

Creativity in Education: A Review

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Abstract

As part of a series of literature reviews that will occur within this and subsequent editions of the journal, this paper aims to locate a discussion of creativity in education within a discourse that is appropriate and accessible for design and technology (D&T) educators. In doing so, literature relating to: defining creativity; the context of creativity research and the relationship of design and technology and creativity, will be discussed. Inevitably, this review of creativity merely scratches the surface of a large body of literature and consequently some aspects of the topic have not been covered.

Key words

Creativity, design and technology, research

Introduction

There can be few topics that generate and retain so much interest and debate, yet remain as elusive as creativity within an educational context. Creativity, by its very nature is a complex topic of many facets – something that remains a ‘slippery concept’; that is difficult to pin down, nebulous and awkward to define. Yet for many educators, whether from an elitist or egalitarian perspective, creativity remains the elusive and ultimate goal of education; central to an individual’s well being.

In general, it is agreed that our creative capacity is what truly separates humans from other species and therefore creativity has a paralleled development with the evolution of our culture and society. Subsequently products of sublime creativity (Cropley 2001) or ‘big’ creativity (Gardner 1993; Csikszentmihalyi 1997) such as: the creation of fire, the wheel, space flight, and nanotechnology are all significant creative leaps that are witnessed throughout our history. Such ‘extraordinary’ creative (Craft 2003) leaps have significant positive implications upon society; however, creativity also has enormous potential to create negative societal repercussions such as poorly conceived urban planning, nuclear arms, military technology and product obsolescence.

But what is the role of creativity within an educational context, as it is unlikely that ‘extraordinary’, ‘sublime’ or ‘big’ creativity will be seen on a daily basis?

At its simplest, creativity in education can be considered to exist in one of two states. Firstly, it can be defined as a feature of elitist high-level intelligence - innate and prominent in the gifted few and not considered as something that can be taught. Alternatively, rather than the preserve of the few, creativity can be recognised in all students to be facilitated and nurtured as an essential life skill, delivered across the school curriculum at all stages to enable all children to develop the capacity to restructure their own world and develop what Bandura (1995) refers to as ‘self efficacy’. Both states would concede that ‘ethicacy’, ‘originality’ and of ‘some value’ (all these terms are worth exploring) are key features of creativity within education, however the location of creativity within the school curriculum remains a contentious area of discussion as there is a tendency to locate creative activity merely within the arts. Most educators would acknowledge that this is a naïve perception yet the pragmatics of education, which often take precedence, mean that although desirable, creativity is often marginalised and remains on the periphery rather than at the centre of the curriculum - even in D&T.

The differing perspectives on creativity are ultimately driven, changed and manipulated depending upon the prevailing educational, political and economic imperatives of the time. During the last thirty years a consistent focus of interest has been upon defining characteristics of creative individuals (MacKinnon 1975, Getzels & Csikszentmihalyi 1976, Simonton 1984, Gardner 1993, and Sternberg 2001). From this strand of creativity research, a common list of characteristics of a ‘creative’ person has been identified as including:

- intellectual curiosity;
- deep commitment;
- courage to be different;
- independence in thought and action;

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- strong desire for self-realisation;
- strong sense of self;
- strong self-confidence;
- openness to impressions from within and without;
- attracted by complexity and obscurity;
- high capacity for emotional involvement in their investigations;
- intrinsically motivated.

Csikszentmihalyi (1997:57) summarises this list by identifying 'complexity' as the key attribute by which to recognise one key creative individual from others.

The current interest in creativity within the United Kingdom (UK) can be considered a move away from defining individual traits and more as a 'backlash' and reaction to an overly prescribed teaching and learning culture as well as a response to the future needs of a creative economy. The need for creativity to be nurtured and encouraged rather than stifled by over prescription and pragmatism is generally recognised, and the current impetus is captured in the government initiated creativity report *All our Futures* (1999) by the National Advisory Committee on Creative and Cultural Education (NACCCE).

