

**An analysis of research and literature
on
CREATIVITY IN EDUCATION**

Report prepared for the Qualifications and Curriculum Authority

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Section 1: Introduction

1.1 Aims and purposes

This review forms part of a project which the Qualifications and Curriculum Authority (QCA) is taking forward on *creativity across the curriculum*. The purpose of the project is to identify key features that enable the development of pupils' creativity.

This review identifies some key messages from the research and literature related to creativity and highlights some issues for further investigation.

1.2 Approach taken and areas covered

The review has included literature published in books and journals in a range of disciplines and national contexts. There is a large variety of research on creativity. Its range is extremely broad, and as Rhyammer & Brolin (1999) point out, there has been 'an even broader range of speculation' about the nature of creativity. Narrowing the literature search to relevant sources was problematic, one reason being the range of related terms used to describe so-called creative activity. In the economic environment, for example, the terms 'entrepreneurship' and 'enterprise' are used, whereas in sociology the term used is 'innovation'. Yet in education and psychology, the term 'creativity' is widely used.

In this particular literature review the focus has mainly been on texts relating to education, developed in the foundation disciplines of psychology, philosophy, sociology and neurophysiology, as well as applied areas such as business and education policy and practice. They are mainly from North America and Great Britain but also include texts from Australia, Austria, Germany, Japan, the Macedonian region of former Yugoslavia, Italy, Bulgaria, Norway, Sweden and the Sudan.

Whilst aiming to be as comprehensive as possible, any literature search may inevitably miss something out. There is, for example, some discussion in the literature of differences between Eastern and Western conceptions of creativity, but this has not been included here. This review has focused on creativity in its generic form rather than within subject domains, although quite a lot has been written about creativity in some subject areas, specifically music, drama, art, information and communication technology, design and technology and mathematics. In addition, a little has been written on leadership/management practices and creativity as well as counselling and creativity, both of which may be relevant to schools. There is also a great deal of literature concerned with creativity in engineering and with gifted pupils (although this latter appears to imply a particular view of creativity).

Section 2: A summary of the research and literature on creativity

2.1 Historical overview

Theories and ideas about creativity stem from far back in history, unsurprising as Ryhammer & Brolin (1999) point out, given that the development of new ideas and original products is a particularly human characteristic. The notion of ‘inspiration’ or ‘getting an idea’ (ibid, page 260), is found in the Greek, Judaic, Christian and Muslim traditions and is founded on the belief that a higher power produces it. During the Romantic era in Europe, the source of inspiration and its artistic expression was seen as being the human being. During this era, originality, insight, the creative genius and the subjectivity of feeling were highly valued. From the end of the nineteenth century, people began to investigate the question of what fostered creativity.

The first systematic study of creativity was undertaken by Galton (1869). His focus was ‘genius’ and there followed a hundred or so studies on this theme, defined as achievement acknowledged in the wider public arena. This line of investigation remained prevalent into the 1920s, when the focus in psychology shifted to the investigation of intelligence. Although Binet’s work included some investigation of the creative side of intelligence, the major study of creativity in psychology occurred in the 1950s.

2.2 The early part of the twentieth century

Although creativity has a very long history, systematic study of it began at the turn of the last century. The early years of the twentieth century saw a move toward empirical investigation of creativity within the new discipline of psychology. There were four major traditions in which this took place:

- the **psychoanalytic** tradition (including Freud’s discussion of creativity as the sublimation of drives and Winnicott’s work on development which makes creativity central and intrinsic to human nature)
- the **cognitive** tradition (stemming from Galton’s work and including Mednick’s exploration of the associative process and Guilford’s exploration of divergent production of ideas and products)
- the **behaviourist** tradition (including Skinner’s discussion of chance mutation in the repertoire of behaviours)
- the **humanistic** tradition (including Rogers, May and Maslow whose discussions focused on the self-realising person acting in harmony with their inner needs and potentialities).

As Ryhammer and Brolin (1999) point out, some theorists were influenced by more than one tradition or line of work. Overall however, the early decades of the twentieth century were influenced more by philosophical speculation than by empirical investigations, because of the methodological approaches

of at least two of the four branches described above. These approaches to the study of creativity continue to provide theoretical frames for investigators, although with different emphases at different points in time.

2.3 More recent directions in creativity research

As indicated above, a particularly rich and influential period of research in creativity occurred during the 1950s. Here the focus was on the psychological determinants of individual genius and giftedness. Empirical work formed the methodological basis for much of the investigative work, usually involving large-scale, positivist studies. Many would argue that this era of research was launched by Guilford's (1950) examination of the limitations of intelligence tests and his investigation of 'divergent thinking'. There followed a large amount of research which attempted to test and measure creativity, to pin down its characteristics and to foster it through specific teaching approaches.

2.4 Lines of study stemming from the 1950s

The 1950s research led to three major lines of development: work on personality, cognition and how to stimulate creativity. These lines have drawn on all the four methodological traditions given above. The three major lines of development were as follows.

2.4.1 Personality

This included a focus on prominent creative persons, notably carried out by the Institute of Personality Assessment and Research, at Berkeley (including the work of MacKinnon, 1975, Getzels & Csikszentmihalyi, 1976, and Simonton, 1984). It also studied much narrower personality traits or dispositions which are correlated either positively or negatively with creativity, such as Dogmatism, conformism, narcissism, frustration, resilience, elation, hypomania, and affect tolerance (surveys of these in Shaw & Runco, 1994, and Eisenman, 1997).

From this particular strand of creativity research, the creative person can, it seems, be described as having the following characteristics (summarised by Brolin, 1992):

- strong motivation
- endurance
- intellectual curiosity
- deep commitment
- independence in thought and action
- strong desire for self-realisation
- strong sense of self

- strong self-confidence
- openness to impressions from within and without
- attracted to complexity and obscurity
- high sensitivity
- high capacity for emotional involvement in their investigations.

