

# From Ambiguity to Complexity: Conceptualising Creativity in the Context of Formal Design Education

Hedda Haugen Askland, Anthony Williams and Michael Ostwald  
The School of Architecture and Built Environment, The University of Newcastle, Australia

**Abstract.** This paper explores the question of creativity as it relates to formal design education. It outlines the dominant historical conceptualisations of creativity and considers the implications these may have on educational practice. It questions what creativity means in relation to formal design education and whether or not creativity can be subject to educational practice.

**Keywords:** Creativity, romanticism, rationalism, 4Ps (process, product, person, press), creative ability, education, design education

## 1 Introduction

Occupying a vexed position between the constraints posed by physics and technology and the unremitting limits of imagination, design encapsulates what is often perceived as the essence of creative acts; namely, the generation of ideas and products that have the quality of being at the same time useful and original, appropriate and novel. Creativity is a profound and essential element of design. It enables designers “to transcend conventional knowledge domain[s] so as to investigate new ideas and concepts which may lead to innovative solutions” (Casakin, 2007: 22); that is, creativity facilitates unorthodox and innovative approaches to problems. However, despite the central position of creativity to design, exactly what is meant by creativity remains unclear and definitions of the concept are in many respects vague and ambiguous.

The preliminary definition of creativity as the generation of products or ideas that are novel and appropriate restricts the framework for understanding creativity to products; it does not clarify what may lead to such products, nor the characteristics of creative processes and traits of individuals and/or groups that can be conducive to creative behaviour. Creativity is not simply a characteristic of design outcomes; it is also an ability or capacity of individuals and groups, and a characteristic of particular processes. It is a complex concept and a multifarious phenomenon that has been subject to

extensive discussion and debate. The design discipline at large has, however, been reluctant to deal with this debate. This reluctance is instrumental to the ambiguity and vagueness that today exist in relation to the concept of design creativity. Across the design disciplines there is no shared understanding about creativity and creative processes, particularly as they relate to learning and teaching experiences.

The ambiguity surrounding the term “creativity” has serious implications for design education and training, leading to the question: how do we teach creativity if we do not have a clear understanding of what creativity is? Based on an extensive and critically framed literature review, this paper considers the concept of creativity as it has developed through history. It explores the notion of creativity in relation to educational issues and, more specifically, design education. The paper is divided into three main parts: the first section briefly explores the dominant historical conceptualisations of creativity; the second section considers the implications of these conceptualisations in relation to the formal education of creativity; whilst the third section draws on the previous discussion but emphasises the issues related to teaching and assessing creativity as they present themselves in design education. Ultimately, the paper aims to illuminate two main questions: What does creativity mean in the context of formal design education? Can creativity be taught, and, if so, what aspects of creativity do we teach?<sup>1</sup>

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<sup>1</sup> This paper forms part of an ongoing two year research project concerning the question of creativity in design education in Australia. The research project, [name of project] is funded by the [name of funding body]. The project aims to create a conceptual framework for understanding creativity and to generate a set of shared terms and concepts that can be used when assessing the creative component of design students’ work.

## 2 Historical Conceptualisations of Creativity

Understanding contemporary, scientific and non-scientific, approaches to creativity requires an understanding of how the concept has evolved through history. Historically two dominant models of creativity existed: romanticism and rationalism. These models can be traced back to pre-Christian times, though they have re-emerged throughout history as, for example, expressionism (romanticism) and modernism (rationalism).

Both romanticism and rationalism can be traced to ancient Greece, and, more specifically, to the writings of Plato (429–347BCE) and Aristotle (384–322BCE) respectively. As the champion of the romantic model of creativity, Plato argued that creativity is the result of divine inspiration and that rational deliberation interferes with creative processes (Sawyer, 2006: 15); creativity, as divine inspiration, is a process of unfettered and undisciplined “agonised” searching (musing). According to Plato, an artist could only create what his (or her) Muse dictated and, as Sawyer (2006: 12) explains, “[t]he artist’s job was not to imitate nature but rather to reveal the sacred and transcendent qualities of nature. Art could only be a pale imitation of the perfection of the world of ideas.” A later version of the romantic model is embedded in the Prussian philosopher Immanuel Kant’s (1724–1804) theory of aesthetics. In the Kantian notion of creativity, the creative individual is seen as someone who possesses “an extraordinary innate ‘gift’ that is beyond the grasp of mere mortals” (Cowdroy & Williams, 2006: 100). This idea of “gifted individuals” maintains Plato’s view of creativity as an innate (or divine) force that cannot be promoted or fostered; it emphasises creativity as something that lies beyond the rational conscious.

