to be useful, whatever the underlying dimensions.

These preliminary findings suggest that in teaching creatively there is one domain that involves what teachers know and understand about creativity; knowledge they use when planning for teaching creatively for creativity. Another domain involves how they put into practice their knowledge and understanding of teaching for creativity. This suggests that how teachers view and understand creativity is related to what they do in the classroom to put creative teaching into practice during the teaching-learning process in order to promote their students' creativity. The attitudinal/affective domain permeates the planning and teaching dimension since it involves a positive attitude and motivation towards enhancing students creativity through creating the conditions required in the classroom. So, knowing-planning, doing-teaching and being although they may be highly related, seem to represent three different domains of a general pedagogical model of teaching for creativity.

The following Chapter (11) offers general discussion and conclusions of the present research including limitations, contributions and future research recommendations.

Chapter 11 Discussion and conclusions

*'Not everything important is measurable and
not everything measurable is important.'*

Elliott Eisner

11.1 Introduction

The overarching purpose of this research was to design a pedagogical model for creative teaching and a tool to enhance teachers' reflection on their teaching practices as they related to developing creativity in their students. In the present chapter, the limitations of the research are set out, followed by discussion of the findings in relation to the research questions. The contribution of this research is then considered along with the educational implications and recommendations for future research.

11.2 Limitations of the implementation of the research

This research has limitations which mean that a degree of caution is required in their interpretation. These are set out in this section.

The initial study to identify Mexican teachers' and students' implicit theories about creativity was limited as the samples were relatively small. This meant that it was not possible to generalize the findings beyond the context of the research. In Mexican Higher Education at the time of the research, it was not easy to find teachers who were willing to voluntarily participate in research given the amount of time they were required to dedicate to academic and administrative activities including covering the content included in academic programmes, doing research, publishing, participating in academic meetings, and attending Continuing Professional Development events in order to meet promotion requirements. For this reason, those participating in the initial study were teachers who were about to participate in a

creativity workshop conducted by the researcher. The teachers who were enrolled in the workshops were a self-selecting group who valued creativity and who might therefore be more knowledgeable about creativity than their peers. They may have already had more positive attitudes and interest in creativity and creative teaching than their non-participating peers. The questionnaires were administered at the start of the training so they were communicating their perceptions based on their previously held views not what they had learned as part of the training. It is also possible that their responses were influenced by the fact that the researcher was going to facilitate the workshop. This may have led to them attempting to meet what they believed were the researchers expectations.

A further limitation is the relatively small number of questions used in the pilot study to explore Mexican higher education students' and teachers' conceptions of creativity and creative teachers. A decision was made to keep the questionnaire short to ensure completion of the entire questionnaire. A similar approach was adopted by Isaksen (1998) when exploring perceptions of organizational climate and was effective. It therefore seemed appropriate to use it in the current study.

The team of volunteers who were involved in collecting data from the students and responsible for noting their responses may have made errors during this process and not accurately recorded their views. Some material may have been omitted or misunderstood, despite the fact that the volunteers had all received training.

Due to the way both samples of the initial study were gathered and the relatively small sizes of the samples it was not possible to make statistical inter-group comparisons, including those related to gender, age and academic program.

There were also limitations in the piloting of the tool Crea-teach. The tool was administered online. The teachers participating were from different educational institutions. Those that responded were likely to have been those who already had an interest in creativity, were more inclined to reflect on their current teaching practices and identify the required changes in their teaching and were more likely to have more positive dispositions towards innovation. This could have resulted in bias in the results. The online nature of the research led to the sample being small. This meant that it was not possible to undertake a factor analysis. Overall, it is

clear that further research is needed with a larger and more diverse sample using different ways of administering the self-assessment tool to make this possible.

11.2.1 What conceptions of creativity do Mexican students and teachers hold?

The first research question focused on the conceptions of creativity held by Mexican students and teachers. The findings from this have already been discussed in chapter 8. Overall, in relation to one of the propositions stated in Chapter 4, the Mexican students' and teachers' conceptions of creativity emerging from the research supported with what they considered as enabling or obstructing their creativity, as well as supporting the explicit theories presented in the literature review. The main categories that emerged from the students and teachers responses related creativity to: novelty, newness, originality and to the possibility to improve things. Teachers and students also shared the conception that creativity is a human capacity, and as such, can be developed.

As seen in the literature review, creativity has been related to problem solving (Parnes, 1977; Treffinger et al., 2003). Congruent with this approach, teachers also linked creativity to the possibility of providing 'new solutions to well-known problems' or 'to solve problems in an original way'.

One conception that was unexpected and that emerged from teachers' and students' responses was the connection of creativity to the possibility of improving existing things or practices. In the literature it is more common to find, among lay people, conceptions of creativity being linked to the creation of new things, i.e. with invention and not to improvement. However, as discussed in the literature review, creativity can meet a range of needs and may be applied in different ways, i.e. not only for creating new ideas or items, (invention), but for solving problems by improving an existing product or procedure. This conception is related to what Kirton (2003) defines as an adaptor style.

Mexican students' responses included linking creativity to imagination and as a means of the expression or communication of ideas. These conceptions did not emerged from teachers

responses. However, both processes, imagination and communication, are relevant for creativity and have been studied previously (Damasio, 2001; Jackson, et al., 2006).

Imagination involves creating a diversity of representations (divergence), that may evolve into an unusual product after a process of analysis and evaluation (convergent thought). Teachers did not explicitly mention imagination in their responses. However, they related creativity to 'a way of thinking'. An equivalent category to this did not emerge from the students' responses. It is possible that changing the way that students think is more important from the teachers' perspective. In the words of Passmore: "the stimulation of imagination is important and the teacher can introduce the pupil to 'possible worlds', opening up his mind to alternative modes of feeling, living" (Passmore, 1980, p.163).