Our aim must be to create a nation where the creative talents of all the people are used to build a true enterprise economy for the twenty first century - where we compete on brains, not brawn. (Blair, 1999:6)

A paradox exists however as whilst the NACCCE aims are commendable, at the same time the tightening of control around both 'curriculum and pedagogy', as well as other aspects of management, inspection and financing of schools in England (Craft, 2003) have resulted in an often distorted and tokenised approach towards creative practice. Therefore, whilst in theory creativity has been encouraged, the means by which other educational goals are being achieved, through a standards driven approach, have often been at odds and have proved highly constraining for many educators.

The extent to which Blair's vision has been achieved is however not the focus of this review and given Simonton's (2000) belief that creativity is what makes us productive, adaptive and efficient it would appear that creativity should not be considered optional or to be at the expense of other educational aims, but that it should be clearly interwoven and embedded in all activities.

Barriers to creativity are however prevalent as an individual's creativity can be affected by various attributes such as personality (Amabile 1996), reward and criticism (Berger 1990) and environmental stimulants (Amabile 1989) including time pressure, evaluation, status quo and political problems. Craft (2003) suggests that ultimately there are four limitations and potential barriers to the development of creativity in education: the limitations of the terminology; conflicts in policy and practice; limitations in curriculum organisation and limitations stemming from centrally defined pedagogical practice.

Defining creativity

The term creativity can be considered to be overused, often oversimplified, misrepresented and frequently interchanged inappropriately for related terms such as enterprise, innovation or different. Fortunately in the last decade Sternberg (1999) and Runco (1997, 1999) have both attempted to draw together research on creativity through a series of creativity handbooks which now make the subject more accessible and penetrable. Within their discourse on creativity they have attempted, along with many other contributions, to define creativity and to determine its place within formal education systems. The wide-ranging definitions provided by the various commentators have served in the main to reinforce the point that creativity is a 'nebulous' and ultimately 'slippery' concept – all the more so when considered within differing educational contexts.

Cropley (2001) provides a useful starting point towards definition as he identifies that the constant factor in virtually all discussions of

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creativity is 'novelty'. Not novelty for its own sake, but novelty that can be applied and add value to products, activities or services. The concept of 'novelty' can be further distinguished by Kaufmann (2004) when considering 'low task novelty' (reactive creativity) and 'high task novelty' (proactive creativity). Cropley extends this definition by highlighting that Bruner (1962) regarded creativity as involving the process of achieving surprise in the beholder whilst Heinlett (1974) draws a useful distinction between mere self-indulgence 'pseudocreativity' and novelty that meets external standards of effectiveness 'quasicreativity'.

The notion of 'quasicreativity' can be classified further using Sternberg's (1999) broad taxonomy of different ways of viewing the act of being creative. These include 'conceptual replication' (creates novelty by transferring what already exists), 'redefinition' (novelty by seeing the product in a new way), 'forward incrementation' (takes existing product further in existing direction), 'advance forward incrementation' (extends and goes beyond existing tolerated approaches), 'redirection' (extends the known in a new direction), 'reconstruction and redirection' (takes a previously abandoned approach or idea and extends it) and 'reinitiation' (begins at a radically different point from the current one and takes a new direction).

A further classification can be considered using a big 'C' and little 'c' creativity (Gardner 1993, Simonton 2000, Craft 2001) approach. Little 'c' creativity, which is often used as an indicator of ability to deal with incremental change, problem-solving and the ability to adapt to change, is more likely to be what educators will see from students on a daily basis; whereas big 'C' creativity remains far more elusive and dynamic and occurs when a creative solution to a problem creates a 'highly novel' response that shifts how other people think and live their lives. "At the big-C level, it's something that we give Pulitzer and Nobel Prizes for" whilst "at the little-c level, creativity implies basic functionality" (Simonton 1999).