Although this line of research has provided important information about creative persons, it has been criticised for a range of reasons. The most significant of these is that the studies have been too narrow, focused on eminent and/or productive persons and that consequently the qualities appear to be both contradictory and superficial. In addition, as the criteria for the selection of the individuals and the criteria for defining what is creative vary from study to study, it is difficult to compare one with another. Eysenck, on the other hand, has recently argued that studies of creative individuals have demonstrated surprising agreement over the years (Eysenck, 1997).

Dacey & Lennon (2000) suggest that one distinctive set of attitudes stands out in life-long, high level, creative achievement. These are:

- self-control
- sustained hard work
- determination
- perseverance.

Stoycheva (1996) suggested, from her studies of creativity of very able pupils in Bulgarian secondary schools, that highly creative pupils have self-perceptions, values and motivations that differ from those of other pupils, which can create problems for them in seeking peer acceptance. In addition, she found that teachers tended to devalue independence of judgement and also the involvement of emotion, which are two factors associated in personality studies of creativity with high creative potential. She also found that teachers put a very low value on creativity traits within the school environment and that their perceptions of creativity were centred around its intellectual aspects and problem-solving processes.

2.4.2 Cognition

Various branches of study emerged in the early years of twentieth century. They can be summarised as follows:

- creativity as an aspect of intelligence (for example, Binet & Henri, 1896)
- creativity as a mainly unconscious process (for example, Poincare, 1913, Freud, 1957)
- creativity as a problem-solving capacity (for example, Wallas, 1926)
- creativity as an associative process (for example, Spearman, 1931).

Creativity has also been described in relation to various processes of thought and experience, summarised by Ryhammer & Brolin (1999) and including the following:

- thinking in opposites, analogies and metaphors
- intuition
- inspiration
- intelligence
- various processes of mental representation
- specific perception processes
- problem finding
- problem solving.

Coming to the latter half of the twentieth century, two major lines of creativity investigation under the cognition umbrella have occurred since the 1950s, namely psychometrics and experimental psychodynamics.

Psychometrics: Psychometric approaches to creativity were begun by Guilford, who developed a tool for measuring the extent of divergent thinking, which he later developed into the concept of 'divergent production' (Guilford, 1967). Later variations of Guilford's work include the Torrance tests of creative thinking (1966, 1974), which have permeated school contexts, particularly in the United States where tests have been used to assess pupils' creative thinking. This approach was influenced heavily by Mooney's (1963) 'four elements' view of creativity, which defined it as encompassing specific aspects of the environment (place) of creation, the product as an outcome of creativity, the process of creation and the person doing the creating.

The tests have, however, come under harsh criticism for measuring intelligence-related factors rather than creativity and for being affected too easily by external circumstances. It has also been suggested that the test procedure purely measures 'creativity on request' as opposed to creativity in daily life. Others, however, have considered that the tests have proved to be useful estimates of the potential for creative thought (Bachelor & Michael, 1997) and some think that they have a future (Kirschenbaum, 1998, Plucker & Runco, 1998).

Psychodynamics: During the 1970s and 1980s work was undertaken on personality, perception and creativity. These studies focused on specific groups such as architects, students, children and young people, artists and university teachers. They indicate that the creative person has the ability to make alternative views of reality, has good communication between logic and imagination, has the courage to go against convention, has a belief in their own ideas and is emotionally involved in the work of creation (Smith & Carlsson, 1990, Schoon, 1992, Andersson & Rhyhammer, 1998).

One of the major developments during the 1980s and 1990s in personal and cognitive research has been the shift of emphasis away from measurable outcomes-based and product-linked approaches such as those developed by Torrance in the 1960s and 1970s, including tests of creative ability (Torrance, 1966, 1974). More recent investigations focus on understanding the creative mind in terms of intelligence (Gardner, 1993) and attempts to explore implicit theories of creativity held by people considered to be representative of certain fields (Sternberg, 1998, Speill & Von Korff, 1998).

2.4.3 Ways to stimulate creativity

Since the 1950s there has been a strong concern that education should prioritise the development of creativity. Implicit in this is the assumption that creativity can be so influenced. Since the 1950s, a range of attempts to stimulate creativity have been developed, although there is, as Ryhammer & Brolin (1999) point out, a serious lack of systematic, controlled evaluations of such programmes. It is also the case that the methods and criteria for evaluating these are underpinned by differing theories of creativity. In addition, whether looking at attempts by cognitive psychologists, psychodynamicists, humanists or behaviourists, there is no evidence of transfer into new contexts. See the section on progression and development for further discussion of transfer issues.

There was also work done in the 1980s which suggested that early family responsibilities and opportunities for independent action encourage creative achievement and that creativity training programmes in schools are more effective when teacher involvement is high (Benjamin, 1984).

2.4.4 Creativity and social systems

By contrast with these earlier developments, research into creativity in the 1980s and 1990s became rooted in a social psychological framework which recognises the important role of social structures in fostering individual creativity (Ryhammar & Brolin, 1999, Jeffrey & Craft, 2000). This has been described as being a fourth, coherent area of study (Jeffrey & Craft, 2000): creativity and social systems.

Some significant theories have been put forward in which creativity is seen from a systems perspective (Cziksentsmihalyi, 1998, Sternberg, 1998, Sternberg & Lubart, 1991a, 1991b, 1995), where various elements of the overall social and cognitive context are seen as highly relevant to the activity of creating.

Three major studies were undertaken - one in Europe (Ekvall, 1991, 1996) and two in the USA (Amabile, 1988, Isaksen, 1995) - which explored the organisational climates which serve to

stimulate creativity. The results from these three programmes have converged at several major points, suggesting that, in a creative climate, the participants in the organisation:

- feel challenged by their goals, operations and tasks
- feel able to take initiatives and to find relevant information
- feel able to interact with others
- feel that new ideas are met with support and encouragement
- feel able to put forward new ideas and views
- experience much debate within a prestige-free and open environment
- feel uncertainty is tolerated and thus risk-taking is encouraged.

