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ASSESSMENT OF CREATIVITY IN EDUCATION

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Abstract:

This article reports themes emerging from a small-scale literature review on creativity in education. The purpose of the review was to identify key themes and approaches to inform future research. The research questions are; what is creativity? Which theory of creativity is most relevant and useful? Can creativity be assessed and if so, how? The author's interest arises from a desire to develop teaching styles and curriculum content that improve the learning experience of children with disabilities, an interest in relationships between learning difficulties, multiple learning styles and creativity, and from support for social values of inclusion. The review gives an overview of current approaches to creativity in education mainly focused on the UK. It covers definitions and theories of creativity, options for measuring and testing creativity, and examples of previous empirical research. The conclusion suggests that the field is a complex one and that research efforts need to reflect the complexity

Introduction

In the context of a holistic approach to education Cropley (1990) argued there is a link between everyday creativity and mental health. He carried this forward into practical suggestions for teachers in his 2001 *Creativity in Education & Learning*. Art, music and drama therapies are well researched and used in teaching and learning strategies for children with learning difficulties and disabilities. Since the late 1990s interest in creativity as beneficial to a healthy economy and society has increased (Craft, 2002). Craft notes the "large variety of research on creativity" (2003: 142) but argues that the distinction of teaching for creativity and creative teaching is false, proposing instead the concept of "little c creativity" (2003:148) that combines several definitions.

Sternberg (2006) seeks to bring together creativity theories in an 'investment theory', reporting on studies, largely based on tests of cognitive abilities conducted to validate idea (2006: 93).

Averill et al (2001) offer a theme of emotional creativity, explore the interactions of emotion and creativity and comment on the impact of cultural and social contexts on the definition of creativity.

Examining the main themes from Craft, Sternberg and Averill et al, the following sections cover definitions and theories of creativity, measuring and testing creativity (briefly covering tests in use) and a selection of previous relevant empirical research. Findings from the review are discussed and followed by conclusions and recommendations for future research.

Definitions of creativity

This section addresses the first research question about the nature of creativity. Dictionary definitions usually refer to producing something new, although creativity usually involves recombining and modifying existing ideas. In education, definitions vary from completely new ideas to new ways of considering and solving problems, from creativity specific to the arts to the idea of scientific breakthrough. According to Csikszentmihalyi (1996), most commercial programmes aimed at increasing individual creativity focus on divergent thinking which is seen as important to creativity fluency and originality (relative rarity of an idea).

In the UK, the National Advisory Committee on Creative and Cultural Education (NACCCE: 1999) distinguished between teaching creatively and teaching for creativity based on research in an early years school. However, it omitted the possibility of learning creatively or any relationship with multiple learning styles as defined by Gardner et al (1995).

Currently, several definitions are used in the UK education system. The UK National Curriculum defines thinking skills as information processing skills, enquiry skills, reasoning skills, evaluation skills and creative thinking skills. For children under five years old, creativity is defined in terms of art, craft,

design, dramatic play and creative expression. There is conflicting guidance about whether creativity is cross-curricular or not, for example, QCA and DFEE: (2000) and QCA (1999).

Woods (1990) identified four shared characteristics of creativity and pedagogy to demonstrate that creativity of teaching and teaching creativity were interdependent: relevance, ownership, control and innovation. Sternberg (2006: 88) locates creativity in a combination of “intellectual abilities, knowledge, style of thinking, personality, motivation and environment”, a systems approach. Similarly, Craft (2003) proposes that in the context of an uncertain environment and future, it may be useful to consider teaching creatively and creative learning as complementary aspects of an education system within a wider society., and to focus on “the creativity of everyday life or *‘little c creativity’*” which involves “a life-wide resourcefulness which is effective in successfully enabling the individual to chart a course of action by seeing opportunities as well as overcoming obstacles” (Craft: 2003, p148). This definition applies across the curriculum and age ranges, but also allows the possibilities of high art, creative genius or unusual personalities, and is appropriate to educating children who will become adults in an uncertain world of diminishing resources.