In contrast, the rationalist paradigm suggests that creativity is “generated by the conscious, deliberating, intelligent, rational mind” (Sawyer 2006: 15). The rationalist perspective of creativity was first proposed by Aristotle who emphasised that conscious work, rationality and deliberation is required in order to realise creative inspirations. In Aristotle’s view, creativity was potentially more commonplace and it included the creation of uncomplicated or predictable objects as acts of creation. It was, however, not until the European Renaissance that the rationalist model started posing a serious challenge to the romantic idea of special talent or unusual ability as manifestations of an outside spirit. The Renaissance valued reason above all, and the emerging rationalist model of creativity emphasised reason, knowledge, training and education as essential elements to creativity.

An important change embedded in the rationalist model is the transferral of creative ownership from an external source to the individual “actor”. With rationalism, creative potential and creative agency became an attribute of the artist him/her self; rather than artists and artisans *having* a genius, as suggested by romanticism, creative agents were now seen as *being* geniuses. Nevertheless, it was not until the end of the 18<sup>th</sup> century that the discussion of creative ownership fell upon four generally accepted distinctions, which (a) separate the genius and the supernatural, (b) perceive genius as potential in all human beings, (c) distinguish between genius and talent, and (d) acknowledge the role of the political (and socio-cultural) context upon the potential and exercise of a genius. These four distinctions have, as Albert and Runco (1999: 22) assert, “become the bedrock of our present-day ideas about creativity” and they have vast implications for issues related to teaching and learning of creativity and creative skills.

## 3 Creativity and Education

Rationalism and the transferral of creative ownership promote the idea of creativity as a skill or ability that can be promoted or fostered in an individual. Though the philosophy supporting the teaching of creativity can be traced back to Aristotle’s time, discussions surrounding pedagogical frameworks that can support and develop creativity are relatively recent. Indeed, it was not until the middle of the 20<sup>th</sup> century that the romantic ideas of giftedness and inspiration were seriously challenged from an educational perspective. During the 1950s, calls for educational forms of teaching that encourage creativity were made, arousing the discussion of whether or not creativity is a trait of a few individuals and whether or not it in fact can be taught, promoted or fostered (Crompton, 1997: 83). At this point of time, the romantic ideas prevailed and the general assumption of creativity was that it was the trait of particularly gifted children.

In 1963, in an emotional plea to reconsider current practices of educating “the gifted child”, psychologist Ellis Paul Torrance (1981[1963]: 6) argued that gifted children had been regarded as “mysterious, beyond human understanding, evil and unrighteous”. He proclaimed that, as a result of an “unwillingness to accept a realistically complex picture of the human mind and personality” (Torrance, 1981 [1963]: 7), gifted children had suffered. A common perception of gifted children during the time of Torrance’s writing was that gifted children held superior potential and should therefore be able to look after themselves; gifted children were seen to “already have more than

others” and questions were therefore made as to why society should “be concerned about giving them more” (Torrance, 1981 [1963]: 6). Torrance objected to this and proposed that the very complexity of the human mind and the respect for human values demanded that education and guidance make room for both convergent and divergent thinking, discipline and creative behaviour. In fact, “order, discipline, organization, guidance, purpose, and direction are necessary, even for creative behaviour, and are not incompatible with creativity” as long as “order, discipline, and organization [...] are flexible enough to permit change and to allow one thing to lead to another” (Torrance, 1981 [1963]: 17).