In addition, Amabile's (1988) model suggests that individual creativity may be affected by even very minor aspects of the immediate social environment. For example, creativity may be impeded where rewards are determined in advance, where there is undue time pressure, over-supervision, competition or where choices are restricted in terms of approach or working materials, or where evaluation is expected. The role of the context or subject domain has been increasingly emphasised since the early 1990s.

In addition, 1970s debates on creativity within philosophy regarded creativity as moving away from product outcomes and being connected with imaginativeness (Elliott, 1971). During the 1980s a new line was developed, born of social psychology and systems theory, where environmental conditions were taken into account. Within these four lines of development, (personality, cognition, stimulating creativity and social theories) there were specific foci such as the person who creates, the creative process, environmental factors, and the outcome (a fourfold set of foci, originally proposed by Mooney in 1963 as indicated above).

During the 1990s, due to the development of the approach from social psychology, research into creativity became more comprehensive, integrating these specific foci. Research began to focus more on the creativity of ordinary people within aspects of education. At the same time the methodology for investigating creativity in education also shifted, within a general trend, from positivist, large-scale studies aiming to measure creativity, toward ethnographic, qualitative research focusing on the actual site of operations and practice, as well as philosophical discussions around the nature of creativity.

In education in the United Kingdom, for example, Beetlestone (1999) focused on creativity in the early years' classroom, Woods (1995) and Woods & Jeffrey (1996) explored teacher creativity, and Craft (1996) looked at how to nourish the creative teacher. Beetlestone documents practical strategies for fostering creativity within the early years curriculum, using examples from a large variety of early years contexts. Woods & Jeffrey work through in-depth case studies to document

ways in which a small group of teachers operate creatively in the face of a wider context which arguably suppresses the creativity of the teaching profession. Craft explores in depth the perspectives of eighteen educators involved in a holistic postgraduate course specifically designed to nurture their own creativity.

There are, of course, some overlaps in these periods. For example, from the applied education context, Fryer (1996) undertook a large-scale survey of teachers' attitudes towards creativity in their daily professional work.

2.5 Background to creativity in education

In England, there have been two recent periods in which creativity has been recognised as a desirable aim for inclusion in the curriculum, particularly in primary education. The first was in the 1960s with the publication of the Plowden Report and the second during the late 1990s.

The first period linked creativity to a particular, child-centred, discovery-based pedagogical approach and to the arts. But it was this 'free' approach to creativity which formed part of the critique of child-centred education practices by the Black Paper writers (Cox & Dyson, 1971) and which, arguably, laid the way for the introduction of a subject-content-based national curriculum at the end of the 1980s. In addition, some thought that many schools were implementing the Plowden ideas incompetently (Alexander, 1995).

However, since the mid 1990s, there has been a growing recognition from policy-makers and commentators alike that learner creativity is an extremely important aim for education. The economic imperative to foster creativity in business has helped to raise the profile and credentials of creativity in education more generally.

During the recent review of the National Curriculum (Curriculum 2000), the Secretary of State for Education and Employment set up a number of advisory groups to provide input into the debate. One of these groups was the National Advisory Group for Creative and Cultural Education (NACCCE), which submitted its final report in 1999. The report contained a wide range of recommendations, which called for further work and investigations into creativity and cultural education.

2.6 Broader claims for creativity in the curriculum

It has been argued that by fostering pupils' creativity in the classroom, they will be helped to identify and establish a framework for their lives (Annarella, 1999). The development of creative skills and attitudes across the curriculum may enable them to 'route-find' in a range of contexts in their lives

(Craft, 2000). Weaver (1999) describes the social consequences of this as developing 'an entrepreneurial culture', which he argues is essential if society is to contend with the various dimensions of change.

It is also currently being argued (Jeffrey & Craft, 2001*) that fostering the climate of creative purpose and challenge appears to act to disperse a culture of 'whingeing' and blame. Encouraging creativity in organisations may well not only enhance market share but also serve to ensure higher levels of commitment from employees. The role of creativity in business and innovative organisations has been acknowledged and described by many (Fatt, 1997, 1998) although it is also acknowledged by some that culture shift in small companies is a significant challenge in fostering innovation and creativity in the economy (Vaux, 1999).

It has been suggested that organisations now have good reason to develop democratic cultures that encourage creativity (Lucas, 2001*). Education is seen by many to have a role in this policy area as well as in the economic one (Heeboll, 1997). It is argued by some that the promotion of collaborative practices and 'team work' prepares pupils and students for work in organisations that need to be creative and single-minded if they are to be effective in their highly competitive markets (Ball, 1994, Hargreaves, 1994).¹

It could be argued, however, that the continual innovation and constant change characteristic of the culture of today's western world is not necessarily desirable. A consequence of such a view would be that the role played by democratic creativity in continuing to develop these cultural norms should be carefully debated.

¹ There is also quite a range of literature exploring the relationships between research in higher education and creativity in business (for example, Tegart, 1996, describes a specific Australian programme set up to link researchers to the users of their research; Walshok, 1996, discusses the expanding role for US universities in economic development; Woolhouse & Cramphorn, 1999, discuss the collaboration between education and business organisations which contributed to economic regeneration in two large areas of England and Jones & Jenkins, 1999, describe a similar project in Wales involving Cardiff University).

* This source is in press and will be published in 2001.

Section 3: What do we mean by creativity?