A key question when attempting to recognise or reward creativity is; what form is the creativity taking? Shallcross (1981) considers two schools of thought: creative outcomes that are merely new to the learner (even if the outcome has existed before) or creative outcomes that are unique that have not existed before. This definition has significant implications for those in D&T education when considering a student's creative development alongside the situated context of their learning. The key question that educators must ask themselves is how new is the 'creative leap' to the individual within the context of broader education experience. The significant point being that in educational terms, uniqueness of experience is a powerful and effective component of learning and that true originality is a rare element in human experience. Mackinnon's (1962) well-known definition of creativity emphasises the end product or response:

It involves a response or an idea that is novel or at the very least statistically infrequent. But novelty or originality of thought or action, while a necessary aspect of creativity is not sufficient. If a response is to lay claim to being part of the creative process, it must to some extent be adaptive to, or of, reality. It must serve to solve a problem, fit a situation, or accomplish some recognizable goal. And thirdly, true creativeness involves sustaining of the original insight, an evaluation and elaboration of it, a developing of it to the full. Creativity, from this point of view, is a process extended in time and characterized by originality, adaptiveness, and realization. (Mckinnon, 1962, as cited in Feldhusen and Goh, 1995: 233)

Seltzer and Bentley (1999), helpfully define what creativity is not. 'The most important misconception about creativity is that it involves artistic sensibility'. They go on to clarify that creativity is not equivalent to brilliance nor does it imply talent. Finally, 'and most importantly', creativity is not a skill. 'It is not simply a technique that one can perform well on command'.

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Context of Creativity research

Since the first recognised systematic study of creativity by Galton (1869), research has evolved through differing lines of enquiry with the principle area of investigation developing from psychological perspectives.

The modern era for research into creativity as a psychological domain is considered to have begun following Guilford's address to the American Psychological Association in 1949. Guilford challenged behavioural scientists to consider creativity as an important area of scholarship (Beghetto et al, 2002) and argued that up to that point researchers had emphasised convergent thinking skills in preference to divergent thinking skills. He also posed the question as to why schools were not producing more 'creative persons' (Fasko, 2002)?

The use of the word 'creativity' in the title of the presentation and subsequent paper was used to sum up the kind of divergent thinking that he had in mind and in 1961 Rhodes (as cited in Feldhusen and Goh, 1995) defined creativity as consisting of a process, a product, a person and an environmental press: the '4 Ps' of creativity. This view has subsequently been questioned by Runco (1997) who considers that even though the four broad categories are useful they are insufficient to contain the ever-increasing insight into the topic.

From the 1950s, there developed a predominant focus on psychological determinants of individuals with creative genius and giftedness. This was driven by a focus upon the elusive goal of defining measurable outcomes (testing) and product linked approaches, such as those developed by Torrance during the 1960s and 1970s (Torrance 1974). Research into measuring creative capacity however remains in its infancy and many 'purists' would consider that attempting to isolate, 'pin down' and measure a creative act is both undesirable and unachievable.

Rhyammar and Brolin (1999:259) consider the same period as ultimately having three major lines of creativity research and development

from the 1950s that concentrated upon personality, cognition and how to stimulate creativity. This was supported by the philosophical debate from the 1970s, which saw creativity as moving away from product outcomes and being connected with imaginativeness (Elliot, 1971).

Clearly creative research has predominantly been driven by psychological enquiry and this has included considering differing cognitive dispositions, personality, intelligence, problem solving, motivation and child development with each providing their own line of enquiry and adding to the level of complexity. Hennessey (1999) conversely considered the socialisation and situational factors, the external determinants, of education and its impact upon creativity. In particular, she has explored the direct motivational orientation of an individual and the impact upon creative performance. This work qualifies Amabile's (1983, 1999) 'Intrinsic Motivation Theory Principle of Creativity' which ultimately defines that intrinsic motivation is highly conducive to creative acts whilst extrinsic motivation is almost always detrimental. Regardless of the age group these findings have remained consistent and from which Hennessey (1996) has identified five 'sure-fire' killers of intrinsic motivation and creativity: expected reward, expected evaluation, surveillance, time limits and completion; an unfortunate truth being that these identified 'killers of creativity' resemble the current orthodox approach to education in the UK.