When a creator has generated a novel product or has arrived at an original solution, he/she feels the need to communicate to others about the outcomes of the creative process. For young people communicating their ideas and expressing their emotions are central for the process of identity construction. It may be that students in the sample saw creativity as a means of achieving this. The category of creativity as a means of expression or communication of ideas did not emerge from teachers' responses. However, teachers linked creativity to a way of being, which may represent a broader category that involves reason and emotion, thinking, attitudes and self-expression. This approach to creativity has been widely studied from a humanistic approach (Rogers, 1995) which suggests that creativity is a constellation of cognitive, biological, social and affective aspects which together represent a way of approaching reality, challenges, professional and personal situations.

To conclude, the conceptions of creativity that Mexican teachers and students held were highly congruent with explicit theories of creativity. Together these may provide a framework for enhancing creativity in education. Overall, the conceptions indicated that teachers and students believe that creativity is a human capacity that can be developed. This suggests that initiatives promoting creativity in higher education may have positive outcomes.

Interpretations and conceptions of creativity from Mexican teachers and students participating in the initial study are in general aligned with a western approach which emphasis the production or generation of a product (Sharma Sen & Sharma, 2004). However, some teachers of the sample related creativity to a 'way of living' and emphasized the importance of attitudes

which could be more on line with an eastern perspective to a state of personal fulfilment, the expression of an inner essence, spiritual and religious self-expression (Sharma Sen & Sharma, 2004).

11.3 What are Mexican students' and teachers' perceptions of the factors that enhance their creativity in the classroom?

Knowing and understanding students' and teachers' perceptions of what may facilitate their creativity in the classroom is central to defining what teaching for creativity should look like, as well as identifying the kind of conditions that should be created at an organizational and structural level in educational institutions. The findings from the Mexican teachers' and students' responses were considered in relation to the concepts from explicit theories of what promotes creativity and there was considerable agreement. Students and teachers shared perceptions of the following conditions as facilitators of their creativity in the classroom: motivation, dynamism, teachers' positive attitudes, a positive climate and participation. These categories will be explored in the following sections.

Motivation

There has been considerable research in relation to motivation and creativity in education (Amabile, 1996; Runco, 2007; Eisenberger & Armeli, 1997; Cropley & Cropley, 2008). When the students referred to motivation in the classroom, they identified that for them it was very important to be interested in the subject, feel enthusiastic and be willing to invest energy and involvement in the learning activities. Teachers identified the effect that students' motivation and involvement had on their own motivation. Teachers also recognized the importance of their own enthusiasm in teaching, and of how they communicated it while teaching. This was perceived to facilitate their own creativity. It is important to underline the reciprocal effect that students' and teachers' involvement, participation and motivation has and the way it influences the generation of a positive climate for creativity in the classroom.

In education there is an ongoing debate in relation to the role of intrinsic and extrinsic motivation and how education may move students from extrinsic motivation towards intrinsic

motivation (Dabdoub, 1997). This gives emphasis to promoting students' motivation to be involved and to enjoy the learning and creative process per se and not only for the kind of external rewards they may receive.

There has been a debate as to whether it is appropriate to adopt reinforcing mechanisms in relation to creative achievements since this may lead to undue emphasis on extrinsic motivation. For instance, Runco (2007) highlights the possible impact that the use of incentives may have on students, since incentives may induce them to conform to teachers' expectations instead of thinking independently and creatively. Teachers, therefore need to be aware of the way that they use incentives in the classroom particularly when they are linked to activities that involve creativity.

Students' intrinsic motivation can also be enhanced by the way activities are presented, for instance, when teachers set challenges, when they present problems or cases that require a novel approach in order for solutions to be found and students' are required to generate a product or to put their ideas into action. Where such activities are adopted teachers need to communicate with clarity the kind of behaviours, attitudes or ways of thinking that are related to creative performance, as well as defining the criteria that will be taken into account to assess the products or outcomes. The relationship between creativity and assessment is extremely important and needs to be included in teacher education programmes, so that teachers can develop the knowledge, skills and attitudes to be able to promote students' motivation to learn and to create assessments that support rather than hinder this. Clarity in communicating the assessment criteria that will be used to evaluate the creative product is highly important (Besemer, 1998).

Dynamism

Another aspect that students identified as a facilitator of their creativity in the classroom was dynamism and novelty in relation to the learning activities proposed by teachers. A similar category emerged from teachers' responses. This supports the work of Cropley (2001), Sternberg (1991), and Lin (2011) among others, who have all stressed the importance of using a variety of teaching strategies to enhance students' creativity.

Teachers' positive attitudes and positive climate

Teachers and students acknowledged the importance of teachers' attitudes in relation to students' creativity. This supports earlier research which identified their impact on the development of students' self-confidence (Fryer, 1989). The role of feedback is relevant to the promotion of self-confidence and self-image. This is related to assessment. The way that feedback is delivered should take into account that for a creator it is sometimes difficult to separate assessment of the product from the assessment of the self. This affective aspect is related to having a positive climate in the classroom, which also emerged from the responses of both students and teachers. Several studies have identified the importance of teachers' attitudes towards creativity and its effect in enhancing students' creativity (Fryer & Collings, 1991; Fryer, 1989; De Souza Fleith, 2000) and the importance of the conditions that characterize a positive climate for creativity (Torrance, 1965; Isaksen et al. 1999; Hickey, 1999; Torrance, 1965; Raina, 1989).