The general understanding of creativity and giftedness has changed significantly since Torrance’s writings. The idea that children should be able to develop their potentialities to the fullest has gradually transformed educational practices to emphasise the role of creativity, both as a *tool for learning* and as a *desired educational outcome* (in terms of enhanced creative ability and performance) (see also Plucker, 2002). Educators have moved away from the restricted conception of creativity as a trait of particularly gifted children, emphasising the psychological aspects of creativity that are present, at least as potentials, in everyone. Despite this conceptual change, the question of creativity and education remains contested. A general view is that the modern school system, with its focus on conformity, may discourage students’ curiosity, ingenuity and, ultimately, creativity, and that pressure to conform and to satisfy prescribed standards present obstacles for creative personalities to unfold and develop (Chamorro-Premuzic, 2006). However, as was noted by Guilford as early as in 1950, education has a role to play in creativity (Guilford, 1950). Of importance to the development of creativity are knowledge, experience and readiness for ideas (Cunliffe, 2008; Pedersen & Burton, 2009), all of which can be expanded through education. Education provides opportunities for students to engage in creative activity and learn about creative endeavours; it broadens their knowledge base and experience, subsequently enhancing their chances of creative success.

The idea that creativity can be fostered and promoted rests on the proposition that, by providing a favourable environment and appropriate learning conditions, the characteristics underpinning creativity can be developed (Cropley, 1997: 83). Accordingly, when speaking about creativity in relation to education, a holistic approach to creativity is required. This means that the romantic idea of creativity must be replaced by the rationalist model. As Cropley (1997: 107) concludes in his discussion of how to foster

creativity in the classroom: “[w]hat is needed is an approach in which all aspects of teaching and learning adhere to basic principles for fostering creativity. These involve [...] not only intellectual, but also personal, motivational, emotional, and social aspects of creativity [...] children need contact with complexity, ambiguity, puzzling experiences, uncertainty, and imperfection.”

In recent years there has been a move away from the traditional teacher-centred approach to learning towards a student-centred approach that emphasises problem-based learning and enquiry-based curricula, this being particularly evident at the university level. This shift mirrors the observation of Elton (2006: 131) who argues that: “[i]f a curriculum is to encourage creativity, then it must hand over a high degree of responsibility for learning to students – not in the traditional and inadequate way that teachers are responsible for teaching and students for learning, but in a new way, in which students initiate the learning process and are supported in this endeavour by their teachers, who become ‘facilitators of learning’.” Similarly, Lindström (2006) maintains that creative ability is developed through investigative work and inventiveness. In the educational context, investigative work refers to the use of assignments that allow students to explore central themes in the domain over extended periods of time. Inventiveness, on the other hand, concerns the need to emphasise process as well as product, and to provide opportunities for research, experimentation and revision. This last point addresses the role of the teacher, who, as Lindström (2006) argues, must be sensitive to students’ signals of creative behaviour, such as being adventurous and willing to take risks. The teacher must show appreciation and approval of the students’ courage. Moreover, the teacher must encourage students to integrate production with perception and reflection, to engage in self-assessment and to be open to feedback from teachers and peers. The question of self-assessment refers to the need for *criticality* (Elton, 2006); for learning to be possible and creativity to be encouraged, it has to be accompanied by the ability to separate bad ideas from good ones, to assess process, performance and end product, and be open for critique from others. The question of criticality and self-assessment indicate a social, interactive aspect of creativity. An important part of creativity is evaluation; through self-assessment and review, the creative idea moves through stages towards the final product.

## 4 Creativity and Formal Design Education

In contrast to other disciplines, the very essence of design education is project-based, or problem-based, learning.<sup>2</sup> Rather than encouraging students to seek a single correct answer, design education encourages students to make speculative and exploratory propositions. This particular teaching strategy is conducive to creative thinking, which, as stated above, is an essential element of design. Moreover, it represents a pedagogical strategy that can utilise a curriculum which may familiarise students with so-called “ill-defined” or “wicked” problems; that is, the type of problems that design is often described as pertaining to.