3.1 Definitions or descriptions of creativity

The concept of creativity has traditionally proved an elusive one to pin down. Most of the dominant writers on creativity acknowledge a broad spectrum of activity which can be described as creative; even studies focusing on so-called creative people, such as Spiel & von Korff's (1998) study of politicians, scientists, artists and school teachers, produce a wide variety of descriptions. One major distinction made by analysts is that between 'high' creativity and ordinary, everyday, creativity. Another of the distinctions is between creativity within specific domains as opposed to creativity as a separate process, applied within domains. The dominant/influential descriptions of creativity given below are in the main concerned with creativity in this latter, generic, sense.

Definitions of creativity which have influenced thinking in the past include that developed by Torrance (1969), whose thinking dominated psychometric approaches to creativity in the USA and elsewhere as discussed earlier in this report. Torrance saw creativity broadly as the process of sensing a problem, searching for possible solutions, drawing hypotheses, testing and evaluating, and communicating the results to others. He added that the process includes original ideas, a different point of view, breaking out of the mould, recombining ideas or seeing new relationships among ideas.

Although Torrance's definition has been influential and is still considered by some to have value, as indicated earlier it is tied to a psychometric approach which has been widely criticised and is largely considered outmoded.

More recent and commonly used definitions at the present time (2000) include the following, which can be grouped into high creativity and ordinary creativity.

3.2 High creativity

Some influential descriptions of high creativity, ie the sort of publicly acclaimed creativity which changes knowledge and/or our perspective on the world, include the following:

- *'the achievement of something remarkable and new, something which transforms and changes a field of endeavor in a significant way. . . the kinds of things that people do that change the world'* (Feldman, Csikszentmihalyi & Gardner, 1994, page 1)
- *'exceptional human capacity for thought and creation'* (Rhyhammer & Brolin, 1999, page 261)

- *'a person's capacity to produce new or original ideas, insights, restructurings, inventions or artistic objects, which are accepted by experts as being of scientific, aesthetic, social, or technological value'*
(Vernon, 1984, page 94)
- *'the ability to produce new knowledge'*
(Dacey & Lennon, 2000).

Some have also acknowledged the role of the wider cosmos in the creation of new ideas. For example, Khatena (1982) described creativity as three-dimensional, consisting of the person, the environment and the cosmos.

One of the difficulties with definitions which focus on extraordinary, or high, creativity is that it only applies to some extremely talented people, and may be of less relevance when focusing on the education of all pupils.

3.3 Ordinary, or 'democratic' creativity

Perhaps more relevant to education is the notion of ordinary, or 'democratic' creativity. The phrase 'democratic' creativity was coined in the NACCCE Report (1999) to mean the creativity of the ordinary person, recognising that all pupils can be creative.

All of the following definitions take as a fundamental assumption that creativity is something which all pupils can do:

- *'imaginative activity fashioned so as to yield an outcome that is of value as well as original'*
(National Advisory Committee on Creative and Cultural Education, 1999, page 29, para. 26)
- *'it may be possible to discern three overlapping categories:*
 - *free expression ('self-expression', 'improvisation', 'exploring unknown outcomes')*
 - *imaginative/associative thinking ('flexibility', 'a holistic approach', 'problem solving')*
 - *critical thinking ('making conceptual decisions', 'making things happen', 'eclecticism')*
(CAPE(UK), 1998, page 3)
- The National Curriculum Handbook included creativity within the section on thinking skills:
'Creative thinking skills . . . enable pupils to generate and extend ideas, to suggest hypotheses, to apply imagination, and to look for alternative innovative outcomes.'

(National Curriculum Handbook for Primary and Secondary Teachers, 1999)

- *'at the core of creative activity, I would posit the engine of 'possibility thinking' - and necessary to being creative I would specify insight . . . What I am concerned with . . . is the kind of creativity which guides choices and route-finding in everyday life, or what I have come to term 'little c creativity'.'* (page 3) *'Creativity involves being imaginative, going beyond the obvious, being aware of one's own unconventionality, being original in some way. It is not necessarily linked with a product-outcome.'*
(Craft, 2000)

- *'Creativity is the application of knowledge and skills in new ways to achieve a valued goal. To achieve this, learners must have four key qualities:*
 - *the ability to identify new problems, rather than depending on others to define them*
 - *the ability to transfer knowledge gained in one context to another in order to solve a problem*
 - *a belief in learning as an incremental process, in which repeated attempts will eventually lead to success*
 - *the capacity to focus attention in the pursuit of a goal, or set of goals.'*(Seltzer & Bentley, 1999, page 10).

Kirton (1989) has suggested that individuals can be classified into 'adaptors' or 'innovators' and that these are stable personality traits applying across contexts and across time.

A further problem arising from these definitions, and perhaps highlighted by Kirton's work, is the conceptual 'slippage' between ordinary creativity and the similar but distinct notion of adaptability.

Section 4: The development of creativity in education

4.1 Research into the development of creativity in education

There is very little recent research, it seems, investigating the development of creativity in education, although some commentators suggest that creativity can be developed. Seltzer & Bentley (1999), for example, suggest in their recommendations on knowledge and skills for the new economy, that 'creativity can be learned' (page 10) and that the school curriculum should be restructured 'to reflect forms of learning which develop creative ability' (page 10). There is, it seems, a dearth of conclusive research evidence suggesting that creativity can be developed or that progression can be identified in creativity.

An overview of findings from such studies as exist is given below, using five categories.

4.1.1 Comprehensive approaches

Stein (1974, 1975) has summarised studies up until the mid 1970s, in which researchers evaluated attempts to stimulate adult creativity at the individual and group level, using a range of techniques, including role play, brainstorming, psychotherapy and hypnosis. His review of the literature up to that point suggests that attempts to train people to become more creative are not particularly effective, although some studies did indicate short-term effects (Mansfield et al, 1978).