Teacher education programmes need to include learning outcomes and activities which enable teachers to be able to purposefully create conditions conducive for creativity and the development of students' thinking skills in the classroom and through the whole teaching-learning process.

Differences in students' and teachers' responses

There were some differences in the responses made by Mexican teachers and students. Three categories mentioned by students did not emerge from the teachers' responses. These were 'teaching and learning resources', 'teaching abilities' and 'the use of challenges' as teaching strategies. Why teachers did not refer to these is not clear. Each of these categories requires the teacher to have the knowledge, skills and attitudes to use different resources to support learning as well as being able to use a variety of teaching strategies that may involve challenging students' current knowledge and experience. These categories are related to the dimensions identified as part of what has been called the 'climate for creativity and change' (Isaksen et al., 1999). It is a common perception that creativity can be enhanced when the required resources are available, for example, equipment, materials, and time. However, these are not in themselves sufficient to develop creativity. Other factors may act as constraints (Stokes, 2006). Students' perception of the importance of challenge to their creativity is

congruent with this and is related to what Kirton (2003) calls the paradox of structure: too much structure may limit creativity, but having no boundaries may also inhibit the creative process.

Whether something is challenging depends on the perception of the individual in relation to the particular activities presented and whether they challenge that individual to go beyond her limits in order to respond to the demands of the task. An activity may become challenging when the conditions for completing it are not ideal. There are many examples of this in the arts and sciences (Stokes, 2006) where the constraints of existing practices lead individuals to search for novel ways to surmount difficulties.

In education, it is important to propose tasks according to the level of knowledge and skills that the particular groups of students have, so that tasks are not perceived as so difficult to be impossible paralyzing students' motivation to participate, but are perceived as an opportunity to put students' creativity into action. As mentioned earlier, challenging activities stimulate students' motivation and involvement.

11.4 What are students' and teachers' perceptions of the factors that hinder their creativity in the classroom?

Mexican teachers and students shared three similar perceptions of factors that might hinder their creativity in the classroom: a negative climate, a rigid mindset and apathy. These aspects were negatively related to what both groups mentioned as facilitators of their creativity, i.e. dynamism, the variety of activities, participation and motivation.

'A rigid mindset' from the teachers' point of view was related to following strict procedures and meeting academic standards. A challenge for policy makers and managers is to find ways in which the administrative activities and standardized procedures required to manage education do not absorb too much of teachers' energy and time giving space for teachers to have freedom to invest their creative efforts in teaching.

Mexican students perceived that the adoption of ineffective teaching strategies and monotony hindered their creativity. These aspects reflected the opposite of what were identified as facilitators of creativity.

Differences

Mexican teachers perceived as obstacles to their creativity, the lack of adequate resources for teaching, including time. These may be conceptualized as external constraints. They also mentioned internal or personal constraints, such as stress (that may be caused by external or internal factors), fear and lack of self-confidence.

Teacher education programmes need to take these factors into account and support teachers in overcoming their fears and developing self-confidence so that they become willing to make changes in their teaching practices in order to foster students' creativity.

11.5 What conceptions of creative teachers do students and teachers hold?

Research emphasizes pedagogy or, what a teacher does more than what a teacher is or is able to do. How would the characteristics identified by creativity researchers in relation to highly creative persons be expressed in teachers who might be considered creative? Studies of the characteristics associated with persons who are considered creative include, personality traits, attitudes and skills. The findings from the Mexican students' and teachers' responses in the research are congruent with such characterizations. Their responses show congruency with their conceptions of creativity and of what enhances and constrains their creativity.

Six common categories emerged from the teachers and students responses characterizing a creative teacher as an innovator, who possesses wide and current knowledge, who enjoys teaching and is enthusiastic, with good communication skills (in particular being an active listener) and someone who stimulates students' motivation and who has positive attitudes. These categories are consistent with what has already been suggested as the characteristics of a creative person and a creative teacher in particular. For example, Csíkszentmihályi (1988) has mentioned commitment to self-improvement, and to deepening the knowledge domain.

Sternberg (1988) in his characterization includes innovator and non-conformist, open to novelty, imaginative and with high self-esteem.

The responses of the Mexican students and teachers participating in the initial study revealed that the role of positive attitudes was important for the enhancement of personal creativity and for creating a positive environment to enhance others' creativity. Such attitudes as being flexible, empathetic, respectful and humble have been suggested by researchers such as Amabile (1988), Sternberg (1988), Jackson (2005).

Differences were also found in some categories between responses from the students and teachers. Different elements emerged as priorities. Students gave importance to traits such as: enthusiastic and effective teaching, being dynamic and using a variety of methods and resources. These teacher characteristics were seen as enhancing students' motivation, learning and creativity. The Mexican students' implicit theories in relation to a creative teacher support the conceptions, attributes and characteristics offered by explicit theories (e.g. Cropley, 2001; Urban, 1996; Root-Bernstein & Root-Bernstein, 2000; Runco, 2003; Craft, 2006; Fryer & Collings, 1991; Fryer, 1996; Bramwell et al., 2011).

Three characteristics of a creative teacher emerged from the teacher data that did not emerge from the students responses.

1. A creative teacher promotes students' creative thinking. This relates to Craft's conceptualization of 'teaching for creativity' (Craft, 2004; NACCCE, 1999).
2. A creative teacher is imaginative. Teachers participating in Tan's research (Tan, 2000) mentioned this characteristic. It is also related to the findings on creativity in Fryer and Collings' study (1991).
3. A creative teacher is interested in students' learning. This characteristic is related to a student centred and humanistic approach, which has been previously related to creative teaching (Torrance & Myers, 1970; Fryer & Collings, 1991).