Dorst and Cross (2001) identify the task of defining and framing design problems as a key aspect of design creativity. Correlating creativity with problems solving is a common approach, though it is important to note that most research emphasise the dialectic between problem framing/definition and problem solving as the generator of creative activity (e.g. Gallagher 1994; Hospers 1985; Jay & Perkins 1997; Sternberg & Lubart 1993; Sunley et al. 2008). As Yukari (2009) explains, the design process is a dual process that involves two continuous aspects; namely, an aspect of *problem solving*, wherein the process begins with a set goal, and an aspect of *concept generation*, wherein the process begins when the goal is absent.<sup>3</sup> Both problem solving and concept generation require knowledge and familiarity of the relevant field and domain. Accordingly, formal design education must encompass a curriculum structure that gives students the necessary skills and knowledge to engage in creative design processes.

These assumptions rest upon an understanding of creativity that moves beyond the generic definition constrained by “originality” and “appropriateness”. These two commonly used adjectives emphasise the tangible outputs of creativity, but, as suggested by the above, creativity is not restricted to outcome. In a study of the implicit theories of creativity in beginning

design students, Margaret Portillo (1996) argues that creativity is a multidimensional construct that involves person, process, product and place. Her theory reflects the alliterative scheme first presented by Mel Rhodes (1987 [1961]); a theory which distinguishes between creative products, creative processes, creative persons and creative press. Rhodes presented his scheme as part of his effort of classifying studies of creativity, and the categories represent a synopsis of the main variables that have to be acknowledged when speaking about creativity within contemporary educational contexts. In short, Rhodes’ four categories are:

- Product – studies that focus on the outcome of creative processes, generally classifying products according to a list of properties that indicate creative value;
- Process – studies that emphasise behavioural aspects of creativity and that include empirical and sub-empirical referents such as ideas (initial, critical, composite), idea generation, use of technology, combining and restructuring, creative leap and social and physical contexts;
- Person – studies that consider personal characteristics, including personality, intelligence, values, attitudes, motivation (intrinsic), expertise and skills;
- Press – studies that emphasise the pressure on the creative pressor and/or the creative agent. Press refers to “the relationship of human beings and their environment” (Rhodes 1987 [1961]: 220), or, more specifically, general influences, which “perhaps operate through implicit valuation and tradition (as would be the case of cultural, organizational, or familial presses) or more specific [influences] (as would be the case in interpersonal exchanges or environmental settings)” (Runco 2004: 662).

Drawing on Rhodes’ scheme, Portillo moves the emphasis away from the creative product towards the creative person. She contends that understanding creativity requires an understanding of how the creative person and personal factors relate to the three other aspects of creativity; cognitive characteristics should be related to the creative process (aesthetic taste, imagination, integration and intellectuality, decisional skills and flexibility), motivational attitudes should be related to the creative product (goal-orientation and seeking recognition for creative work), and personality traits should be related to place (being unorthodox, challenging societal norms). Her theoretical framework suggests that efforts to teach design creativity should encompass all four aspects of

<sup>2</sup> When used in this context, the word “problem” refers to a wide range of situations, some of which may be framed as opportunities, open-investigations, or as “wicked” or “ill-defined” settings.

<sup>3</sup> The role of problem definition in relation to creative thinking is also emphasised by Sternberg and Lubart (1993) who argue that there are three insight processes that lead to creative thinking; namely, (a) *selective encoding* (noticing what is potentially relevant in order to understand and solve problems), (b) *selective comparison* (relating new and old information), and (c) *selective combination* (correlating appropriately connected information).

creativity. Through formal design education future designers should develop their cognitive skills and learn how to apply high-level cognition in creative activities. They should learn about motivational issues and become confident in defining and solving problems, setting goals and promoting their own work. Related to this is the ability to understand what represents good design and, not least, a creative design product. Lastly, students should be able to identify and adhere to codes of practice and relate to the rules, boundaries and requirements of the relevant field and domain. But can this be taught? Can cognitive, motivational and personal traits be subject to education and training?