The last decade has seen an increased level of interest into creativity research in education and this is as much a consequence of the demands of society as it is a response to the stifling effects of accountability through a measuring culture that currently pervades education. Craft (2001) has identified interest and research into creativity as going through phases which during 1980s and 1990s became rooted in a social psychological framework, with influence by writers such as Gardner focussing upon the creative mind in terms of intelligence (Gardner, 1993) and Sternberg

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driven by the business and organisational context of creativity. However, the current prevailing climate (Craft, 2003) for creativity research is quite distinct from the earlier one, with an emerging focus now upon:

- ordinary creativity rather than genius;
- characterising, rather than measuring;
- the social system rather than the individual;
- encompassing views of creativity which include products but do not see these as necessary.

At the time of Guilford's 1949 address, creativity research was represented in merely 0.002% of psychological abstracts (Beghetto et al, 2002). Since then the subject has evolved and has developed through differing lines of enquiry to a representation of research that has grown to 0.5%; illustrating a positive growth in creativity as a line of systematic enquiry.

Many areas of creativity research however remain patchy, particularly investigation into the relationship of differing cultural response and creativity, which can be considered to be an area of relative neglect. This is primarily due to the USA providing the initial impetus into creativity research as it has been recognised that although the USA represents 6% of the population, its influence has been overly representative on creativity research and as such, creativity researchers needs to readdress the cultural aspect of creativity as well as recognising the differing beliefs and values that can enhance or negate creative activity. Reinforcing this point, Runco (2001) noted, "culture is a surprisingly sparse focus of research within creative studies". Spindler (1983) also acknowledges this point by considering a typically western 'novel product' view of creativity which is individualistic as judged within a social construct and which has evolved where there is a greater emphasis placed on the individual rather than the social group. Asian culture, often reinforced by the existence of an authoritarian government (Ng, 2001) that rewards conformity, places emphasis on non-conflict and group dynamics and

subsequently Asian society as such is particularly prone to 'groupthink' rather than divergent individualism. This can inevitably detract from the need for constructive dissent as an essential feature in the creative process.

Ultimately, creativity is a function of the brain's information processing system and therefore is prone to influences of gender, culture, ethnicity, socioeconomic class and other demographic variables (Simonton, 2002). Our full understanding of the impact and implication of these variables within an educational setting does however remain ill-informed.

Creativity and D&T

Gardner (1997) describes creativity as "the ability to solve problems and fashion products and to raise new questions", whilst Amabile (1990) suggests that a product or response will be judged to be creative to the extent that it is collectively novel, appropriate, useful and correct or valuable, in the context of the task in hand. She sees creativity being expressed in situations where domain-relevant skills, creativity-relevant skills and task motivation are interacting. In many ways both Gardner's and Amabile's rationales could be considered as a narrative for D&T education, as the subject is considered as having a significant role in the enhancement of students creative capability through the fashioning of product responses through consideration of 'what might be' rather than 'what is'. This restructuring of the made and designed world implies a special type of iterative creative thinking that potentially should see D&T at the heart of any creativity orientated curriculum, as by its very nature the subject is a process-based activity, which builds capability by operating effectively and creatively (Harris 2003). As Kimbell (2001) suggests D&T is 'deliberately interdisciplinary': 'It is a creative, restive, itinerant, non-discipline'. Much of this is being delivered through designerly activities (Barlex, 2004) and through tackling 'wicked' problems that are not only ill-defined but which have no defined end and are capable of multiple, divergent outcomes.