11.6 To what extent can teachers' awareness of their teaching practices relating to creativity be enhanced through a process of self-reflection supported by the use of a self-assessment tool?

The two open-ended statements from the second section of the tool 'Crea-teach', were designed to assess Mexican teachers' perceptions of their experiences of completing the self-assessment tool Crea-teach. They were designed to establish whether the tool could accomplish the aim for which it was developed, i.e. to enhance teachers' reflection on their teaching practices in relation to adopting a 'creative teaching for creativity' approach, and to identify the changes they were willing to make to strengthen this approach in their teaching.

Results of the pilot application of the self-assessment tool Crea-teach, reflected what Mexican teachers considered they were currently doing from their responses to the 'ideas' or 'prompts' given by the statements in the tool.

The responses given by the Mexican teachers to the two open questions:

- 'I found that the items of this instrument are useful for me since they...'
- 'From my reflection on these items, some of the changes I would like to make in order to promote students' creativity are...'

confirmed that the tool accomplished the purpose for which it was designed, in congruence with proposition fourth mention in Chapter 4, teachers' reflections on and awareness of their teaching practices in relation to how they may enhance or inhibit their students' creativity, may support their motivation and open-mindedness towards making the changes in their daily teaching practices, and their global approach to the teaching-learning approach, required for a more creative teaching approach.

Moreover, the responses given to these two questions indicated that teachers, once they had the opportunity to think about the teaching practices that they were not adopting were inclined to make changes. They expressed awareness of the need to do more, or differently, in order to enhance their students' creativity. This acknowledgement may represent a point of

departure for a personal transformation process. This was the purpose of the development of the pedagogical model for creative teaching, which has been the focus of this research.

The creative teacher needs to develop the ability to reflect on his or her professional practice within an environment characterized by uncertainty and continuous change, and be able to respond to those circumstances. The findings from the pilot study of the tool confirm that it can be useful as a way to prepare teachers as a first step or initial stage of a teacher education programme for creative teaching. Although there were only a relatively small number of responses the findings suggest that the tool was successful in relation to the aim for which it was created since teachers' reported that the tool helped them to reflect on their teaching as well as to identify some of the changes they could make to promote students' creativity.

Although the size of the sample was not sufficiently large to undertake a factor analysis, a correlation analysis was undertaken to explore the relationships among the items in the tool. The results of this must be interpreted with caution because of the small sample size. However, the findings suggest that the three dimensional model proposed may have validity. Further research with a much larger sample will be needed to clearly establish the relationships between the three theoretical dimensions included in the pedagogical model proposed.

11.7 Educational implications of the research findings

Once educational institutions, employers and governments have recognized the importance of including creativity in education, it is essential to include creativity in teaching education programmes. Lecturer education programmes need to include this as the norm and opportunities need to be available in relation to continuing education for lecturers.

It would not be sufficient to merely include concepts (factual or procedural), in relation to creativity in training programmes, courses or workshops, since, creative teaching requires a transformation process from inside-outside so that teachers may become involved in a continuous change process that will allow them to introduce what is needed to enhance their creativity and their students' creativity in their professional practice as teachers.

Creative teaching for creativity requires awareness from teachers of what they already are doing that enhances or impedes students' creativity; awareness in relation to their pre-conceptions or implicit theories of the nature of creativity. The process of transforming teaching towards a more creative approach is facilitated through reflection and experimentation. One crucial aspect of this is to consider how this change process can be enhanced. Creative teaching could be assessed from the pedagogical point of view, identifying whether the teaching strategies used by the teachers as well as the attitudes and behaviours they adopt in the classroom are aligned with what has been identified as enablers of creativity. Change can also be assessed taking into account students' perceptions and the delivery of "creative" products or evidence of their creative achievements.

In the present research the tool developed was not intended to assess teachers' creativity. It was focused on promoting teachers' reflection on their current teaching practices and to enable them to follow up some suggestions of the kind of teaching practices, attitudes and behaviour they might adopt in their teaching towards more creative teaching.

The present research with Mexican students and teachers suggests that creative teaching requires a positive disposition to experiment, to be curious, to learn from mistakes, to be open to the new, to change management, and the adoption of a variety of resources and teaching practices. Most of all the change process that involves creative teaching should be based on teachers' recognition of their strengths and weaknesses in relation to promoting students' creativity; a sense of need in order for the teacher to have the motivation, the energy and the persistence required to consolidate the changes.

In relation to dependability, (reliability from the quantitative perspective), in qualitative studies, the usefulness, value or importance of the findings, are not so much related to the way in which they may be generalized to other populations in a deterministic manner, but for the insights they may provide to explore other similar populations in similar contexts. This is the case in particular in the field of creativity, as in the present research where data is related to the implicit theories of a sample related to a specific context of public Higher Education in Mexico City. The value of such research is given by providing other researchers with detailed information of how the research was conducted and the kinds of findings obtained in order that it may orient future research.

11.8 Future Research

Future research with a larger sample is needed to further explore the framework for a pedagogical model for creative teaching and to design and implement teacher education programmes. It would also be useful to follow up teachers participating in such programmes to explore with them and their students any longer term impact.

Beyond the scope of the intended use of the instrument in the present study, future studies could explore the use of the instrument as a tool to assess creative teaching and continue to explore its validity for this purpose.