Creativity theories

The second research question concerned which theory of creativity is most relevant and useful. The different theoretical traditions relating to creativity are; a psychoanalytic tradition, a personality trait tradition, a phenomenological tradition, a behaviourist tradition and a social cognitive tradition.

In the psychoanalytic tradition, for example Freud, Jung, Kubie (Glover et al: 1989 p 85) and Elliott, cited in Craft (2001, creativity is correlated with fundamental dimensions of personality such as extraversion.

The personality trait tradition relates creativity to aspects of personality that include differences in cognitive ability, tests to assess levels of ability and an underlying factor of general intelligence, the 'g' factor. Csikszentmihalyi (1996) identified ten paradoxical traits of the creative personality which he defines by its complexity. He argues that the creative personalities show opposite characteristics at the same time: physical energy combined with quietness, intelligence and naivety, playfulness mixed with discipline, and a rich imagination together with a strong sense of reality. In his view, creative people seem to be both extrovert and introvert, humble and yet proud, passionate whilst objective about their work, and traditionalist as well as rebellious. Csikszentmihalyi also takes account of cognitive factors such as divergent thinking.

Eysenck (1995) focuses more on differences; extroversion and neuroticism, and the origins and development of personality such as inherited differences. Independent underlying cognitive abilities are identified such as verbal comprehension, spatial ability, visualization and numerical ability, and are more strongly emphasized than the traits highlighted by Csikszentmihalyi.

Averill et al (2001) go further, presenting the concepts of emotions interacting with creativity and of emotions as a complex interaction of biological systems, social systems, beliefs and rules that give rise to emotional states influenced by situational constraints. In their model, emotional traits are "long-enduring predispositions to respond in an emotional way; for example, with fear" (Averill et al: 2001, p 168), emotional states are temporary rather than enduring and emotional responses are "what a person actually does when in an emotional state" (Averill et al: 2001, p 170) in a particular cultural context. Creativity is recognized through end products such as poems or dances that have value to others or "effectiveness" (2001: 172), through novelty and authenticity. Perceived differences in Eastern and Western include less emphasis on novelty in Eastern cultures. The authors argue that emotional creativity can be measured separately from other traits.

The phenomenological tradition proposes people as creative agents in the construction of social worlds and the alternative as meaningless chaos. For them, human life should be creative, individual experience and interpretation of the world is unique, but individuals can work together creatively to form communities.

The behaviourist tradition explains creativity as the response of an individual to influences in the environment. As Craft (2001) notes, “Implicit within behaviourist programmes is the assumption that creativity is learned and that it can be fostered through stimulus, reinforcement and response”. Although Eysenck was behaviourist, his IQ test principles have been extensively used in testing for creativity. He identified links between his psychoticism scale and degrees of creativity, noting that there was both accepted relationship and also difference between genius and madness (Eysenck: 1993).

The social cognitive tradition emphasizes both the link with intelligence, often as measured by IQ tests, and the economic and social benefits of creativity and broad strategies for attaining these benefits. It emphasizes that individuals modify behaviour and responses according to the situation, whereas behaviourists suggests responses may be more homogeneous. Sternberg (2001) considers creativity in the context of society as well as intelligence.

To a large extent, Sternberg brings these together in an “investment theory of creativity” (2006: 87). “Creativity requires a confluence of six distinct but interrelated resources; intellectual abilities, knowledge, styles of thinking, personality, motivation, and environment” (Sternberg: 2006 p 88): intellectual abilities are particularly important. He also highlights that creativity requires conscious decisions at each step to think or do something in a certain way.

Sternberg's investment theory fits well with the little c definition of creativity, and it is possible (if sometimes difficult in the case of motivation) to provide all six resources in the classroom. This article therefore proposes Sternberg's investment theory to be the most relevant and useful.

Policy approaches

In the UK, education policy on creativity for children under five focuses on more traditional 'arts' areas, but creativity in the secondary school emphasizes thinking skills across the curriculum, such as generating and extending ideas, divergent and convergent thinking and innovative problem-solving.