4.1.2 Educational approaches

Various kinds of training programmes have been advocated to develop creative thought processes. Creative thinking is often equated with originality, the generation of ideas, and with a range of problem-solving strategies (sometimes referred to as 'creative production'). Although there have been attempts to do this within a school context, Vernon (1989) concludes that the results of such studies suggest they are much less successful than is sometimes maintained. For although specific skills, such as problem solving, can generally be trained and improved upon, there is rarely a transfer to more complex activities such as creative production.

However, certain approaches to education may possibly foster greater creativity than others. For example, some have claimed that Montessori education (Dantus, 1999, Cane, 1999) is particularly effective in fostering life-long creative skills. These writers suggest that self-expression, encouraged in Montessori education, holds the key to enabling individual agency and on a larger scale recovering human authenticity and a new approach to creativity which seeks a less technologically dominated world.

Others (Edwards & Springate, 1995, Leach, 2001^{*}) have suggested that the Reggio Emilia approach to pre-school education in Italy is particularly successful at fostering children's creativity. This is achieved, they suggest, by:

- involving children in higher-level thinking skills (analysis, synthesis, evaluation)
- encouraging the expression of ideas and messages through a wide variety of expressive and symbolic media
- encouraging the integration of subject areas through topics holding meaning and relevance to the children's lives
- offering adequate time for the in-depth exploration of specific topics which may arise from spontaneous interest.

There is, however, a lack of external evaluation of such approaches which mix together, and possibly confuse, curriculum, learning and pedagogical theories and practices.

4.1.3 Psychodynamic approaches

Both psychodynamic approaches and humanist approaches emphasise the development of personality traits. Underpinning psychodynamic approaches is the belief that thinking can be explained through the way that various motives, conflicts, emotions, processes and structures in the psychic system interact. Openness to the so-called preconscious processes is considered to be important for creativity. The methodological approach to research in the psychodynamic tradition is through case study and there are those which appear to demonstrate increased creativity following psychodynamic input/training. However, it is clearly problematic to generalise from such investigations. In addition it is not possible to compare the creativity of equivalent individuals who did not have the input.

4.1.4 Humanistic approaches

These approaches concentrate on growth within the individual agent. Creativity is understood as self-creation, ie the generation of personal identity and agency. Humanistic studies have also been undertaken using the case study approach and again suggest that humanistic training can influence the individual's effectiveness in creating their own life plan. However, the method of investigation is subject to the same problems as described under psychodynamic approaches above.

Most importantly, neither the psychodynamic nor the humanistic interventions have conclusively improved creative production (Stein, 1974, 1975).

^{*} This source is in press and will be published in 2001.

4.1.5 Behaviourist approaches

Behaviourism as a branch of psychology has not taken creativity to be a major focus of work. However Rhyammer & Brolin (1999) suggest that some educational programmes contain within them behaviourist assumptions. Broadly speaking, behaviourists place emphasis on the significance of the environment in influencing the behaviour of the individual. Implicit within behaviourist programmes is the assumption that creativity is learned and that it can be fostered through stimulus, reinforcement and response and that individuals learn to be creative at different rates, although all can be taught, through this method, to become more creative. Some approaches to fostering creativity in education are described in the section on 'Practical advice' below.

4.2 Teaching approaches to developing creativity

There is some evidence from pre-school research (Angeloska-Galevska, 1996) that certain characteristics of the teacher are correlated with the extent to which creativity is effectively fostered with pupils. These include the teacher's attitude toward creativity, social relations between teacher and pupil, the provision of optimal materials and perhaps most significantly, the educational level of the teacher (university-educated teachers were found, in this study, most likely to foster creativity). Clearly this evidence begs questions about the possible relationships between values and attitudes, educational level, intelligence and pedagogic repertoires. It has also been suggested (Sternberg & Lubart, 1991) that the ideal learner is often characterised as one who conforms, a model which does not appear to embrace pupil creativity. As they say, 'to engender creativity, first we must value it!' (page 614).

The role of the mentor in fostering creativity has been documented by many in the literature (Beetlestone, 1998, Craft, 2000, Fryer, 1996, Shagoury-Hubbard, 1996, Torrance, 1984). Essentially, the research suggests that the provision of a role model who can provide a learner with an apprenticeship approach to developing creativity, is a powerful aid to fostering their creativity. The mentor may be an adult (for example, a teacher or someone from beyond the school itself), or indeed another pupil.

What is clear from the literature is that practical strategies depend on the theory of creativity which underpins pedagogy. The most common examples in the international community at present may be grouped into five areas: those emphasising the creative cycle, single-strategy approaches, multi-strategy approaches, system approaches and those emphasising overall pedagogic criteria. Some dominant approaches within these categories are described below. It will be seen that the strategies draw upon specific parts of the fields which study creativity, as mapped out earlier in this review.

4.2.1 ‘Creative cycle’ approaches

‘Creative cycle’ approaches are those based on the processes of creativity originally proposed by Storrr but then developed by others such as Guildford (1973), and much more recently by Kessler (2000), who describes the stages as preparation, incubation, inspiration or illumination and verification.

Preparation, she suggests, involves the gathering of skills, principles and data, a time of discipline and focus. Incubation by contrast involves the doing of nothing, ‘letting go’. This is an essential fallow period, of receptivity and openness, sometimes even chaos or muddle (and thus offers a potential challenge in the classroom). Inspiration, or illumination, comes directly out of the incubation space. Finally verification involves the refining of the outcome. Craft (2000) adds on the start of the next cycle at the end of the last one. Such process approaches when developed in the classroom may involve offering pupils specific kinds of experience.

Both writers suggest the need to foster in pupils and teachers the ability to:

- be open to possibility, the unknown and the unexpected
- bridge differences – make connections between apparently unconnected ideas and integrate different ways of knowing (for example, physical, feeling, imagining)
- hold the paradox of form and freedom
- hold the tension between safety and risk
- be willing to give and receive criticism
- be aware of the individual.