It requires time for behavioural and attitudinal change to become embedded in practice. Since the process of changing teaching practice is challenging, motivation may decrease over time so ongoing feedback and support is needed. Teaching education programmes oriented to promote creative teaching, should include a systematized procedure of follow up and coaching in order to give support to teachers as part of the transformation process and all that is involved in integrating creativity on a daily basis in all stages of teaching, from planning to assessment, in relation to the specific discipline and learning outcomes.

The pedagogical model developed as part of this study could be enriched emphasizing guidelines for assessing students' creativity linked to discipline related products. Further research might explore relationships among teachers' teaching strategies and students' creative performance.

It is important to use the tool with a wider sample in order to validate teachers' perceptions about the utility of such a tool and to follow up the implementation of the changes they identified as required in their teaching practices as a result of responding to the tool. Using a wider sample, it would be possible to consider comparing opinions of teachers from different disciplines, ages, genders and teaching experiences.

Based on the findings from further research, the self-assessment tool, Crea-teach, could be revised to include other prompt items, for instance, teachers' behaviours in relation to promoting curiosity, questioning, risk taking, and learning from mistakes.

11.9 Contribution of the present study

Although the present research was largely exploratory in nature as there was no previously reported research in Mexico it has made a considerable contribution to knowledge.

The unique contributions of this study are:

The first unique contribution to Mexican Higher Education knowledge. At the time when the research was done, there were no formally published research about the perceptions of Mexican students' and teachers' conceptions of creativity prior to the present research known by the researcher. Given that the research was done as an independent study and not supported by any institution, and given the time that Higher Education teachers were required to dedicate to academic and administrative activities (research, publishing, participating in academic meetings amongst others) it was not easy to integrate the samples. However, the findings suggest that despite the particular challenges in Mexican HE participating students and teachers hold similar views to those elsewhere.

A second unique contributions is the development of a self-assessment tool to enhance teachers' reflection and awareness on their teaching creativity practices and approach towards facilitating students' creativity in Higher Education.

Other contributions of the present research are:

- Providing insights into Mexican Higher Education teachers' and students' perceptions of creativity, what enhances or hinders their creativity in the classroom environment and who they perceive a creative teacher.
- Establishing that Mexican higher education students' and teachers' implicit theories in relation to creativity, to what enhances or constraints their creativity and their perceptions of a creative teacher are in general consistent with already established explicit theories.
- Establishing that Mexican students stress the importance of openness and the teachers' ability to actively listen and support new ideas in promoting creativity
- Establishing that Mexican teachers' identification and awareness of their strengths and weaknesses in relation to creative teaching may be enhanced with a tool such as a questionnaire.

- Providing a framework to design teaching education programmes towards a creative teaching approach that could generate the framework for achieving the objectives stated in the educational program for equipping Mexican students' with skills for creativity and innovation as a means to face the challenges of the 21st century.
- Making a contribution to knowledge in terms of developing creativity in higher education in Mexico, responding to a gap in the literature and developing a pedagogical model of how to enhance teachers' motivation towards making the changes needed to stimulate students' creativity.
- Providing a tool to enhance teachers' awareness of what they are actually doing to foster students' creativity and to awaken their willingness to initiate the changes they would need to make towards a more creative teaching for creativity. The use of the questionnaire is proposed as part of an initial stage of teacher educational programmes intended to promote a professional and transformational development process of teachers towards a more creative teaching based on sustaining the importance of reflective learning and reflective professional practice.
- The development of a pedagogical model including three dimensions: planning with creativity in mind, teaching with creativity in mind and being creative. These dimensions constitute guidelines for the knowledge, skills and attitudes that teachers require to develop in order to enhance creativity through teaching. They may be used as a framework for what should be included in teacher education programmes.
- Emphasizing the need to include creativity as part of teachers' education programmes and presenting a pedagogical model for creative teaching which provides guidelines for policy makers, those planning teacher education programmes and for teachers to develop the required knowledge, skills and attitudes for enhancing creativity through teaching.

11.10 Implications for Education

This research has shown that once teachers become aware of the strengths and weaknesses of their teaching practices they are more inclined to make changes in their teaching towards more creative teaching.

The present research raises awareness of the importance of promoting creativity in higher education and outlines ways in which this can be achieved in an educational sector where little

attention has previously been paid to this. This is particularly important as higher education is the last opportunity for many learners to develop their creativity in an educational environment.

While there are educational professionals in Mexico making an effort to generate workshops and programmes to enhance teachers' creativity, there is a lack of systematization and a more generalized policy impact of these studies on public or private education. This research will contribute to raising awareness and support the development of more creative teaching approaches.

11.11 General conclusion

To foster creativity in education, it is important to stimulate teachers' reflexive thought. Self-observation is required in order to understand an individual's personal creative style, to recognize personal attributes, skills, attitudes and emotional processes that may influence the creative process and also how it successfully flows or how it is hindered under certain circumstances.

If creativity is conceived of as an important asset for the person in the 21st century, teacher education programmes need to include the development of the knowledge, skills and attitudes required by teachers to be able to teach creatively for creativity at all educational levels across the curriculum. Mexican students' and teachers' implicit theories as well as contributions from previous research become an important input to understand the characteristics of creative teaching. The present research represents a contribution for further teacher education initiatives towards a more creative education.

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Appendix 1

Questionnaire for the initial study

Reflexiones sobre creatividad

Te agradeceré tu apoyo para la investigación que realizo en torno a la creatividad. Este cuestionario es confidencial, por lo que no hace falta que pongas tu nombre.

- Carrera en que imparte clases:
- Antigüedad como docente:
- Edad:

Reflecting on creativity

I will be very grateful for your collaboration for the research I am conducting in relation to creativity. This questionnaire will be managed as anonymous, so you do not need to include your name on it.

