

Comparing University Design Students' and Tutors' Perceptions of Creativity

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ABSTRACT

This paper explores the perceptions and views of creativity amongst UK-based architecture and product design tutors and design students. This study is an extension of the authors' earlier work that examined a group of design tutors' views on creativity in design in a UK university design education context. The authors adopted a semi-structured interview approach and collected a series of rich insights into how design tutors and design students conceptualize creativity and how both perceive their role in developing creativity. The findings of the research indicate clear differences in the way that design tutors and design students assess their creative potential. Yet, at the same time, they both find it very difficult to define and conceptualize. The results also show that the design students generally acknowledge the role that design tutors play in promoting cultures of creativity in the university design studio, but also stressed the importance of the wider socio-cultural system. Lastly, the research reveals that many aspects of creativity in the university design studio remain shrouded in mystery and this lack of knowledge of creativity and how it facilitates design may well be compromising the education of design students. There is, however, clear interest from both the design tutors and students regarding creativity, and the value of domain-specific versus general notions of the concept of creativity in developing this cognitive skill.

Keywords: Creativity; Perception; Design Tutors; Design Students; University design education

INTRODUCTION

The authors' earlier study of a group of university design tutors' perceptions of creativity (Jones *et al.*, 2013) found a number of interesting results, including design tutors clearly valuing creativity, but not all design tutors believing that they themselves are creative. This research inquiry also identified that design tutors find creativity very difficult to define and conceptualize, and that very few tutors had done any extensive reading on creativity and, perhaps as a consequence, the design tutors interviewed found it difficult to articulate whether their teaching promotes and facilitates this aptitude in their students. Finally, the study found that design tutors would value understanding creativity more in order to improve their teaching activities and the work they do with their students.

This paper builds on the authors' earlier research by comparing the responses of a group of design students and a group of design tutors at two leading university design departments in the UK. The study asks a number of questions in relation to creativity in design and explores the differences in design students' and design tutors' attitudes to creativity from an individual perspective to a socio-cultural perspective, examining the roles that design students and design tutors play in this often close and lengthy relationship. Lastly, we interrogate how the findings from this study might be used to help inform and shape future forms of design education.

Context of Study

The context of this study is the university design studio, a place where both formal and informal

pedagogical encounters occur and where a strong sense of community and partnership between staff and students is cultivated and maintained (Tinto, 2006; Trigwell, 2002). As is generally accepted, one of the fundamental aspects of higher education is that there exists an inextricable relationship between teaching and learning that is subject to numerous conditions which influence and impact the success or otherwise of learning (Ashwin, 2009). The teaching and learning of design, in particular, relies on continuous interaction between students and tutors but it is acknowledged that this exchange and interaction between design tutors and students is not well understood (Shreeve *et al.*, 2010). Moreover, the current university design studio teaching and learning model is increasingly under threat from funding pressures and requirements to increase efficiency in higher education. Research has suggested that the relationship between design tutor and design student where the interaction and exchange is treated as an “adult to adult” connection is more conducive to learning (Mortiboys, 2005). Given the external and internal pressures on conventional design studio teaching and learning, this paper probes further into the perspectives and attitudes of 30 design students and 30 design tutors relating to creativity and innovation at two leading university design departments in the UK.

This study of architecture and product design tutors and students asks a number of questions in relation to creativity in design. In particular, the study seeks to define whether design students and design tutors believe creativity is an essential characteristic in contemporary forms of design. Exploring the roles of both design students and design tutors, we believe, is key to understanding creativity within the context of design education at university level. There have been a number of studies that have looked separately at design tutors’ beliefs and creativity (Diakidoy and Kanari, 1999; Fryer, 1996; Nicholl and McLellan, 2008) but none that compare the perceptions of creativity amongst design students and design tutors. Thus, this study makes an original contribution to the field because there have been no studies that have explored and compared architecture and product design students’ and design tutors’ conceptualizations of creativity in design and, particularly, the facilitation of creativity in design education at both undergraduate and postgraduate levels.

PERCEPTIONS OF CREATIVITY STUDY

Creativity is a vital component of any contemporary society. It is a major driver of economic and social innovation (European Commission, 2009) and an essential feature of the post-industrial economy (Ottosson, 1995). Companies now need more than efficient manufacturing process, cost control, and a good technological base to remain competitive. They also require motivated staff and a management team that respects creativity and understands its processes, potential, and impact. Companies also need to develop products and services that meet customers’ expectations. Creativity can be very helpful in this respect. Designers, managers, engineers, manufacturers, clients, customers, and other stakeholders involved in new product design and development rely heavily on creativity. Creativity is, therefore, a crucial factor when designing products (Chakrabarti *et al.*, 2004; Gero, 1993). Creativity can also facilitate innovation, support problem solving, and enable companies to increase greater market share (Ottosson, 1995). Without creativity in design, there is no potential for innovation (Amabile, 1996). The UK’s top innovating companies produce 75% of their revenue from products or services that did not exist 5 years ago (Cox, 2005). Thus, within industry, creativity does not necessarily equate to success. However, without it, long-term failure is a near certainty (Cox, 2005).