Balke (1997) suggests that, in early childhood and primary education, play is essential in the development of creativity. The association of play with creative development can be misleading although some play may be creative. Play is necessary to creativity, but not all play is necessarily creative (Craft 2000). For example, snakes and ladders is not creative whereas hide and seek or other dramatic play may be. Hence the early years early learning goal ‘creative development’ which incorporates play, may be slightly misleading in that not all play is creative.

4.2.2 Single-strategy approaches

One well-known single-strategy approach is De Bono’s ‘six hats’ method. Some schools already use this and it is used in other organisational contexts. Based on his view that creative thinking is essentially ‘lateral thinking’, this is a method developed to encourage the viewing of any issue from a number of different perspectives. The idea is that, when ‘wearing’ any one of six possible

fictional coloured hats imbued with certain qualities, the thinker emphasises certain approaches to thinking.

Another is Craft's 'possibility thinking' (2000). Here the idea is essentially that pupils are encouraged to approach learning across the curriculum with a 'what if?' attitude. In other words, with a questioning approach which wonders about possibilities and is both prepared to follow, and be supported in, seeing the questions through to an outcome.

4.2.3 Multi-strategy approaches

Shallcross (1981) identified a range of strategies important in pedagogical approaches to creativity. These include allowing adequate space and time for developing a creative response to any given situation. She suggests that teachers often intervene too early in a child's thinking process, preventing pupils from working out ideas for themselves. In addition, she suggests that it is essential to provide an overt 'mental climate' in the classroom which includes fostering self-esteem and self-worth and the valuing of achievability ie setting tasks for children which are achievable, in order to build their confidence. The emotional climate of the classroom should enable each child to grow in security and personal confidence without constant scrutiny. As Shallcross puts it, 'The ground rules are personal guarantees that allow [pupils] to grow at their own rate, retain the privacy of their work until they are ready to share it, and prize their possible differences' (1981, page 19).

4.2.4 System approaches

Edwards & Springate (1995), writing of the Reggio Emilia approach to fostering creativity in the Italian pre-school, suggest a range of teaching system strategies which enable the modification of classrooms to support children's creativity. It is important to realise, however, that they are discussing mainly artistic creativity.

The pedagogical strategies they name are listed below:

- Time – giving children adequate time to finish their work, so they are not artificially rotated or asked to move on before they are ready
- Space – offering children the physical space to leave work from one day to the next without it being destroyed; also providing a bright working space with harmonious colours, furnished with child-sized areas and examples of their own and others' work including that of known artists, and including appropriate and inviting materials
- Rich resource materials – these are particularly useful when the children themselves have helped to select them. Resource materials may be bought, found or recycled and include, they suggest, paper goods of many kinds, tools for writing and drawing, construction and collage

materials, including buttons, shells, beads, seeds and stones, as well as sculpting materials such as shaving cream, clay and play dough

- Climate – the atmosphere in the classroom, they propose, should encourage risk taking, making mistakes, innovation and uniqueness, alongside mess, noise and freedom, whilst in an overall environment of order. Teachers themselves should be encouraged to experiment alongside the children
- Occasions – teachers should provide a variety of exciting and intense encounters for the children between their outer and inner worlds. The stimulus of field trips, visitors to the classroom, the introduction of specific artefacts, animals or plants to the learning environment, and so on, can be intensified, they suggest, by representations both before and afterwards.

These pedagogic strategies reflect studies done beyond schools, such as that by Greenberg (1992) investigating the creativity of fashion design students at college in the USA. She discovered that those students who were more creative had more choice in identifying which problems they were going to work on and took more time over completing their task. She also found that such students expressed more positive feelings about their work, an important point for school teachers, for it could be argued that fostering a positive attitude to one's own creativity is an essential starting point.

Sternberg & Lubart (1991) propose what they call an 'investment theory' of creativity which is influential in creativity discourse internationally. They suggest that it is possible to create, or foster, creativity in children and adults and that this involves teaching them to use the following six resources:

- Intelligence: By this they mean problem definition and re-definition; and the ability to think insightfully. This means 'seeing things in a stream of inputs that most people would not see' (page 609), or 'seeing how to combine disparate pieces of information whose connection is usually non-obvious and usually elusive' (page 609), or 'seeing the non-obvious relevance of old information to a new problem' (page 609). Problems requiring insightful solutions are usually not obvious in the first place. Most school situations set up problems as obvious. So encouraging children to identify problems in the first place is an important role of provision in education.
- Knowledge: Knowledge of a field is essential in order to be creative within it. It is essential that the knowledge is usable for the pupil. Pupils also need to know *why* they are learning particular knowledge, if they are to use it.
- Intellectual style: Here they suggest that the creative individual enjoys seeing things in new ways as well as having the ability to do so. They call this having a 'legislative proclivity' in 'mental self-government' (page 611).

- Personality: Personality attributes include tolerance for ambiguity, willingness to surmount obstacles and persevere, willingness to grow, willingness to take risks, having the courage of one's convictions and belief in oneself.
- Motivation: Intrinsic motivation is, they propose, important. Extrinsic motivation can even undermine creativity. The motivation to excel is also important.
- Environmental context: They suggest that the environment (or classroom) needs to spark creative ideas, encourage follow-up of creative ideas, evaluate and reward creative ideas.

4.2.5 Overall pedagogic criteria approaches

Based on qualitative research in primary school classrooms, Woods (1990, 1993, 1995) identified four features at play for both pupils and teachers, where creativity was successfully fostered:

- relevance
- ownership
- control
- innovation.

Interpreting these, Jeffrey (1997) suggests that any given situation may offer or demand all or some of these features. For creativity to be fostered there must be 'an innovative idea or approach, some ownership and control over the process by the teacher and the pupil, and the event must be relevant to both teacher and pupil'. From a more philosophical perspective, Sisk (1989) suggests that the overall employment by the teacher of novel strategies, techniques and approaches will enhance creative behaviour in the classroom.