Academic program in which you are teaching:

Years as teacher:

Age:

1. ¿Para ti qué es la creatividad?

How do you conceptualize creativity?

2. ¿Qué favorece tu creatividad en las clases?

What facilitates your creativity in the classroom?

3. ¿Qué obstaculiza tu creatividad en las clases?

What hinders your creativity in the classroom?

4. ¿Cuáles consideras que son las características de un profesor creativo?

Which are, in your opinion, the characteristics of a creative teacher?

Appendix 2

Crea-Teach, Spanish version

1. Este cuestionario está orientado a explorar las prácticas que utiliza como docente. La información que proporcione se utilizará exclusivamente con fines de investigación. Agradecemos su participación en todo lo que vale.

Institución:

Carrera en que imparte clases:

Ciudad

Sexo:

Edad:

Antigüedad como docente:

Elija la opción que más se acerca a su desempeño como docente.

	Siempre	Con mucha frecuencia	Algunas veces	Casi nunca	Nunca
1. Planeo el curso incluyendo la promoción de la creatividad como un propósito.					
2. Utilizo estrategias innovadoras para atraer la atención de los estudiantes.					
3. Mis clases son interactivas ya que involucran la participación activa de los estudiantes.					
4. El sentido del humor es importante en mis					

clases como un recurso para crear un ambiente relajado.					
5. Pido, de manera explícita a mis estudiantes, que apliquen su creatividad al realizar sus tareas y trabajos.					
6. Utilizo actividades significativas para que los estudiantes puedan aplicar sus conocimientos.					
7. Relaciono los conocimientos con retos de la vida real.					
8. Doy a los estudiantes oportunidades para experimentar con sus ideas.					
9. Busco que haya un balance entre la exposición de temas por mi parte y el uso de estrategias centradas en la participación del estudiante.					
10. Promuevo el aprendizaje a través de la reflexión.					
11. Presento actividades generativas tales como elaboración de proyectos, para que los estudiantes se involucren en un proceso creativo.					
12. Busco desarrollar formas para evaluar					

el aprendizaje que involucren pensamiento independiente y no exclusivamente el uso de la memoria.					
13. Incluyo la enseñanza de técnicas para la creatividad en mis cursos.					
14. Utilizo una variedad de recursos para apoyar el aprendizaje.					
15. Creo oportunidades para estimular la imaginación de los estudiantes.					
16. Organizo mis clases presentando la información de manera interesante y atractiva.					
17. Utilizo diferentes estrategias de enseñanza para promover la participación e involucramiento de los estudiantes en el proceso de aprendizaje.					
18. Presento a los estudiantes retos que requieren creatividad para ser solucionados.					
19. Utilizo aprendizaje basado en problemas como un camino para promover la					

capacidad innovadora del estudiante.					
20. Utilizo, al inicio de las sesiones, una variedad de recursos tales como historias, acertijos, preguntas para inducir curiosidad y un ánimo creativo.					
21. Utilizo estrategias de enseñanza creativa para estimular la curiosidad de los estudiantes.					
22. Al diseñar las clases tomo en cuenta los intereses de los estudiantes para despertar su motivación.					
23. Utilizo juegos educativos para estimular la imaginación de los estudiantes.					
24. Reconozco y recompensó la creatividad de los estudiantes.					
25. Estoy dispuesto a probar nuevas formas de enseñanza.					
26. De vez en cuando, cambio las estrategias y métodos de enseñanza para introducir novedad.					

27. Aliento la curiosidad de los estudiantes.					
28. Promuevo una actitud cuestionadora entre mis estudiantes.					
29. Animo a los estudiantes a tomar iniciativas.					
30. Favorezco que los estudiantes aprendan a partir del análisis de los errores.					
31. Ayudo a los estudiantes para que desarrollen su autoestima y confianza en sí mismos.					
32. Estoy dispuesto a probar nuevos métodos de enseñanza para promover la creatividad de los estudiantes.					
33. Respeto las opiniones de los estudiantes.					

Considero que las afirmaciones de este cuestionario son útiles ya que me han permitido:

A partir de la reflexión sobre estas afirmaciones, algunos de los cambios que me gustaría hacer para promover la creatividad de mis estudiantes son:

Appendix3

Sources for statements included in Crea-Teach under each dimension of the pedagogical model for creative teaching

DIMENSION: PLANNING WITH CREATIVITY IN MIND

Spanish	English	Source: students' categories	Source: Teachers' categories	Mentioned by researchers	Researcher exploration
<i>Planeo el curso tomando en cuenta la promoción de la creatividad.</i>	I plan the course with the facilitation of creativity in mind.	<ul style="list-style-type: none"> Teaching abilities 	Creativity as integral part of existence Promotes creative thinking		✓
<i>Al diseñar las clases tomo en cuenta los intereses de los estudiantes para despertar su motivación.</i>	When designing classes I take into account students' interests as a way to generate motivation.	Motivation	Interest in students' learning Motivator		
<i>Utilizo estrategias innovadoras para atraer la atención de los estudiantes.</i>	I use innovative strategies to get students' attention.	Uses a variety of methods and resources	Openness to novelty Varied and new activities Imagination	Cropley (2001) and Craft (1999) openness to the new Jeffrey B. () Jackson and Messick (1965): open-mindedness	
<i>Mis clases son interactivas ya que involucran la participación de los estudiantes.</i>	My classes are interactive, since they include students' participation.	Stimulating Participation Enthusiastic and effective Teaching Teaching abilities	Students' motivation and participation		