Despite enormous amounts of research to understand better and support creativity in design (Bonnardel, 2000), it is still difficult to locate any common agreement among researchers on operational definitions of what it means for a designed product, space, experience, service, or system to be ‘creative’. Given the importance of creativity in our modern society, and the role that both design students and design tutors play in this socio-cultural system, this paper explores the perspectives and attitudes of 30 design students and 30 design tutors at two leading university design departments in the UK. The authors adopted a semi-structured interview approach, which is a highly useful method for uncovering new insights (Robson, 2002) whilst being an excellent mechanism for identifying

general patterns in descriptive studies (Saunders *et al.*, 1997).

The study seeks to explore a number of corresponding objectives, including:

- What are the differences, if any, in how architecture and product design students and design tutors conceptualize creativity?
- Whether architecture and product design students and design tutors believe they possess creativity themselves and whether it is important that they do.
- Whether architecture and product design students and design tutors see creativity as important and/or valuable.
- How architecture and product design students and design tutors view their roles in developing creativity and how they manage this in a university setting.
- Whether architecture and product design students and design tutors would like to know more about creativity.

The study involved asking 10 questions to both the architecture and product design students and the design tutors. The 10 questions probed their beliefs about creativity in design across three areas – (1) Questions 1 to 3 focus on an individual’s point of view, how creativity is defined and conceptualized by individual students and tutors; (2) Questions 4 to 6 focus on how creativity is encouraged, facilitated and developed between design students and design tutors within an educational context; and (3) Questions 7 to 10 are all about socio-cultural issues surrounding creativity in design beyond the educational context. Given the stated aims and objectives of the study, the 10 questions were posed to 30 design students and 30 design tutors.

The questions asked, in order, were as shown in Table 1 below.

Table 1. Perceptions of Creativity Questions

3 Areas	Design Students Questions	Design Tutors Questions
Creativity and the Individual	1. Do you consider yourself to be creative?	1. Do you consider yourself to be creative?
	2. How do you think your design tutors conceptualize creativity? What is it, can it be defined?	2. How do you conceptualize creativity in students? What is it, can it be defined?
	3. Do you think creativity is an essential attribute for your tutors to possess?	3. Do you think creativity is an essential attribute for your students to possess?
Facilitating Creativity	4. Do you think you join the university as a ‘creative individual’ or do you think it is what your design tutors do that develops your creativity as a cognitive skill?	4. Do design students join the university as ‘creative individuals’ or do you think it is what you do as a tutor that develops their creativity as a cognitive skill?
	5. Do you think your design tutors’ teaching methods promote creativity in you?	5. Do you think your teaching methods promote creativity in your students?

	6. Do you think having some knowledge of creativity and how to improve it would be of some interest in improving your design work?	6. Do you think having some knowledge of creativity and how to improve it would be of some interest in improving your teaching?
Socio-Cultural Perspectives of Creativity	7. Have you ever read anything on creativity?	7. Have you ever read anything regarding creativity and how to improve it as an attribute within your students?
	8. If not have you learnt to be creative?	8. If not have you learnt to be creative, and how have you learnt to teach your students?
	9. What do you think is more important in design education at University – (a) an awareness of design precedents and the work of past designers and their work OR (b) developing your innovation and creativity?	9. What is more important in HE design education – (a) teaching the students an awareness of precedents and the work of past individuals and their vocabulary OR (b) teaching innovation and creativity?
	10. Do you think creativity is valued within your discipline?	10. Do you think creativity is valued within your discipline?

In summary, the list of 10 questions have been posed to both the design students and design tutors in order to tell a story of looking at creativity from an individual perspective through to a socio-cultural perspective, where both design students and design tutors play key roles in the cultivation, development and dissemination of creativity in design. In other words, how do both the design students and the design tutors view their roles in this creativity exchange? Moreover, can the findings from this study be used to help inform and shape the future of design education?

RESULTS

Creativity and the Individual

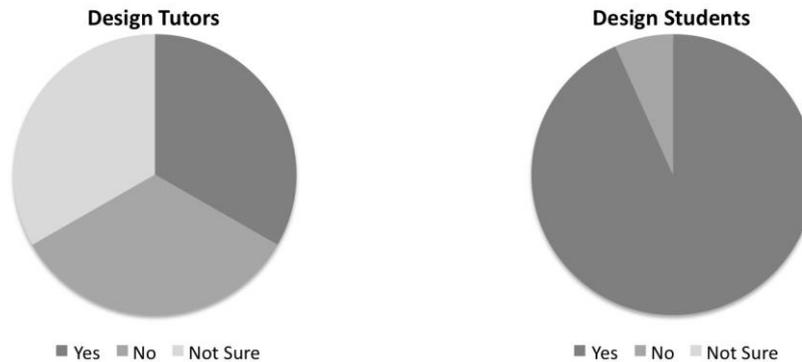
Design Tutors and Design Students and the Self

The first question asked each design tutor if they considered themselves to be creative. One third of the 30 design tutors replied with a firm “Yes”. They justified their claims of being creative by stating things such as “*I come from a creative family...*” (Tutor 2), “*Yes being a designer makes me creative...*” (Tutor 21), “*I believe myself to be a creative thinker that can pull disparate ideas together through synthesis and I am good at seeing possibilities...*” (Tutor 7), and “*[Compared] to the average person on the street, I am probably highly creative...*” (Tutor 8). Conversely, an equal number of the design tutors were much more circumspect and cautious in their responses and replied “No” to this question. The reasons they gave included “*No. Enzo Mari in his ‘vaffanculo’ talk defined creativity as the door of hell*” (Tutor 9), “*No, not as creative as I would like. I seem to inherently restrict myself...*” (Tutor 10), and “*No, there appears to be a tangible pressure in society for one to become creative and as such it has become a term used by an increasing unspecified and growing sector of the population*” (Tutor 11).