Faced with this wide variety of approaches to fostering creativity in the classroom, the advice of Perkins (1999) is perhaps apposite; he suggests that teachers need to adopt a pragmatic approach to enabling pupils to construct their own understanding of knowledge, which further enables them to express creativity. He urges teachers to consider their repertoire of skills as a 'toolbox' given that no one situation in teaching is ever identical to the next. His advice reminds us of the complex artistry involved in teaching, documented by many (Dadds, 1993, 1995, Woods & Jeffrey, 1996, Halliwell, 1993).

Section 5: Assessment and creativity

5.1 Recording and assessing creativity

There is very little on the recording and assessing of creativity in the literature although in the field of psychometrics, creativity tests were historically used, for example those developed by Torrance (Torrance, 1966, 1974). Torrance described four components by which individual creativity could be assessed:

- fluency: the ability to produce a large number of ideas
- flexibility: the ability to produce a large variety of ideas
- elaboration: the ability to develop, embellish, or fill out an idea
- originality: the ability to produce ideas that are unusual, statistically infrequent, not banal or obvious.

More recently, however, teachers have preferred to use a variety of means to assess creativity, by monitoring pupils' work, behaviour and what they say (Fryer, 1996).

Some attempts have been made to identify the criteria relevant to the assessment of creativity. For example, Besemer and Treffinger (1981) group these into:

- novelty - how new the product is in terms of techniques, processes, concepts; the capacity of a product to spark further creative products inspired by it; the potential of a product to 'transform', or create a radical shift in approach
- resolution - the extent to which a product meets a need, or resolves a situation
- synthesis - the extent to which a product combines elements which are unlike, into a coherent whole. Synthesis thus encompasses criteria such as complexity, elegance, attractiveness, expressiveness, completeness and the quality of its crafting.

Others (for example, Jackson and Messick, 1965 and Kneller, 1965) propose 'relevance' or 'appropriateness' as an additional and essential area of criteria. It could be argued that this set of criteria is implicit in the three groups of Besemer and Treffinger, as it would be difficult to imagine how a product could be novel without also being appropriate or relevant.

However, as Fryer (1996) notes, when considering the creativity of school pupils, there are some problems with such taxonomies of criteria. For example, how is novelty to be understood in the context of school pupils? In Fryer's study of 1,000 teachers, many suggested they preferred judging pupil's work against each individual's past performance. Thus something might be deemed to be original for a particular pupil.

Another area of difficulty concerns how comprehensive all criteria for assessing creativity must be. Work which succeeded in satisfying all or most of the criteria would be of a very high standard, with a potential for damaging pupil self-esteem. Fryer recommends that in the case of school pupils' creativity, much less stringent criteria are required, and that self-assessment should be encouraged. Craft (2000), following the same line of less stringent criteria, nevertheless leaves assessment in the hands of the teacher, suggesting that the observation and recording by the teacher of the behaviour of young children is particularly significant, as this highlights what is then novel for the individual child as meaning maker.

A further area of difficulty highlighted by Fryer's study concerns teachers, in terms of the approach which they bring to the definition of creativity as a whole. For example, there are gender differences: female teachers seem to value the personal sides of creativity more than male teachers who place higher value on the elegance of an outcome, and this affects their judgements of pupil creativity. This finding was borne out by Stoycheyva's work (1996). In addition, the teacher's subject area has an impact on their confidence as an assessor, for it seems that staff teaching art and design feel most confident about assessing creativity and other teachers are much less so. Stoycheva found that primary teachers were found to be reluctant to nominate children of either gender as non-original.

Turning finally to the wider context for assessing and recording creativity, there is a case for examining the relationship between fostering creativity and the bureaucratic arrangements for the quality assurance of teaching and learning, including subject-centred level grading of achievements of both teachers and pupils. Some have used empirical studies to argue that such arrangements have led to the diminution of creativity in education (Jeffrey & Woods, 1998, Woods et al, 1997, Woods and Jeffrey, 1996).

Section 6: Conclusions and key findings

This section summarises the main findings from the research and literature reviewed in the preceding sections. This shows that, while there is a significant amount of research and literature into the nature of creativity, there is relatively little research into the development and assessment of pupils' creativity. There are also important areas unresolved, such as whether being creative in one subject/domain can be transferred to another subject/domain.

What is clear is that there are a number of different aspects that need to be clarified if pupils' creativity is to be promoted. These aspects include outcome, the pupil, the process, the strategies used by the teacher, and the social context in which the activity takes place. For example, it has been suggested that early family opportunities for independent action encourage creative achievement and that creativity training programmes in schools are more effective when teacher involvement is high. Individual creativity may be affected by even very minor aspects of the immediate social environment. For example, creativity may be impeded where there is undue time pressure, over-supervision, competition, or where choices are restricted and evaluation is expected.

The review has identified eight aspects which have a direct effect on the promotion of pupils' creativity. These are described in the following sections.

6.1 High and democratic creativity

Most writers acknowledge a broad spectrum of activity that can be described as creative. A major distinction has been made between 'high' creativity, shown by the exceptional person, and 'ordinary' or 'democratic' creativity, which can be shown by everyone. Recent definitions of creativity include that suggested by the National Advisory Committee on Creative and Cultural Education: '*imaginative activity fashioned so as to yield an outcome that is of value as well as original*'. In this description, both 'value' and 'originality' are seen to exist at the level of the child, school, community and society, thus including both 'high' and 'democratic' creativity. It should be noted that in the CAPE(UK) study some teachers prefer not to have creativity defined as they feel that this will limit the extent to which pupils will be encouraged to show a wide range of creative responses.