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The central feature of designers thinking is the recursive relationship between projective thinking (into the future) with reflective thinking (on the impact of the projection). Designing involves creative exploration of the new and unknown and (at the same time) reflection on this new state, in terms of how we got there, why we got there, whether or not we have been successful.
(Kimbell 2000:3)

Within D&T the centrality of creativity as an essential activity is secured by the National Curriculum statement of importance (QCA/DfEE, 1999:15) where D&T is the only subject to have creativity mentioned twice (Howe, 2001). Within this context D&T does however have the potential to become 'gridlocked' (Stables 2004) as it struggles to meet its desired aims. This is reinforced by Atkinson (1994) who discovered that high order thinking, such as creativity, problem solving and analytical thinking were not always capitalised upon and could in fact be detrimental for student learning because of the need for high levels of performance at public examinations which fail to reward creativity; a sad indictment of both the subject and the system found evidence that creative capabilities are not necessarily required and that being highly creative could in fact be a hindrance in terms of examination grading (Atkinson, 2000).

Davies (2000) revealed similar contributory factors by identifying difficulties that teachers found in promoting creativity through D&T. Teachers were anxious about their understanding of creativity and frustrated about keeping their knowledge and skills updated. Davies concluded that teachers may ultimately be impeding creativity in their students if they themselves lacked confidence about their understanding of creativity and in doing so were unwilling to take risks within a legislative and institutional framework. This would appear concurrent with McCormick's (1996) suggestion that the prevailing pedagogy of D&T remains 'hegemonic'.

What the debate reveals is that a tension exists between current rhetoric and the claims that are made for the subject and the actual experience that is offered to children within Design and Technology (Hopper, 1998; Kimbell, 2002; Spendlove, 2004). Indeed the on-going international debate centred on creativity and D&T is enhanced by continued widespread academic interest within the Design and Technology community (Davies 1999; Howe 2001; Atkinson 2002; Kimbell 2002; Rutland 2002; Barlex 2003; Spendlove 2003; Benson 2004) culminating in an international research conference focusing on the theme of creativity and design and technology (Norman et al, 2004).

An emerging theme of 'creativity in crisis' (Kimbell 2000) ultimately prevails with a conclusion that the "majority of current practice at both Key Stage 3 and 4 is not conducive to creativity" (Barlex, 2003:8). Whilst Kimbell (2002:178) had previously indicated that it was time we 'grasped the nettle of assessment and admit the limitations', a feature his current QCA 'assessing design innovation' research. Assessment is inevitably only one feature of this multifaceted issue relating to recognising and encouraging creativity in D&T and Keirl (2004:155) subsequently contextualises the concerns and calls for a 'culture of creativity' but emphasises that "it is much easier to facilitate a culture of risk taking, questioning and being different if such behaviours are both valued and well managed".

When students are engaged through creative practices Thorsteinsson (2002:179) validates the societal benefits of the act of being creative as it provides a powerful force for children in enabling them to use their powers of creation to mould their environment, ultimately strengthening the stability of future societies. Thus, creativity is more than merely embellishment of products but is integral to a sustainable economy and the shaping of future societies. The inclusion of opportunities to engage in creative processes within a child's experiences provides a powerful force for children to use their creative ability to have ownership over their environment. Such

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empowerment ultimately leads to the strengthening and further stabilisation of future societies where each individual has the enhanced capability of shaping their destiny. Thus creativity must be regarded as being much more than transforming or adding value to products, but rather it is an integral necessity; a component of a sustainable economy and a key determinant in the shaping of future societies.

Within design and technology, creativity has generated much research interest and powerful arguments have developed as to why and how creativity should exist. Harris (2003) provides two key questions which as yet remain unanswered about the subject's ability to implement creativity and which present D&T educators with a clear challenge:

- Can the claims of supporters that D & T encourages critical thinking, problem-solving and creativity be substantiated?
- What are the most effective ways of encouraging design and creativity in D & T at all stages?

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