The design students by contrast were unequivocal, with only two out of the 30 believing that they were not creative. The design students justified their claims by stating “*I must be otherwise I wouldn't be a design student...*” (Student 8), “*I have been told throughout my education (pre-HE and HE) that I am...*” (Student 23), and “*I definitely think more creatively than my friends who don't study design subjects...*” (Student 28). It is interesting to note that the design tutors and design students who

answered yes to this question implied in their responses that being creative is a core function of being a designer.

Do you consider yourself to be creative?



Commonalities	Design tutors that responded yes to this question gave reasons such as “coming from a creative family” and “compared to an average person”. Design students were generally much more relaxed about being labeled “creative” than the design tutors. Both tutors and students stated that being creative is crucial to being a designer.
Differences	The product design tutors were more circumspect about seeing themselves as “creative” than the architecture design tutors.

Figure 1. Do you consider yourself to be creative?

The second question asked the design tutors and design students how they conceptualize creativity, what it is, and can it be defined? Both the design tutors and design students struggled to articulate what they understand creativity to be. Defining creativity is not straightforward. There is no single definition of creativity. This difficulty has been highlighted previously in several studies (Bonnardel, 2000; Gero, 1994; Sedlacek, 1987). Likewise, in this study there were 14 different definitions of creativity offered by the design tutors and 15 different definitions from the design students. The design tutors were uneasy at being asked to conceptualize creativity; the range of their definitions were broad, but perhaps more accurate than the students' definitions, with several tutors combining the generally accepted notions of “novelty” and “value” (Amabile, 1983). Some of the design tutors' answers imply that creativity can indeed be defined, their responses included “*Imaginative responses to a design brief...*” (Tutor 1), “*...it is about being inventive*” (Tutors 3 and 8), and “*... [includes] tackling problems unconventionally*” (Tutor 29). A number of design tutors, on the other hand, tended to respond in a negative manner and generally suggested that creativity cannot be defined. Their comments ranged from “*...creativity is difficult to define (but we know that already, don't we?)... I don't even try*” (Tutor 11), “*I don't think of creativity as a thing, something that can be isolated and witnessed*” (Tutor 13), and “*I don't believe I can define it... it's an internal aptitude that defies definition*” (Tutor 24).

Of the student sample 60% believed creativity could be defined; they tended to use synonyms such as being artistic, inventive, imaginative, and innovative. Several students (13, 18, 26 respectively) discussed the term in more detail and with more confidence by stating “*...thinking laterally about your work*” (Student 13), “*...forming association between disparate ideas and information*” (Student 18), and “*...a cognitive skill utilising artistic intelligence to solve wicked problems*” (Student 26). The “value” component, so prevalent in many traditional definitions of creativity, was generally absent in the

students' conceptualizations of the term in this study, with the vast majority citing art and imagination as being more important. The remaining 40% of the design students were far more questioning and critical of the term creativity, some believing it to be almost impossible to define, describing it as "...enigmatic" (Student 28), "...by trying to define it, it limits its possibilities" (Student 8), and "...it's a word that defies definition, you know it when you see it" (Student 6).

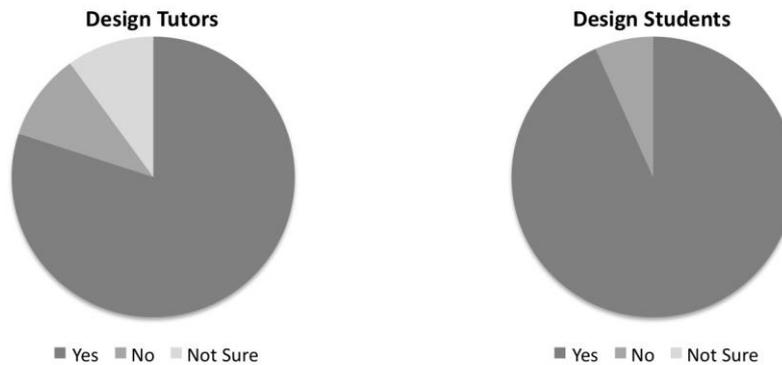
What is creativity? Can it be defined?

<p>Commonalities</p>	<p>Both design tutors and design students struggled to articulate creativity. Several design tutors defined creativity as that which has "novelty" and "value" (Amabile, 1983). 60% of the design students believe creativity can be defined. They defined creativity using terms such as "being artistic", "inventive", "imaginative", and "innovative". The remaining 40% of the design students believe creativity is almost impossible to define.</p>
<p>Differences</p>	<p>The design tutors and design students did not agree on a single definition of creativity. There were 14 different definitions of creativity offered by the design tutors and 15 different definitions from the design students.</p>

Figure 2. What is creativity? Can it be defined?