6.2 Domain-specific and generic creativity

A key distinction has been made between creativity within specific domains as opposed to a generic process, applied across domains. The descriptions of creativity given in this report are in the main concerned with creativity in this latter, generic, sense. However, there has been a general shift toward recognising the importance of the domain over the last ten years and it is suggested by some that up to

half of the aspects of creativity may be domain-specific (Plucker, 1999). An issue is the balance between 'programmes' which teach thinking, approaches which 'embed' thinking in the subjects of the curriculum and finally approaches which emphasise transferability. Since the evidence for transferability is questionable, this suggests that generalised approaches on their own are unlikely to be effective. One aspect of domain-specific creativity to be explored is information and communication technology (ICT), in particular, its potential and role.

6.3 Teacher and pupil creativity

The distinction between teacher and pupil creativity has been raised as an issue by several researchers for example, the CAPE(UK) study. It could be assumed that a creative teacher will, by definition, foster pupil creativity. However, it has been argued that the creativity of the teacher may expand to crush pupil creativity (Craft, 2000). On the other hand where a teacher's own creativity is stifled, it would seem unlikely that pupils' creativity would be fostered effectively. The literature review suggests that teachers tend to place a low value on creativity traits as being useful in the school environment (Fryer, 1996). This may have implications for the extent to which teachers enable and encourage creativity in the pupils.

6.4 Pedagogic strategies

There is some evidence from pre-school research that certain characteristics of the teacher are correlated with the extent to which creativity is effectively fostered in pupils. These include teacher attitude toward creativity, social relations between teacher and pupil, the provision of optimal materials and perhaps most significantly, the educational level of the teacher (university-educated teachers were found, in one study, most likely to foster creativity).

Strategies found to be important in pedagogical approaches to creativity include:

- having adequate space and time
- fostering self-esteem and self-worth
- offering learners mentors in creative approaches
- involving children in higher level thinking skills
- encouraging the expression of ideas through a wide variety of expressive and symbolic media
- encouraging the integration of subject areas through topics holding meaning and relevance to the children's lives.

This review has identified a wide variety of approaches to fostering creativity in the classroom. One view given is that teachers may need, therefore, to adopt a pragmatic approach, to develop a repertoire

of skills as a 'toolbox', given that no situation in teaching is ever identical to the next. For teaching involves complex artistry as documented by many researchers.

6.5 Recording and assessing creativity

There is very little literature on recording and assessing creativity. Torrance's tests of creativity, developed in the 1960s, are now little used as they de-contextualise creative thinking, although they did have an impact in the past, particularly in North America. More recent studies have focused on the appropriate criteria to assess creativity 'in situ'; these may be grouped into criteria associated with novelty, resolution, synthesis and appropriateness.

In the context of creativity in education, various difficulties arise in interpreting these criteria. They include how originality is to be understood, how comprehensive the criteria should be, gender differences in teachers' perceptions of pupil creativity and the confidence of teachers in assessing creativity. In one study of 1,000 teachers, many suggested they preferred judging children's work against each individual's past performance (Fryer, 1996). Thus something might be deemed to be original for a particular pupil. This raises the issue that pupils' self-assessment may be important, especially for older pupils. Another study suggests that the observation and recording by the teacher of the behaviour of young children is particularly significant, as this highlights what is then novel for the individual child.

The relationship between formal arrangements for the quality assurance of teaching and learning, including the use of subject-centred levels, and the fostering of creativity may need examination. Some have argued, through the use of empirical studies, that such arrangements may have led to the diminution of creativity in education.

6.6 Gender issues

There is some evidence (Spiel & Von Korff, 1998) that females mostly associate 'idea' to creativity, whilst males mainly focus on the aspect of 'novelty'. In addition, males use the concept of 'fantasy' as important in creativity and females frequently describe creativity by what it is not. Fryer's (1996) large-scale study of teachers in primary, secondary and further education suggested that male teachers were far more inclined to view creativity in terms of the product's 'elegance' and the critical thinking involved in its conception and evolution, assessing a product's creativity per se, rather than seeing it as a product of experience. By contrast, women teachers were far more likely to see creativity in terms of depth of thought, depth of feeling, originality and experience.

6.7 Cultural issues

It has been argued by some that creativity is a state of being which is challenged by the ways in which western civilisation socialises young people, in that their creativity is stifled from early childhood. It could be argued, however, that the continual innovation and constant change characteristic of the culture of today's western world is not necessarily desirable. The desirability of cultural norms of constant change and innovation (and thus the overall role of creativity) may need to be debated. For it could be argued that there are socially and environmentally destructive aspects to fostering a culture of innovation. This is related to the question raised in the NACCCE report that the concept of creativity itself may be culturally specific.

6.8 Social context issues

Although recent studies of creativity have focused on systems approaches which explore creativity in a social environment, there is nevertheless evidence (Spiel & Von Korff, 1998) that researchers tend to focus more on the person and the process than on the outcome or the social context in which the creativity occurs. Given the social contexts of the classroom and school and the wider social context in which pupils will operate their creativity, the development of strategies which encourage creativity in a social system need further investigation. This is particularly the case within the education system, for creativity is often cast as not being relevant to conventional education. There is some evidence from the Sudan that a 'modern' education approach does not necessarily improve creativity (Khaleefa et al, 1997). However, it has been argued that it is essential to create the climate and the skills for fostering creativity in order to educate a generation of young people who can visualize new solutions to the problems of today and tomorrow's work force, social fabric, and environment (Kessler, 2000).

The research and literature point to a wide range of potential gains from the promotion of pupils' creativity. These include:

- personal development, eg helping pupils establish a frame for their own lives and increasing motivation
- social development, eg promoting collaborative practices and team work
- cultural development, eg helping pupils recognise that they can change their own culture
- economic development eg encouraging an entrepreneurial culture.

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