There remains the fundamental difference between creativity as skills that everyone can apply to some extent and creativity as a feature of the talented and gifted. A creative personality might say that these are false dichotomies and that the range of theories and policy approaches are all parts of a complex whole.

There is also a subject-driven approach in that ICT and art, design and technology are seen as focal points in the curriculum for increasing creativity in the classroom,

The first of these is more concerned with the development of the individual child, whilst the second and third are linked to the development of a post-knowledge economy economy.

For children with special educational needs, a combined policy approach may be particularly important, for brain stimulation, for learning through other senses and learning styles, and for children who exhibit synaesthesia. Creative teaching and learning, and teaching for creativity, may benefit them more than others, but ultimately should benefit all learners.

Measuring and testing creativity

This addressed the third research question of whether and how creativity can be assessed under three subheadings: widely used measures, models of creativity and empirical research.

Widely used measures

Testing creativity is a contentious issue. Probably the most widely used test is the Torrance Test for Creative Thinking (TTCT) which includes measurement of thinking creatively with pictures, figural testing and verbal testing. The main value of using this test would be in evaluating the effectiveness of creativity training.

In the classroom, QCA (2004) suggest pupils' creative behaviour can be assessed by observing if they are questioning and challenging, making connections and seeing relationships, (thinking about what could happen ie 'possibility thinking'), being open-minded and exploring ideas, and reflecting critically on ideas and actions (QCA 2004).

Major variables used in formal testing can be categorized as cognitive, environmental, personality and emotional. These are summarized in table 1 on the following page

Table 1. Variables used in measuring and testing creativity

- | | |
|---------------------------|--|
| ● Cognitive Variables | ● Intelligence |
| | ● Knowledge |
| | ● Technical skills |
| | ● Thinking styles (divergent/convergent) |
| ● Environmental Variables | ● Politico-religious factors |
| | ● Cultural factors |
| | ● Socioeconomic factors |
| | ● Educational factors |
| ● Personality Variables | ● Motivation |
| | ● Extraversion/introversion |
| | ● Non-conformity |
| | ● Paradoxical traits |
| | ● Interests |

Cross, Cattell and Butcher (1967) using Cattell's 16PF questionnaire found artists differed significantly on 12 out of 15 factors. Dellas and Gaier (1970) suggested interests, attitudes and desires are more consistent predictors of creativity than intelligence. Many creativity tests have four main components: divergent thinking (for example Guilford's Alternative Uses Task and Torrance Test of Creative Thinking (TTCT) (1974); convergent thinking as in Insight Problems and Remotes Associations Task (Mednick), artistic assessments based on expert judgment (Barron-Welsh Art Scale) and self-assessments such as Khatena-Torrance Creative Perception Inventory, NEO-PI-R

(Openness to Experience component) and Gough Personality Scale. Divergent thinking and convergent thinking can equally be measures of dimensions of intelligence.

Although new instruments are being constructed, there is still scope for improving reliability, depending on agreeing definitions of creativity, which may vary from one culture to another as indicated by Averill et al (2001) in the context of Western and Korean cultures.