The third question asked if creativity is an essential attribute for tutors and students to possess? 24 of the 30 (80%) of the design tutors stated clearly that creativity is an essential or a vital attribute for their students. The responses were variable and included "...absolutely, they won't be able to function on the course without being creative" (Tutor 1), "...yes, but it will be developed at university" (Tutor 18), and "...yes, without high levels of creativity they will undoubtedly fail" (tutor 20) whereas other tutors tended to add caveats such as "...it (creativity) is not the ONLY essential attribute" (Tutor 11) and "Yes, but I don't think that creativity is an essential attribute for our students to possess" (Tutor 13). Three tutors, interestingly, do not think creativity is an essential attribute at all to study design.

Is creativity an essential attribute to possess?



<p>Commonalities</p>	<p>80% of the design tutors believe creativity is an essential attribute to possess. Design tutors stated that students would not “be able to function without being creative” and without it “they will undoubtedly fail”. The design students agreed that creativity was an essential attribute to possess and stated “creativity is a prerequisite to being a design tutor”.</p>
<p>Differences</p>	<p>Some design tutors suggested “creativity is not the only essential attribute to possess” and 3 design tutors stated creativity is not an essential attribute.</p>

Figure 3. Is creativity an essential attribute to possess?

The design students were in agreement that creativity was an essential attribute for design tutors to possess to be able to teach on the course, with only two students arguing the contrary. Of those who said yes the following comments were made “...they (the tutors) wouldn't be able to teach design otherwise” (Student 2), “...surely it is a prerequisite to become a design tutor!” (Student 14), and “...you need some inspiration from someone sometimes - we rely on their [design tutors] creativity” (Student 17). Seven of the 30 students suggested that not all of the design tutors were creative. It was also expressed that only the design tutors needed to be creative; the design students stated it was less important for those tutors teaching supporting modules (e.g. history and technology etc.) to be creative.

Cultivating, Developing and Disseminating Creativity

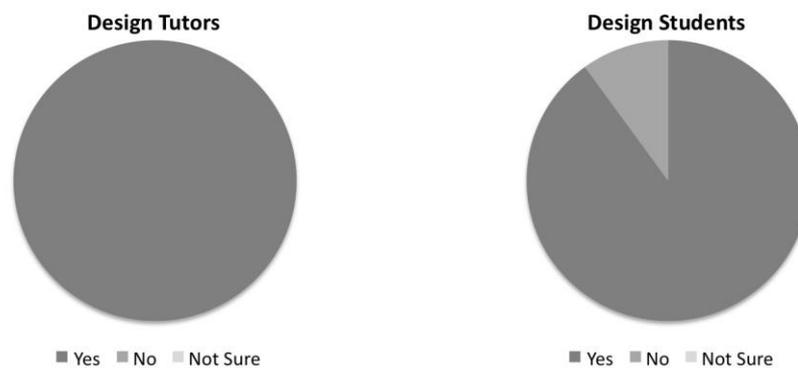
Design Tutors and Design Students on Developing Creativity

The next set of questions, (4 to 6), consider design creativity as something that develops within an educational context. Question 4 asked each design tutor whether their design students joined the university as ‘creative individuals’ or if it is what they do as a design tutor that develops their students’ creativity? The students were asked the same initial part of the question and then whether they thought the tutors had developed their creativity. All of the design tutors tended to agree that students joined the university as ‘creative individuals’ and that their creative capacity was further enhanced over the duration of their studies at university. For example, Tutor 1 believes students “...start with some creative skills and we build on them”, Tutor 23 states “...their creativity is embryonic when they join us and needs developing”, whereas Tutors 12 and 16 agreed that “...we are all born creative”, and Tutor 11 suggested that “...the responsibility is for the tutors to help students develop their creativity”.

The design students were largely in agreement with the tutors, 90% of them believing that they joined

the university as 'creative individuals'. However, only 60% of the design students believe that it is what the design tutors do that develops their creativity. The students stated that the tutors' teaching methods varied considerably, and praise was given to those tutors who encourage making and allow the freedom to experiment. Most of the remaining 40% of students acknowledge that the tutors play a part, but some suggested that it is the overall environment, including peers, resources and the general culture of the academy that develops their cognitive and creative skills.

Do design students join the university as creative individuals?



Commonalities	All of the design tutors agree that students join the university as creative individuals. 90% of the design students believe they are creative when they join the university.
Differences	Not all of the design students believe that it is what the design tutors do that develops their creativity. Some of the design students acknowledged that the design tutors play a part in developing their creativity, but they also suggested that the overall environment, including peers, resources and the general culture of the academy plays a major part.

Figure 4. Do design students join the university as creative individuals?