The first step in answering these questions is to dismiss the romantic idea of creativity. Despite the general consensus that the romantic idea has no place within contemporary (design) education, the three traditional teaching methods in architecture and design at least partially remain embedded within the romantic paradigm. Firstly, the apprentice model of vocational design education is founded upon the idea that creativity is innate and that, with appropriate support and modelling by a Master, the embodied creativity may be channelled to produce ideal outcomes. Secondly, the studio model, which at large dominates the practical component of formal design education, is based on the assumption that creativity can be taught in larger groups, though only by long and direct association with a talented patron. Thirdly, the competency-based teaching models of vocational education, reflect a reproduction model of creativity, which suggests that creativity can be taught *en masse* but only by reproduction of the work of past masters (Cowdroy & de Graaff, 2005; Cowdroy & Williams, 2006). All these three models emphasise different stages of the design process; specifically the processes of schematisation and execution. However, they do not focus on the imaginative conceptualisation. The lack of focus on conceptualisation within traditional design teaching models is problematic. Conceptualisation is, according to Cowdroy and de Graaff (2005: 211) “the highest level of creative ability”. It is the “essence of creativity” and “if it is neither taught nor assessed, then it must be accepted that creative ability as a whole is neither taught nor assessed” (Cowdroy & de Graaff 2005: 211).

When addressing this void of formal design education it is necessary to further consider the cognitive processes underpinning creative works. The definition presented by Cowdroy and de Graaff (2005) is developed further by Cowdroy and Williams (2006) in the article, *Assessing creativity in the creative arts*. Cowdroy and Williams (2006) propose three “agreed” types of creative ability: conceptualisation,

schematisation and actualisation. Each creative ability represents a progressive stage in the movement from initial idea to realised work. Each stage requires a particular type of memory (emotional, declarative, and procedural) and certain thinking skills (imaginative, originality; recollection, orientation, extrapolation, planning, innovation, inventiveness; and, development of abilities to accommodate innovations and inventions); in Cowdroy and Williams’ (2006: 107) words: creative abilities require “combinations of particular types of memory, particular types of thinking skills and particular crafting skills.” On the lower stages (schematisation and actualisation), the cognitive and behavioural aspects are separate. At the higher level conceptualisation stage, however, only thinking is involved. Accordingly, higher level creativity denotes progression from “conceptualization to schematization to actualization” (Cowdroy & Williams 2006: 107), though, for this progression to take place, “a decision (commitment) must be made (perhaps unconsciously) [...] and a further decision on how to maintain continuity of the originating idea must also be made” (Cowdroy & Williams 2006: 107). Cowdroy and Williams (2006) identify the connecting thinking points as “facilitative thinking”, concluding that this form of thinking is intentional and directional and, as such, represent a strategic thinking behaviour.

This definition of creative ability, set within a cognitive psychological framework and “tracking the psychological processes of inspiration and complex decision-making” (Cowdroy & Williams 2006: 97), represents an innovative approach to creative design education. It proposes a framework within which teaching, learning and assessment strategies can be developed. According to Cowdroy and Williams (2006), design students have to develop all three levels of creative ability. This would require them learning each component (memory, thinking, behaviour) both individually and in combination for each of the three levels of creative ability. Such a complex learning outcome requires a combination of multiple learning methods. As Cowdroy and Williams explain, it requires the conventional RRR (rote, recognition and repetition) methods, DDD (dialectic, diagnosis and debate) methods, and EEE (exploration, experimentation and extrapolation) methods.

RRR methods will develop the students’ lower-order task abilities. DDD methods, on the other hand, shifts the focus of learning towards student-centred heuristic learning, which encourages students to experiment and debate, subsequently promoting higher order skills typically involved in lateral thinking. These skills are further developed by EEE methods, though these methods move the students towards the highest level of creative ability, taking them out of the

conventional learning paradigms and into close proximity with the higher level of design practice.

By progressively expanding the curriculum structure and the pedagogical strategies from an emphasis on RRR, via DDD, to EEE, the students should develop the crafting skills required to actualise, present and communicate creative outputs, they should gain technical knowledge and an understanding of historical and theoretical issues which will allow them to generate conceptual ideas and develop these into a preliminary designs, and they should develop self-direction, self-confidence and skills for self-assessment, which are essential skills for the conceptualisation and associated progression to higher-level creativity.