		Creativity as the expression or communication of ideas or emotions			
<i>Pido, de manera explícita a mis estudiantes, que apliquen su creatividad al realizar sus tareas y trabajos.</i>	I explicitly ask for creativity in students' work and assignments.	Challenges Stimulating Creativity as the expression or communication of ideas or emotions	Promotes creative thinking Imagination Creativity as a way of thinking	Isaksen et al. (1999): challenges	
<i>Relaciono el conocimiento con retos de la vida real.</i>	I relate knowledge to real life challenges.	Challenges	Interest in students' learning Commitment Creativity as innovative solutions to problems	Isaksen et al. (1999): challenges Cropley (2001): teachers should seek to foster in students willingness to try difficult tasks, readiness to accept challenge; readiness for risk taking	
<i>Doy a los estudiantes oportunidades para experimentar con sus ideas.</i>	I provide opportunities for students to experiment with ideas.	Creativity as idea generation through imagination Creativity as idea generation through implementation Creativity as novelty-originality Creativity as the expression or communication	Promote creative thinking Creativity as innovative solutions to problems	(Runco, 2004)self-efficacy and self-esteem	

		of ideas or emotions			
<i>Busco que haya un balance entre una enseñanza expositiva y el uso de estrategias centradas en la participación del estudiante.</i>	I promote a balance between direct lecture teaching and teaching strategies centred on students' active participation.	Teaching abilities Dynamism Participation Innovator Enthusiastic and effective teaching	Dynamism Varied and new activities Openness to novelty Commitment Imagination	Jackson and Messick (1965): open-mindedness Runco (2007) openness to experience	
<i>Promuevo el aprendizaje a través de la reflexión.</i>	I promote learning through reflection.		Creativity as a way of thinking	Jackson and Messick (1965): reflection	
<i>Busco desarrollar formas para evaluar el aprendizaje que involucren pensamiento independiente.</i>	I try to develop ways of assessing work which require independent thought and not only the use of memory.	Challenges novelty	Promotes creative thinking Creativity as a way of thinking Interest in students' motivation		
<i>Utilizo una variedad de recursos para apoyar el aprendizaje.</i>	I use a variety of resources to support learning.	Teaching and learning resources Uses a variety of methods and resources	Varied and new activities Innovation Openness to novelty Imagination Teachers' motivation/enthusiasm for teaching	Jackson and Messick (1965): open-mindedness Runco (2007) openness to experience	

DIMENSION: TEACHING WITH CREATIVITY IN MIND

Spanish	English	Source: students' categories	Source: Teachers' categories	Mentioned by researchers	Researcher exploration
<i>Creo oportunidades para estimular la imaginación de los estudiantes.</i>	I create opportunities to stimulate the use of students' imagination.	Creativity as idea generation through imagination Creativity as the expression or communication of ideas or emotions	Imagination Promotes creative thinking Creativity as integral part of existence		
<i>Organizo mis clases presentando la información de manera interesante y atractiva.</i>	I organize my classes presenting information in interesting and attractive ways.	Enthusiastic and effective Teaching Motivation	Interest in students' learning Motivator		
<i>Utilizo diferentes estrategias de enseñanza para promover la participación e involucramiento de los estudiantes en el proceso de aprendizaje.</i>	I use different teaching strategies to promote students' participation and involvement in the learning process.	Participation Uses a variety of methods and resources Motivation Creativity as the expression or communication of ideas or emotions	Students' motivation and participation Varied and new activities Imagination Motivator	Cropley (2001) and Craft (1999) openness to the new Jeffrey B. () Jackson and Messick (1965): openness	
<i>Presento a los estudiantes retos que requieren creatividad para ser solucionados.</i>	I present challenges to students which require creativity to be solved, problems for which there are	Stimulating Challenges Interest for students' learning	Promotes creative thinking Involvement Creativity as innovative solutions to problems	Isaksen et al. (1999): challenges Cropley (2001): teachers should seek to foster in	

	no current solutions.			students willingness to try difficult tasks, readiness to accept challenge; readiness for risk taking	
<i>Utilizo aprendizaje basado en problemas como un camino para promover la capacidad innovadora del estudiante.</i>	I use problem based learning as a means of enabling students to be more innovative.	Challenges Stimulating Creativity as idea generation through imagination Creativity as idea generation through implementation	Promotes creative thinking Creativity as innovative solutions to problems Imagination Creativity as a way of thinking	Isaksen et al. (1999): challenges	
<i>Utilizo, al inicio de las sesiones, una variedad de recursos tales como historias, acertijos, preguntas para inducir curiosidad y un ánimo creativo.</i>	At the beginning of classes I use a range of resources including stories, puzzles, questions to induce curiosity and a creative mood.	Challenges Uses a variety of methods and resources Imagination Stimulating Interest for students' learning Teaching abilities	Promote creative thinking Imagination Interest in students' learning Commitment Creativity as innovative solutions to problems	Isaksen et al. (1999): challenges Fryer (1989) encouraging pupils to ask questions	
<i>Utilizo estrategias de enseñanza creativa para estimular la curiosidad de los estudiantes.</i>	I use creative teaching strategies to promote students' curiosity.	Creativity as idea generation through imagination Creativity as idea generation through implementation Creativity as novelty-originality	Promote creative thinking Creativity as innovative solutions to problems	NACCCE (1999): teaching for creativity involves fostering students' curiosity	
<i>Trato de utilizar</i>	I try to implement	Teaching abilities Dynamism	Dynamism	Jackson and	