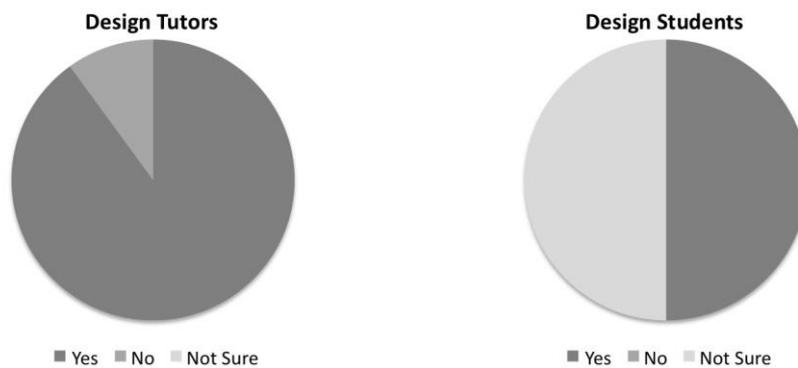
Question 5 asked the design tutors and students if they thought their teaching methods promoted creativity in their students? In their responses, 90% of the tutors felt that their teaching methods positively promoted creativity in their students. The methods the tutors adopted in the promotion of creativity, however, ranged from "Yes, of course, but it is ultimately the students' responsibility to cultivate their own creativity" (Tutor 24) and "I tend to simply take students to a situation of unease and discomfort. I think in this way the student learns to challenge his or her own thoughts, observe more carefully, and build their confidence" (Tutor 8). Several tutors focused on specific methods and tools in their responses such as mind-mapping, brainstorming, etc. (Tutor 11 and 21) and "...in project work I try to encourage idea generation and exploration rather than pursuit of the safe option" (Tutor 14).

There was a definite split in the design students' responses to question 5, however. Approximately one half of the design students believe that the design tutors' methods did in fact hone and develop student creativity and the other half were unconvinced. Of those who said yes the following comments were made "...tutors encourage creativity by setting us challenging design projects" (Student 2) and "...the tutors help with associations and connections between the sources of information and stimuli" (Student 27). Of those who said yes, a number did qualify this by saying the design tutors helped with their design project, but not necessarily how to be creative. "The tutors have taught me a lot, but

nothing to do with how to operate creatively.” There were other students who said that the tutors helped but were only a contributing factor. “I have become more creative since joining university, but it is the whole experience not just the tutor” (Student 1) and “...it's being at university, working alongside creative people (students and tutors) focusing day after day on challenging projects” (Student 17).

Of the students who didn't think that their design tutor's teaching methods promoted their creativity, the following is a sample of their responses – *“No, the tutors are more interested on technical resolution than creative responses” (Student 11), “...the tutors seem to inhibit my creativity rather than develop it... a number promote reliance on them, rather than working independently towards a creative outcome” (Student 7), and “...too many tutors are obsessed with precedent, in effect developing mimicry over creativity” (Student 15).*

Does design teaching promote creativity?

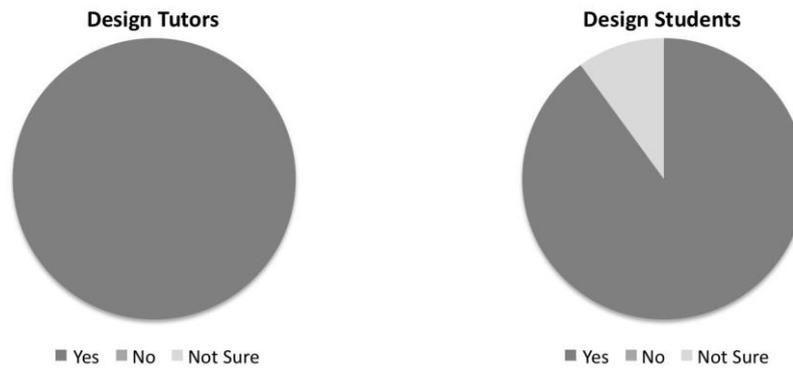


Commonalities	90% of the design tutors believe their teaching promotes creativity in their students.
Differences	Half of the design students stated that the design tutors' teaching helped develop their creativity. The other half were unconvinced, however. Half of the design students disagreed that their design tutors' teaching promoted their creativity and suggested that “the tutors are more interested on technical resolution than creative responses”, “the tutors seem to inhibit my creativity rather than develop it”, and “too many tutors develop mimicry over creativity”.

Figure 5. Does design teaching promote creativity?

The responses to question 6, do you think having some knowledge of creativity and how to improve it would be of some interest in improving your teaching (and learning for the students) had almost all of the tutors and students agreeing that having some knowledge of creativity and how to enhance or improve it would be beneficial. Several of the students, did however qualify this by stating that it had to be specific to design and not general sessions on creativity. For example, *“Yes if it is integrated into the curriculum” (Student 5), “...what is important is how creativity and design interact” (Student 12), and “...general sessions on creativity without application will probably be pointless” (Student 11).*

Would some knowledge of creativity help improve your work?



Commonalities	Almost all of the design tutors and design students agreed that having some knowledge of creativity would help improve their work.
Differences	Some of the design students, however, qualified their responses by stating that the knowledge had to be specific to design and "integrated into the curriculum" and that "general sessions on creativity without application would probably be pointless".

Figure 6. Would some knowledge of creativity help improve your work?

