

Introduction

Creativity, like education itself is something that we all experience and can recognize intuitively in ourselves and others. Unfortunately it is also prone to multiple theories and subject to both scientific and philosophical debate. Harnad (2007) describes Creativity in terms of Method, Memory, Mutation or Magic. Each of these perspectives contains implicit assumptions about the creative process and the extent to which it can be encouraged or developed; whether it can be formularized (Method); is tied to innate knowledge or understanding of the world (Memory); is the result of serendipity (Mutation); or is simply inexplicable (Magic). Each of these approaches is perhaps reductive on its own. To see Creativity as 'magic' is a romantic notion that certainly explains the experience of inspiration but perhaps not the underlying causes. Yet to treat Creativity purely as a method assumes that by following a process it will be guaranteed. Ultimately any approach to Creativity must embrace its complexity at a phenomenological level while allowing the development of tools and strategies to enhance it.

Other approaches attempt to ground the concept, such as the 'Four Ps' model that defines Creativity in terms of Person, Process, Press (environment) and Product (Kaufman and Sternberg, 2007). Nevertheless, Creativity remains an ideological battlefield. At least two theories that have explored the notion of the Creative Person have defined it in terms of Person, Domain and Field (Davis, 2004). While acknowledging luck has much to do with it, Csikszentmihalyi, (1996, p.55) argues 'one can paint beautiful pictures in Alabama or North Dakota, but they are likely to be ignored and forgotten unless they get the stamp of approval from critics, collectors and other gatekeepers of the field'. Howard Gardner in his book *Creative Minds* goes so far as to identify seven eminent people and draw conclusions about what constitutes creativity based on those case studies (Gardner, 1994).

This notion of Creativity as eminence devalues the notion of everyday Creativity and would instantly discount the vast majority of undergraduate students as being creative simply by their youth and inexperience. Such a position is untenable for a course that seeks to develop Creativity in its students, yet it does raise a number of questions. If one is to adopt the notion that everyone has the potential to be creative and that Creativity itself is explainable, then how can Creativity best be framed as an

academic discipline and how can the potential for Creativity be realized within undergraduate students?

Teaching Creativity

One obvious approach to teaching Creativity would be to address it through the application of creative strategies. These can include approaches such as analogical thinking (Davis, 2004) or Jung's Active Imagination for generating ideas (Jung and Chodorow, 1997). For group Creativity, De Bono's six thinking hats ensure a range of perspectives are brought to an issue (De Bono, 2008). There are also analytical and visual tools such as mind mapping, and brainstorming. The question remains, though, around exactly what is being learnt through such strategy instruction. Are they learning to apply tools or genuinely learning to be creative? The issue is compounded by research that has shown that Creativity in one domain does not necessarily lead to Creativity in others (Sawyer, 2011).

One common response to such a conundrum is that while one cannot directly teach Creativity, one can teach *for* Creativity (Kaufman and Sternberg, 2007). Thus, Creativity is like many other fields of study that can be addressed through a range of related skills and attributes. These may involve the acquisition of specific skills and knowledge such as creative strategies as well as broader generic skills such as critical thinking and information literacy. Clements and Nastasi (1999) foreground the role not of knowledge itself but knowledge acquisition strategies. Such strategies 'relate newly acquired information to information acquired in the past. Knowledge-acquisition components are fundamental sources of learning, insight, and creativity.' (Clements and Nastasi, 1999)

This broad perspective on the prerequisite skills for Creativity has also been emphasized by academics such as Brenda Gourley, former Vice Chancellor of the Open University UK. Gourley argued for the following skills to be developed to enhance learners' Creativity:

- Information management;
- Self organisation;
- Interdisciplinary knowledge;
- Personal and interpersonal skills;

- Reflection and self-evaluation skills; and
- Ability to manage risk (Gourley, 2003)

One can see therefore, that the teaching of Creativity must go far beyond the provision of skills to a broader notion of self and personal attributes.

Creativity As Metacognitive Activity

It is the contention of this paper that Creativity is primarily a metacognitive process. One criticism of studies that argue for the domain specificity of Creativity is that many of these studies focus on the products of it as judged by domain experts, (Vissers and Danbaar, 2007) thus reinforcing the paradigm of Creativity as an expertly validated concept rather than the more embracing concepts of everyday Creativity that are so important to creative development across a range of disciplines. A metacognitive view of Creativity allows for this through its focus on generalized skills that cross domains.