<i>actividades significativas para que los estudiantes apliquen sus conocimientos.</i>	meaningful activities that allow students to apply their knowledge.	Participation Innovator Enthusiastic and effective teaching	Varied and new activities Openness to novelty Commitment Imagination	Messick (1965):open-mindedness Runco (2007) openness to experience	
<i>Utilizo juegos educativos para estimular la imaginación de los estudiantes.</i>	I use educational games to stimulate students' imagination.	Creativity as idea generation through imagination		Jackson and Messick (1965): reflection	✓
<i>Incluyo la enseñanza de técnicas de creatividad en mis cursos.</i>	I include creative teaching techniques in my courses.	Teaching abilities	Promotes creative thinking Creativity as a way of thinking Interest in students' motivation		✓
<i>Presento actividades generativas tales como elaboración de proyectos o solución de problemas, para que los estudiantes se involucren en el proceso creativo.</i>	I offer generative activities that require the students to get involved in the creative process, for example, project work, problem solving.	Teaching and learning resources Uses a variety of methods and resources Enthusiastic and effective teaching Innovator Creativity as novelty-originality	Varied and new activities Innovation Openness to novelty Imagination Teachers' motivation/enthusiasm for teaching	Jackson and Messick (1965):open-mindedness Runco (2007) openness to experience	

DIMENSION: BEING CREATIVE

Spanish	English	Source: students' answers	Teachers' answers	Mentioned by researchers	Researcher exploration
<i>Estoy dispuesto a probar nuevas formas de enseñanza.</i>	I am willing to try new ways of teaching.	Innovator Enthusiastic and effective teaching Dynamism	Openness to novelty Commitment Varied and new activities Teachers' self-confidence and knowledge	Barron (1961) and MacKinnon (1975) Openness Stein (1984): Jackson and Messick (1965):open-mindedness Runco (2007) openness to experience	
<i>De vez en cuando, cambio las estrategias y métodos de enseñanza para introducir novedad.</i>	I change teaching strategies and teaching methods from time to time in order to introduce novelty.	<ul style="list-style-type: none"> •Innovator •Uses a variety of methods and resources •Novelty •Enthusiastic and effective teaching 	Varied and new activities Openness to novelty Innovation Imagination	Jackson and Messick (1965):open-mindedness Runco (2007) openness to experience	
<i>Animo a los estudiantes a tomar iniciativas.</i>	I encourage students' curiosity.	Motivation Stimulating Challenges Dynamism	Promotes creative thinking Creativity as a way of thinking Imagination	Jeffrey B. () Stein (1984):curiosity Runco (2007): curiosity Cropley (2001): teachers should seek to foster in students willingness to try difficult tasks	

<i>Promuevo una actitud cuestionadora entre mis estudiantes.</i>	I foster a questioning attitude in students.	Stimulating challenges	Promotes creative thinking Creativity as a way of thinking	Fryer (1989) encouraging pupils to ask questions Sternberg (1991): an educational environment supportive of creativity includes encouraging sensible risks	
<i>Animo a los estudiantes a tomar iniciativas.</i>	I encourage students to take initiatives.	Teaching abilities Motivation Stimulating Creativity as idea generation through imagination	Promotes creative thinking Students' motivation and participation	Sternberg (1991): an educational environment supportive of creativity includes encouraging sensible risks (Runco, 2004): self-efficacy and self-esteem.	
<i>Favorezco que los estudiantes aprendan a partir del análisis de los errores.</i>	I promote learning from mistakes.	Positivism Teachers' positive attitudes Positive climate Active listener	Positive attitudes Interest in students' learning Motivator	Isaksen et al. (1999): learning from mistakes Sternberg (1991): an educational environment supportive of creativity includes allowing mistakes Amabile & Gyskiewicz (1989): not to consider mistakes in a fatal manner	
<i>Ayudo a los estudiantes</i>	I help students to develop	Motivation	Commitment	Fryer (1989): building	

<i>para que desarrollen su autoestima y confianza en si mismos.</i>	their confidence and self-esteem.	Participation Positive climate Good communication skills Active listener	Teachers' self-confidence and knowledge Positive attitudes Positive climate	pupils confidence (Runco, 2004): self-efficacy and self-esteem	
<i>Estoy dispuesto a probar nuevos métodos de enseñanza para promover la creatividad de los estudiantes.</i>	I am willing to experiment with new teaching methods and strategies to foster students' creativity.	Innovator Enthusiastic and effective teaching Enjoys teaching Novelty Innovaator	Commitment Teachers' motivation/enthusiasm for teaching Varied and new activities Teachers' self-confidence and knowledge	Jackson and Messick (1965): flexibility Sternberg (1991): an educational environment supportive of creativity includes encouraging sensible risks	
<i>Respeto las opiniones de los estudiantes.</i>	I respect students' opinions.	Teachers' positive attitudes Good communication skills Active listener Positive climate	Positive attitudes Active listener	Fryer and Collings (1991) and Cropley (2001) enthusiastic, interested in students' learning, good listener Isaksen and Lauer (1998): Trust and openness	
<i>El sentido del humor es importante en mis clases como un recurso para crear un ambiente relajado.</i>	A good sense of humour is important as a means of creating a relaxed environment in my classes.	Teachers' positive attitudes Positive climate	Positive attitudes Positive climate	Runco (2007) playfulness Fryer and Collings (1991) and Cropley (2001) enthusiastic, interested in students' learning, good listener Isaksen and Lauer (1998):	

				sense of humour as element of a positive climate for creativity	
<i>Reconozco y recompenso la creatividad de los estudiantes.</i>	I recognize and reward students' creativity.	Teachers' positive attitudes Positive climate	Promotes creative thinking Positive attitudes Interest in students' learning Positive climate	Sternberg (1991): an educational environment supportive of creativity includes rewarding creative thinking	