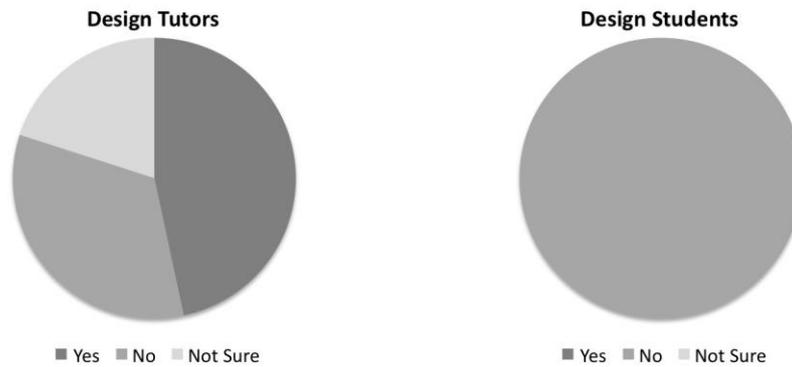
Socio-Cultural Perspectives of Creativity

Socio-Cultural Perspectives of Creativity – Design Tutors and Design Students

The next set of questions relate to both the design tutors' and the design students' socio-cultural perspectives of creativity beyond the educational context. These questions relate to the larger socio-cultural environment that both the design tutors and the design students reside in. The questions posed to the design students, then, were asked in order to tell a story of looking at creativity from an individual perspective through to a socio-cultural perspective, where design tutors play a key role as educators and/or practitioners.

Question 7 asked each design tutor and student if they have ever read anything regarding creativity. Over half of the tutors had not read anything on creativity or were not sure. "No, nothing springs to mind" (Tutors 1 and 2), "No, although if I had more time I would as it is important" (Tutor 4), and "I can't recall reading anything specifically on creativity" (Tutor 8). Of those that said yes, they referred to the work of authors such as Donald Schön, Arthur Koestler, Bryan Lawson, Norman Potter, and Nigel Cross, which tended to be more about the design process. Others stated they had "...read plenty about creativity" (Tutor 13) and "the importance of creativity" (Tutor 15), but they could not list anything in particular. The students had read nothing on the subject, and couldn't recall any authors. A few had watched programmes on TV, but they suggested that these tended to focus on creativity and individual genius.

Have you ever read anything on creativity?



Commonalities	None of the design students had read anything on the subject of creativity. None of them could recall any authors. Over half of the design tutors had not read anything on creativity or were not sure.
Differences	The design tutors that answered yes referred to the work of a range of authors such as Donald Schön, Arthur Koestler, Bryan Lawson, Norman Potter, and Nigel Cross. Other design tutors said they had “read plenty about creativity” and “the importance of creativity”, but they could not list anything in particular.

Figure 7. Have you ever read anything on creativity?

Question 8 asked the design tutors how they have learnt to be creative, and how they have learnt to teach their students? The students were only asked the first part of this question. The design tutors' responses were all very similar, many recognising the importance of experience – “...learning to be creative through doing” (Tutor 4), “...learning on the job... understanding what works in certain situations” (Tutor 8), “...trial and error” (Tutor 24), and “...through practice and engagement with other people trying to be creative” (Tutor 18). The design students' responses were similar – “...through doing” (Student 3), “...hard work” (Student 6), and “...engaging with the challenge of the brief” (Student 20). Many of the students saw making and drawing to be very important in the creative process. A number of the students talk about what works for them, what they had noticed in their own process – “I usually work hard for a few days - making, drawing, thinking etc. and then have a few days off from it - when I come back to the problem I seem to make breakthroughs” (Student 26) and “I work on creative stuff in the morning, I am no good after midday!” (Student 19). Interestingly 20% of the design student sample refers to the importance of looking at the work of others “...looking at precedent helps me get going; something to spring from and get the wheels moving” (Student 19). Despite stating that they believed themselves to be creative several students felt that they were often working blind with the design projects, not knowing how to develop through the stages to a creative output.

How have you learned to be creative?

Commonalities	<p>The design tutors' responses were all very similar. Many stated the importance of "experience" and "learning through doing". The design tutors also highlighted the importance of "trial and error" and "through practice and engagement with other people". Similarly, the design students' responses emphasised "through doing" and "hard work". Many of the design students saw making and drawing to be very important in the creative process.</p> <p>20% of the design students questioned highlighted the importance of looking at the work of others.</p>
Differences	<p>There were no significant differences in the design tutors and design students responses. The design tutors' responses were all very similar, many recognising the importance of experience.</p> <p>Likewise, the design students' responses were all very similar, many emphasising the importance of working hard.</p>

Figure 8. How have you learned to be creative?

Question 9 asked the design tutors and students what they felt was more important in university design education – (A) teaching (learning) an awareness of precedents and the work of past designers, or (B) teaching (learning) innovation and creativity? Here, there is little difference in the responses from the tutors. Eleven tutors stated (A) is most important, 10 believing (B) to be the most important, and the remaining number thinking that (A) and (B) are equally important. The students were split with approx 30% suggesting awareness of precedents (A), 40 % stating innovation (B), and 30% who didn't see (A) and (B) as dichotomous, believing that they are both important for design education. A number of students were clear that precedent was important to refer to for their design projects, but were unsure as to whether it aided creativity. "...too much precedent is surely anti- creative, but is useful in the context of a design project" (Student 7) and "...not all design projects need to be creative" (Student 22).