For example, much of the research into Creativity focuses on the link between Creativity, commitment, intrinsic motivation and a sense of wellbeing. As such, there are underpinning processes that impact on the affective rather than purely the cognitive domain. Corno (1986), argues that metacognition is the dominant controlling process of all of this; that 'affect is the subjective perception of emotional states; thus associated attempts to control negative affect fall within the domain of metacognitive control' (p.334).

What is central to metacognition is the notion of a state of self-awareness that is not inert but interacts with the subordinate domain. It is not necessarily an inherent and immutable state. Indeed, rather than being developmentally fixed, the acquisition of metacognition may be subject to instructional intervention (Boekaerts, 1992).

Nelson and Narens' simple but resonant model of Metacognition (Figure 1) depicts the concept as an information flow of control and monitoring between meta and object levels. Within Creativity one can see it as a process of enacting and monitoring, with the meta level existing as the creative self, and the object level consisting of various strategies and tools that are applied to creative production.

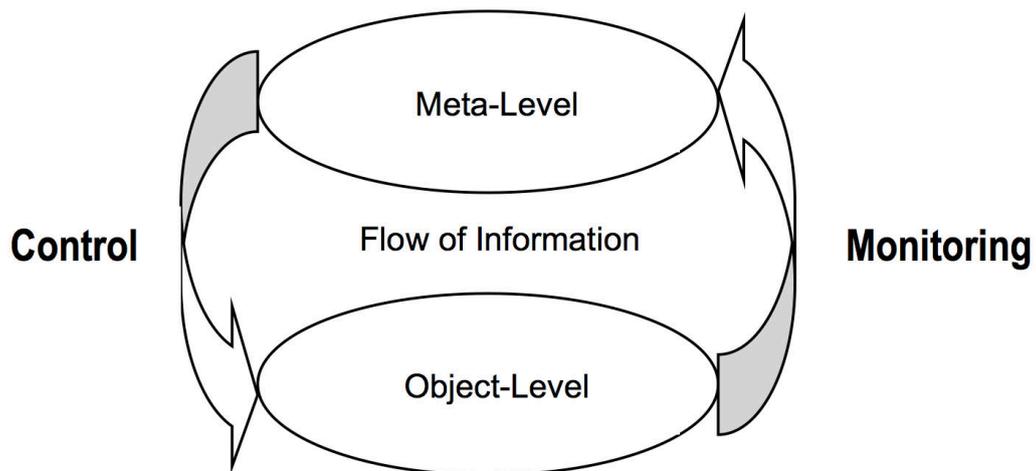


Figure 1: Metacognition (Nelson & Narens, 1994)

The key to developing Creativity therefore would appear to be at this intersection between states and strategies, where Creativity is enacted but also monitored. This monitoring is the key to metacognitive development. A number of general tenets are claimed within the literature for what characterizes effective environments for metacognition. Blakey and Spence (1990) cite Dirkes' synthesis of much of the literature on metacognition into the following features:

- Connecting new information to former knowledge;
- Selecting thinking strategies deliberately; and
- Planning, monitoring, and evaluating thinking processes. (Dirkes, 1985).

Each of these has something to contribute to any approach to developing Creativity; the first two focusing on the knowledge and skills used for it, with the last defining the iterative, reflective processes that formalize them.

From this, a metacognitive model for developing Creativity can be proposed. This model, shown in Figure 2, synthesizes the knowledge and skills associated with Creativity along with the learning supports required to promote the planning, monitoring, and evaluation of thinking inherent in the reflective process of metacognitive development.