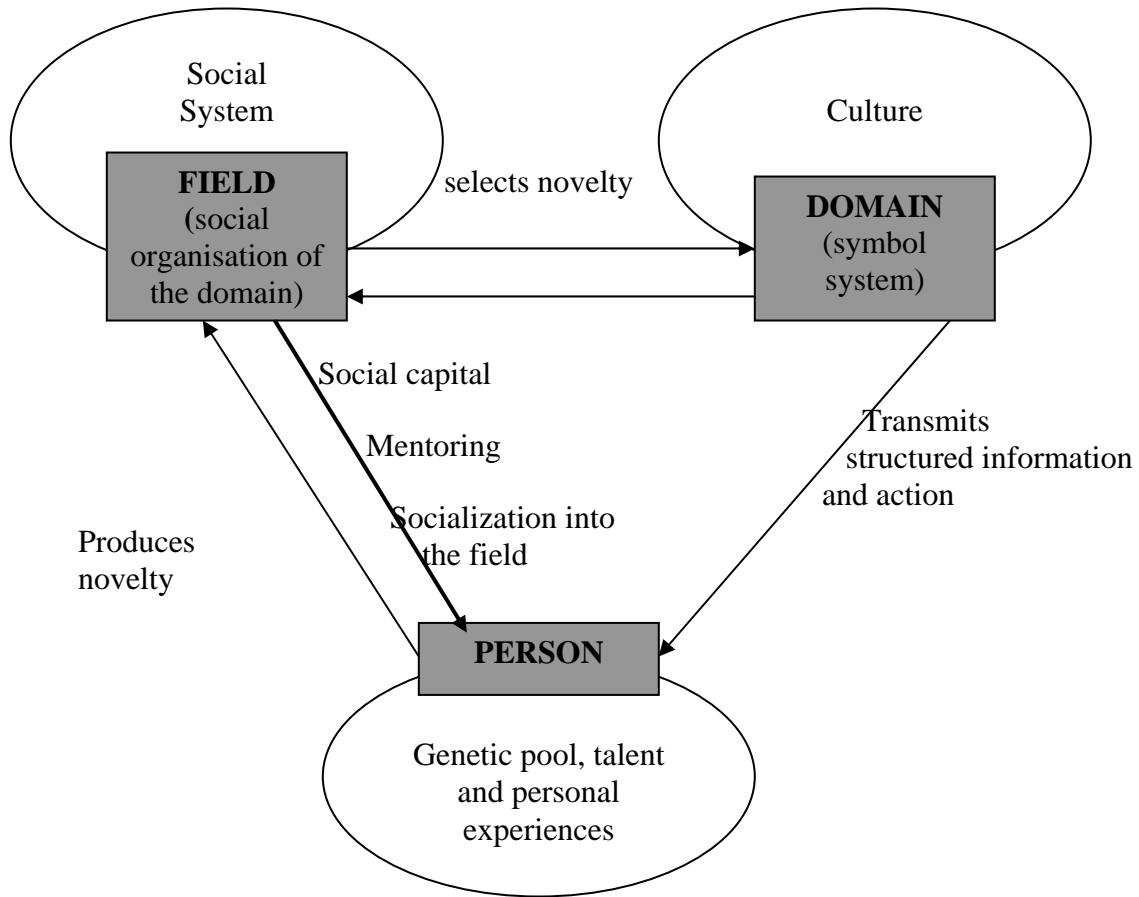
Empirical studies show a statistical relationship between IQ and creativity so IQ tests remain popular. It can be argued that IQ tests are about problem solving and that creativity and problem solving support each other. However, some people with high IQ are not creative, and others with low IQs are creative.

Models of creativity

There are many models for the creative thinking process, some emphasizing mystery and the importance of the subconscious, others focusing on the rational analytical process, and some that reflect a balance between creative and analytic steps. Recent models tend to imply that the process must be purposive, so that if a computer, a chimpanzee and a man all paint identical pictures, the computer is not creative, the chimpanzee may be, and the man is most likely to be creative. All emphasize that thinking is not enough and that a product or action is required to complete the process.

The most recently developed models tend to be systems models: one straightforward model shown in Diagram 1 on the next page is based on Csikszentmihalyi.

Diagram 1



Original source: <http://www.coe.uga.edu/~gclinton/enclaves/images/systemscreativity.jpg>

The more systemic approach suits Craft's little c definition and Sternberg's investment theory.

Empirical research

This section reports a selection of studies from 2000 onwards that give interesting findings relevant to this paper and to teaching and learning. So much research takes place that the author has had to be very selective, first highlighting studies that relate to the relevance, relationships and predictive value of particular variables, as related to the investment theory of creativity of Sternberg (2006), then certain studies that relate to the East-West and emotion themes of Averill et al (2001) and to the concept of little c creativity (Craft 2003).

Relevance, relationships and predictive value

Wolfradt and Pretz (2001) examined the relationship between creativity and personality in college students. Results suggested a positive relationship between openness to experience and all creativity measures. The results confirmed previous research in demonstrating a close association between creativity and specific personality traits.