What is more important – (A) an awareness of precedents and the work of past designers, or (B) innovation and creativity?

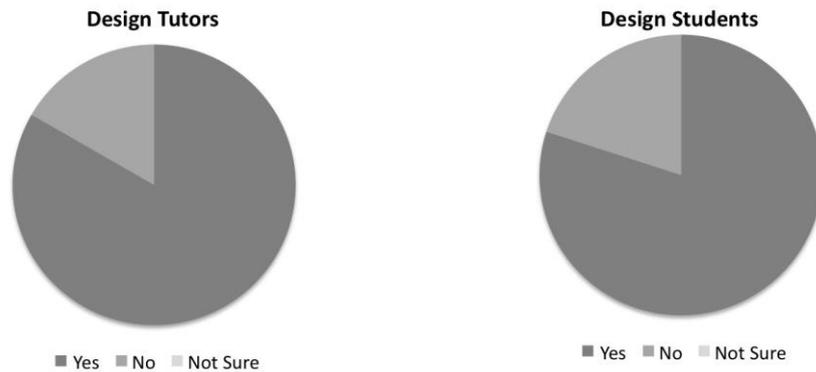


<p>Commonalities</p>	<p>There is little difference in the responses from the design tutors and the design students to whether (A) is most important, (B) is most important, or (A) and (B) are equally important. The design students didn't see (A) and (B) as dichotomous. Rather they believe both are important for design.</p>
<p>Differences</p>	<p>A number of design students were clear that precedent was important to refer to for their design projects, but were unsure as to whether it aided creativity. The design students stated that "too much precedent is surely anti-creative".</p>

Figure 9. What is more important – (A) an awareness of precedents and the work of past designers, or (B) innovation and creativity?

Question 10 asked the design tutors and students whether they think creativity is valued within their discipline? Over 80% of the design tutors (25 of 30) believe that creativity is valued within their university department. However, there are five tutors who disagree, believing creativity is not valued within their discipline and their department. Their comments included *"In my discipline, creativity is valued less than rigour..."* (Tutor 8) and *"...creativity appears to be seen as something to promote and to celebrate by some in my discipline; but it is viewed as a destabilizing force by others"* (Tutor 15). The majority of the students agree that it is valued (circa 80%). The others were critical of the discipline in this regard, suggesting that *reproduction* was by far the most common resultant output; although a number of these students did say that creative work, when produced by students, was rewarded by the tutors, citing innovation prizes for their work, and creative output being used as publicity material for the school.

Is creativity valued within your discipline?



Commonalities	<p>Around 80% of design tutors and design students believe that creativity is valued within their discipline.</p> <p>A small number of design tutors and design students disagree, however, believing that creativity is not valued within their discipline.</p>
Differences	<p>A few of the design tutors stated that "creativity is valued less than rigour" and that it is sometimes seen as a "destabilizing force".</p> <p>The design students, however, did say that creative work is often rewarded by the design tutors.</p>

Figure 10. Is creativity valued within your discipline?

CONCLUSIONS

This study has found a number of interesting results relating to the perception of creativity amongst university design tutors and students. The results have been categorized into three areas presented below.

Creativity and the Individual

Despite the direct nature of question 1, there were a number of interesting findings that emerged. The first is that the design tutors were more cautious than the students regarding whether or not they considered themselves to be creative. The majority of the tutors answered yes, but there was far more doubt expressed in their answers. It was clear that they saw creativity as a loaded concept and ambiguous; hence they felt uncomfortable in committing one way or another. This reflection and criticality is perhaps bound up in notions of expertise as articulated by Dreyfus and Dreyfus (1980) and is also consistent with Polanyi's assertion that we always know more than we can tell and the more we know the harder it is to communicate (Polanyi, 1967, p. 4). Conversely, the design students were far more certain that they were creative, and even the few that said no, judged their creative ability against that of their peers believing that they were probably creative compared to the rest of society. Another interesting finding is that many of the design students assume that they are creative by virtue of the fact that they study a design subject at university. This is a contested assumption with a number of authors arguing that creativity is not the preserve of specific disciplines (Boden, 1990; Cropley, 2001; Kelley and Kelley, 2015). The assumed link between design and creativity is further reinforced by the design tutors stating how important it is that the students are creative to be able to study design and the students arguing that for the tutors to be able to teach design effectively they also have to be creative.

It is interesting that the majority of design tutors and virtually all of the design students believed

themselves to be creative, yet there were very few who could confidently define creativity, with over 20 definitions of the term offered by the design tutors and students. This is consistent with Dasgupta's (1994) findings regarding the confusion over the concept, recording over 80 definitions in the literature. The design tutors' and students' definitions of creativity varied considerably from aesthetic-based descriptions (*i.e.* beauty, elegance) to more politically-related definitions such as "challenging conventions and hegemony", something Csikszentmihalyi (1996) states as being important. Despite the design tutors' and students' inability to define creativity, it was clear through the interviews that the interview participants knew more than they could articulate. An important consideration here is whether their inability to be able to conceptualise and communicate creativity is important or not, as both students and tutors embody creative practices through implicit and tacit forms of communication, what Foucade (2010) describes as "*embodied knowing*".