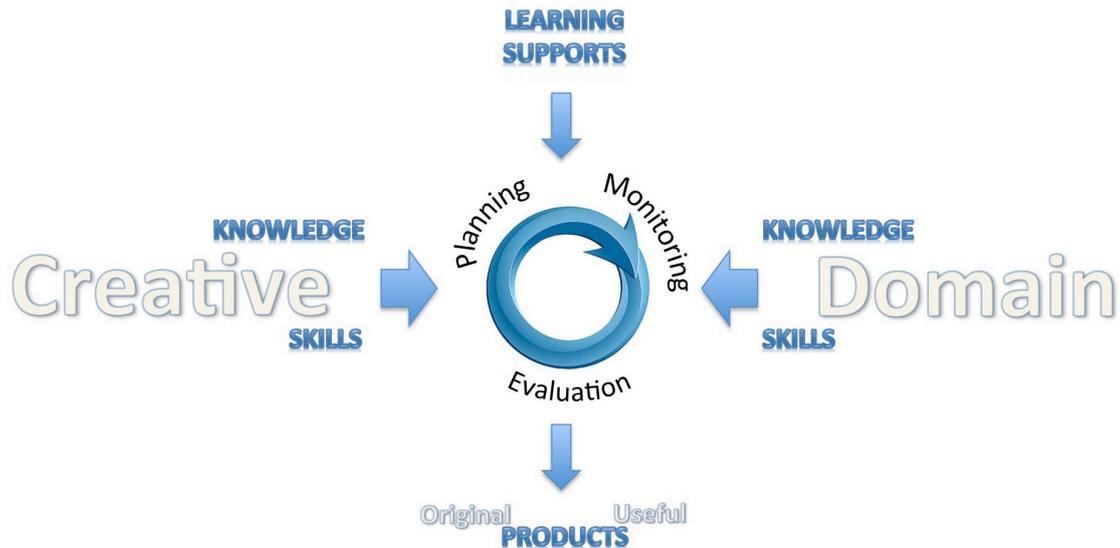


Figure 2: A Metacognitive Model for Teaching Creativity

The key to applying this model is to understand that the reflection inherent in metacognitive development cannot occur in a vacuum. Students need to be provided with a range of creative strategies as well as diverse perspectives on what makes for Creativity. Similarly, the application of Creativity is nearly always framed within a domain or discipline. Much has been made of the role of both divergent and convergent thinking to Creativity (Vissers and Danbaar, 2007). Inevitably, creative strategies can be applied to promote the divergent thinking required for the generation of original ideas. However, originality is only one measure of Creativity. Hennessey (2010) argues the need for creative solutions that have value, reflecting the outcomes of divergent and convergent thinking respectively. The latter is inherently tied to a domain. Put simply, of a chair must function as a chair. Creative knowledge and skills therefore enhance the opportunities for creative products, whereas domain knowledge and skills constrain these opportunities and channel them into useful applications.

For metacognitive development, learning support also needs to be provided. These supports can assist with the reflective process and provide feedback for making plans, monitoring performance as they are undertaking them, and evaluating the outcomes. It is a cyclical and iterative process, with those supports acting as prompts and mediators while creative ideas are developed and refined.

Applying The Model: Cca1103 Creativity – Theory, Practice And History

The model proposed in Figure 2 has been used as the basis of the redevelopment of a core unit in Edith Cowan University's Bachelor of Creative Industries. Students who undertake this unit will be graduating from any of six creative disciplines. As a contextual basis for their studies, the selected domain is Design, with the principles embedded in the unit forming the basis for convergent application of students' creativity to a design-based product. Therefore, the skills and knowledge taught within the unit represent design principles as well as the tools and processes to apply them. On the creative side, students are engaged more generally in knowledge about Creativity and creative skills from a variety of perspectives.

In terms of how both contextual and creative knowledge and skills are taught, the unit is informed a constructivist educational theory that has at its core a relativist epistemology and a philosophy that learners are the active constructors of their understandings during the learning process (Brown et al., 1989). Cognitive theorists have often argued the link between Constructivism and Creativity, particularly in the relationship between higher order thinking and other open-ended learning outcomes (Lubeck and Bidell, 1988). Jonassen (1994) proposes a range of constructivist principles for effective learning, that include multiple perspectives, embracing complexity, emphasising authenticity, and perhaps most importantly promoting reflection. Presented in this way, the skills and knowledge required for Creativity in Design form the raw ingredients for learners to plan, monitor and evaluate their thinking processes.

These were manifest in CCA1103 through the following strategies:

1. **Guest lecturers to promote multiple perspectives.** Throughout the semester students were exposed to a range of perspectives on Creativity through guest lecturers that worked across different disciplines and had different philosophies.
2. **Authentic readings that embraced complexity.** A broad range of readings were used that explored Creativity through the multiple lenses of Person, Process, Press and Product. Students would read original journal articles that described the Swedish design industry, for example, as well as readings from key creative thinkers such as Jung, and Csikszentmihalyi.

3. **Tutorial activities that engaged learners in different creative strategies.** Students used a variety of techniques for visualization and idea generation, were taught a range of tools for organizing and refining their thoughts and so on. The purpose was that they could actively select which techniques worked best for them.
4. **Examples and case studies that represented the diversity of creative and design processes and products.** Case studies enhanced the authenticity of the learning while allowing learners to engage in design principles that were applied to specific products and across multiple media such as Games, Graphics, Interior Design etc.