Prabhu et al (2008) conducted a study in a university setting to test the mediating and moderating role of intrinsic and extrinsic motivation in the relationship between 3 personality traits (openness to experience, self-efficacy, and perseverance) and creativity. They found that intrinsic motivation partially mediated the relationship between creativity and openness to experience, and that self-efficacy and creativity were closely related, with intrinsic motivation completely mediating this relationship. Extrinsic motivation moderated the relationship between self-efficacy/creativity and perseverance/creativity and had a negative association with creativity.

Montgomery et al (2004) investigated the relationship between noninduced mood state and self-perceptions of creativity. A sample of undergraduate student teachers completed two mood state inventories and a creative self-perception inventory. Although findings were mixed when the 5 scales of the creativity measure were correlated to the 6 dimensions of mood, there was some indication that positive mood was related to creative self-perception.

The established link between creativity and intelligence persists. Silvia (2008) revisited the 1965 Wallach and Kogan study which found that 10 measures of creativity did not correlate with 10 measures of intelligence and academic achievement, applying latent variable analysis to the data to assess relationships between latent creativity and intelligence variables. The analysis found that latent originality and fluency variables significantly predicted intelligence and therefore Wallach and Kogan's data replicates other studies.

These findings suggest that researchers still know relatively little about the most appropriate tests to administer in order to identify potential creativity or increases in creative behaviour among teachers and learners.

Kaufman and Baer (2006) explored the application of intelligent testing to creativity assessment to examine whether interpreting a range of scores in different domains could broaden understanding of creativity assessment, making specific suggestions about how this might be done. This approach appears relevant to the investment theory of creativity.

Validity of creativity tests in different cultures

Two studies are mentioned here, one involving Chinese schoolchildren, the other involving Brazilian adults. Cheung et al (2004) normed the Wallach-Kogan Creativity Tests (WKCT) for children in Hong Kong, administering a Chinese version to a large sample of students from grades 1 to 9. There was some evidence of reliability and validity of the Chinese version. Cheung et al state their norming study will provide information about the creative potential of children in Hong Kong, and facilitate future cross-cultural comparison of WKCT scores.

Wechsler (2006) administered TTCT to a sample of Brazilians; 59 had received public recognition through awards and 69 had not. Test results found significant relationships among creative achievements and the creative indicators in the TTCT, and distinctions between persons with and without recognition. Validity of the Verbal and Figural TTCT to the Brazilian culture was confirmed.

Little c creativity and the effectiveness of teaching and learning

Davidovitch and Milgram (2006) investigated creative thinking as a predictor of teacher effectiveness in 58 college-level instructors. The correlation between creative thinking, defined as the quantity and quality of ideational fluency, and teacher effectiveness, defined as real-life problem solving, was statistically significant. Findings suggest there may be benefits in workshops to enhance teachers' creative thinking ability and including creativity in evaluations.

Cremin et al (2006) reported an exploratory study that sought to identify what characterizes possibility thinking in young children's learning experiences and how pedagogy facilitates possibility thinking. The study found pedagogical themes and individual teaching strategies that appeared to foster possibility thinking and offered a model for conceptualizing a pedagogy of possibility thinking.

Nogueira (2006) reported a 2002-2003 pilot study on an enrichment programme MORCEGOS aimed at developing creativity in two different groups, one of gifted students aged 6-14, the other of students

with learning difficulties aged 12-16. Results showed similarities and differences that Nogueira suggests may point to areas of further study.

These all suggest potential for further investigations; the MORCEGOS study may be particularly relevant to assisting development and learning in special educational needs pupils.

Conclusion

The field of creativity is a broad one, with definitions varying in and between countries and no consensus on how best to test for creativity or measure development. However, agreement is emerging that creativity is complex and the investment theory that suggests a combination of factors contribute to creativity (intellectual abilities, knowledge, styles of thinking, personality, motivation and environment) could be tested on the basis of the Kaufman and Baer (2006) application of intelligent testing.

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