This discussion suggests that when speaking about creativity in relation to formal design education, creativity should not be restricted to creative outputs/products. Creativity is a requirement of exceptional design, but it is also a characteristic of the process leading to such design, a trait or ability held by those who achieve such design, and a result of contextual factors that pose requirements and boundaries and that are conducive to both intrinsic and extrinsic motivation. All of these aspects have to be addressed by formal design education; design students have to learn about and gain an understanding of what creativity is beyond the stereotypical and conventional perceptions of the concept. They have to learn about the complexity of creativity, about the role of fields and domains, and about the balance between form and function. Something that is original is not necessarily creative; it should be original in that it reflects an exploration of a range of possible solutions and in that it challenges and expands what already exists, though this exploration and expansion have to be advisable and desirable and therefore reflect the consideration of a carefully chosen alternative that adheres to the rules, boundaries and regulations of the field and domain. As the influential psychologist Mihaly Csikszentmihalyi (1999: 314) contends: “[i]f creativity is to retain a useful meaning, it must refer to a process that results in an idea or product that is recognized and adopted by others. Originality, freshness of perception, divergent-thinking ability are all well and good in their own right, as desirable personal traits. But without some form of public recognition they do not constitute creativity” (Csikszentmihalyi 1999: 314). Emphasising the importance of understanding the role of the field within which the students act and to which their design is addressed is therefore an important part of building the creative capital of the design students. Creativity depends on acknowledgement of the field and domain, as well as the boundaries posed by the physical environment and technological advance. It depends on

an understanding of what is and a willingness and confidence to challenge the status-quo. It requires higher-level cognitive abilities, as well as crafting and technological skills. The process of teaching design and developing the creative abilities of design students must therefore reflect a holistic approach which both confronts and engages students in all of these factors.

## 5 Conclusion

Although definitions of the creative (design) process exist, there is no consensus within the design disciplines as to what creativity really is and exactly what is being taught as creativity remains unclear. The romantic model of creativity and individualist approaches that perceive creativity as spontaneous, unconscious or as an inner spirit retain their influence on conventional understandings of the concept, despite scientific evidence that reject such notions as inaccurate or misleading. Missing a clear disciplinary definition of the concept, these, as well as other myths about creativity and popular stereotypes of the concept further complicate an already complex field. Exactly what constitutes creativity—as an object for teaching and assessment—remains vague, and a lack of stated, recognised standards suggests that the teaching and judgement of design creativity inevitably relies on the instructor’s subjective understanding of creativity. This has severe consequences for design educators and may potentially diminish transparency and consistency in teaching and assessment practices. Moreover, it may lead to confusion amongst students as to what is required by them in order to perform academically. Creativity is a focus of design education and it is a stated learning outcome of the discipline. Accordingly, the need to confront the issue of creativity, including the challenge of defining it and developing strategies to facilitate its development, should be a priority.

It has become apparent in recent research that creativity cannot be dismissed as being simply an innate capacity which happens, despite intentions and purposes. Conversely, creativity is the result of rational and deliberate processes of agents who act within particular fields and domains. There is a need to acknowledge the complexities associated with creativity and creative processes and to create corresponding pedagogical frameworks for teaching and assessment. For this to happen, design must move towards an unambiguous disciplinary definition of creativity that encapsulates this very complexity and that may reduce the ambiguity surrounding the question of creativity in design education.

A major challenge in higher education, in design, is to demonstrate excellence in quality of teaching and learning for the purpose of enhancing creativity.

Design education must grapple with the issues identified above. The competencies, which define a quality design graduate, are complex and diverse if they are to enhance creativity. The implementation of a curriculum, which is supported by teaching methods that scaffold the attainment of appropriate learning experiences, must also integrate into that curriculum a range of assessment strategies. These assessment strategies provide the momentum for students to achieve the desired creative qualities as well as the means whereby students are able to measure their attainment of these qualities.

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