This is not merely an approach to delivery, however. For learners to effectively evaluate their own thinking, a range of supports need to be developed that promote active reflection. These took a variety of forms:

1. **Clear organization and structure.** The paradox of trying to teach Creativity in its complexity is that complexity can affect the accessibility of the subject. As a result, the 'Four P' structure of the unit was made explicit to learners from the outset. With previous instances of the unit, some students had questioned the relevance of guest lecturers. By having the unit coordinator introduce the lecturer and undertake more formal course related lectures at two points within the semester, there was the opportunity to link the lectures more formally with the course, which was also reinforced through tutorial discussions of the lectures.
2. **Engaging learners in information seeking.** As one of the listed prerequisite skills for Creativity, students were required to bring their own information into discussions. Classes took place within a technologically and information rich environment that allowed learners to find and use information in activities and to help generate creative ideas.
3. **A low-risk learning environment.** Students can always fail a unit, but a great deal of emphasis was placed upon formative feedback to which an official mark was not attached. An example of this is the creative project that formed the main assessment for the unit. This was not due until the end of the semester, at which point it was formally assessed, despite making part submission and receiving feedback throughout.

4. **A high degree of peer interaction.** While the final assessment focused on an individual project, many of the tutorial activities were group-based, as was a presentation assignment that students undertook during the semester. This peer interaction enabled feedback that was more targeted to learners' zones of proximal development (Vygotsky, 1978).

The main metacognitive strategy used in the unit was that of a blog. A previous paper has argued the value of blogging for metacognitive development because of its capacity to engage learners in reflective thinking (McMahon, 2010). In this case, blogging for Creativity provided the following specific affordances:

- **An audit trail for thinking.** A key aspect of blogs is their ability to document iterations of planning, monitoring and evaluation. Students post their original ideas and evolve them, being able to refer to their original postings at all times.
- **A feedback-rich environment.** At its best, a blog can form the basis for a community of practitioners. In this case, students engaged in giving each other feedback through comments on posts at specific points in the semester. Tutors also provided feedback to assist learners in refining their creative ideas.
- **A medium for displaying creativity.** One obvious benefit of a platform like a blog is the capacity to digitally represent creative product. As an online environment, learners could embed videos and photos of their work; provide real examples of interactive media interfaces; and so on. To reinforce the notion of a low risk environment, students could also edit their posts, though were discouraged to do so to maintain the integrity of the creative thinking trail.
- **A tool for engaging in the information space.** The connectability of blogs to other forms of information such as Twitter and RSS feeds enables them to become information sources in their own right. Students engaged in formal learning activities that required them to identify examples that could then be linked to or directly embedded in their blog. This engendered an immediacy between the material being gathered and the commentary about it.

Conclusion

Findings from teaching evaluations pointed to an improved response from learners using the above techniques, with a 25% increase in overall satisfaction over the 18 months in which the unit was developed and refined. In particular students scored the unit highly on its ability to challenge their thinking despite the emphasis on personal choice and a risk free environment. The blogs proved particularly popular, with one student commenting on how they enabled him to manage his efforts better; another on their value in garnering feedback at all stages of the product development; and a final student explicitly attributing the ability to 'learn how to learn' to the use of the blogs. As such it is clearly evident that the unit engaged learners in developing their creativity at a metacognitive level. While some students expressed a desire for a consistent lecture stream, the majority of comments found them extremely valuable, the strongest of which referring to the guest lecturers as 'eye opening' and 'inspirational'. It is not suggested that the ideas proposed above are a formula for teaching creativity – far from it. Ultimately, quality teaching is key to providing the supports necessary to engage creatively at an academic level. If a guest lecture was less interesting than others, students were highly critical, though that in itself formed an opportunity for discussion.

What the above strategies can do is provide some heuristics for addressing a highly complex and problematic area of research and teaching. Louis Pasteur's comment that 'chance favours the prepared mind' (Harnad, 2007) is no truer than for developing the skills required to work creatively. Formal education in many ways seems antithetical to the concept of creativity and it has already been argued that Creativity may not be able to be taught directly. However, it is apparent that engaging learners in the complex and multidimensional perspectives of Creativity and by giving them the tools to work with them in a supportive environment that promotes metacognitive development can come some way to allowing them to develop the generic skills required to work creatively in a range of academic and vocational disciplines.

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