Facilitating Creativity

An interesting finding relating to facilitating creativity is that the design students generally acknowledge the role that design tutors play in promoting cultures of creativity in the university design studio, but a number offered an additional perspective acknowledging the importance of the wider socio-cultural system. They argue that the "*holistic learning*" experience is important, including peer-to-peer learning, resources and advances in technology as well as the role of the design tutor. This view is consistent with separate studies by Amabile (1996) and Csikszentmihalyi (1996) who both discuss the importance of the environment in fostering creativity, described by the latter as the "*congenial environment*". Another interesting outcome is that the students gave praise to those tutors that promote a freedom to experiment through encouraging independence and self-direction. This accords with Cunha *et al's* (1999) and Amabile *et al's* (2014) assertion that a free, experimental culture promotes creativity. Almost all of the design tutors believe that their methods helped to promote creativity. The students, however, were far less positive, many suggesting that the tutors' methods actually inhibit their creativity, especially those that were dominant in the classroom; a type of educator that Nicholl and McLellan (2008) refers to as a "*gatekeeper*", who, either through method or personality, discourages creativity within an educational environment.

It is interesting to note that the design students thought that resolution, communication and realisation of ideas were more important to the design tutors, over the students' ability to operate in a creative fashion. The ideation phase is very important for the creative education of design students, but it is often edited out by experts (Runco, 2014). This could perhaps be explained by the phenomenon known as the "*cost of expertise*", where experts skip important steps; in effect fast-forwarding their processes due to their experience (Minsky, 1997). Brown *et al* (1989) argue that creativity is reliant on a deep knowledge of the field. Moreover, many accounts of the development of expertise argue that it comes about through long periods of deliberate practice. In many domains of expertise it is generally considered that 10 years' experience of deliberate practice are required to be truly expert in any field (Ericsson *et al.*, 2006) whereas other less scientifically-backed claims (Gladwell, 2008) suggest it is only around 10,000 hours (417 days). Students at university have perhaps only studied design meaningfully for around half of the 10 years aforementioned, so investment in knowledge of the full creative process is an important part of building knowledge. Uncritical and unreflective design tutors are perhaps operating in a world of what they know, rather than what the students are yet to know, thus compromising the design students' education in this regard.

There was universal agreement from both the design tutors and the students that additional instruction on creativity would be useful. A number of the design tutors admitted that, on reflection, they might have deficiencies in their knowledge and approaches to developing creativity. Also, several tutors spoke of needing some clarity as to what constitutes creativity (even those who said they have read extensively on the subject). An interesting finding from the responses, particularly those from the design students, is that a significant number identified potential limitations with introducing

instruction on general notions of creativity. Several design students stated that any instruction introduced to the curriculum would need to be appropriate to the design disciplines, e.g. covering design development and process through making and drawing, and ideation. This is consistent with Feist (2004), Guilford and Hoepfner (1971) and Baer's (2015) position that creativity is domain specific, and that methods and techniques used to promote it need to reflect the nature of a discipline. However, several authors argue that creativity is a general cognitive skill and can be taught in the same way irrespective of discipline (including art and design-based subjects) using techniques, such as brainstorming, mind mapping, idea association etc. (Sternberg, 1999; Plucker, 1998; Ivcecic, 2007). Perhaps a combination of general and specific methods are required.

Socio-Cultural Perspectives on Creativity

It is surprising how few design tutors and students had read anything on creativity; this perhaps accounts for varied response in their conceptualisations of creativity. An interesting finding is that both tutors and students stressed that they had learnt to operate creatively through action and reflection associated with making and doing; and that this was more important than having specific theoretical knowledge through either instruction or reading on the subject. Although the term was not used explicitly, the importance of praxis in design was thought to be important. This is what Gadamer (1979, p. 275) refers to as the continual interplay between thought, reflection and action, as part of "*one unified process*". Some of the design tutors pointed out that reading and theorising about creativity is entirely different to being creative in practice.

The majority of tutors and students interviewed believe that creativity is valued within their discipline and within their department. Although a number of staff argue that there is the pretence of an interest in creativity within many design departments. The reality accords more closely to orthodoxy, as tutors are forced to use time-tested techniques due to increasing student numbers, research demands and a general drive for efficiency. This issue is potentially made worse with students, through a lack of contact with their tutors, increasingly refer to precedents for idea generation.

SUMMARY

This study has highlighted several important implications for design education. Assuming that study is consistent with other contexts, then the inability of both tutors and students to define creativity has implications for design education. Snodgrass and Coyne (1994) argue that if we don't know what creativity is, then how can we teach, develop or facilitate it within our students and the Academy? Creativity is seen as an essential component of the design process (Kelley and Kelley, 2015; Cross, 1997) and therefore investment in it - through developing a better understanding of it as a concept - is vitally important for design tutors and students. Therefore, there is value in educators reflecting on creativity through their research and their practice to improve their design teaching. A number of the students interviewed for this study expressed that tutors having a better understanding of creativity would help them to be more effective as design teachers.

The criticism of design tutors by their students for not developing their creativity in the classroom is perhaps also an important consideration for elsewhere. Minsky (1997) argues that *reproduction*, rather than *production* of knowledge is a cost of expertise. Therefore, educators must resist just '*going through the motions*' in their teaching and setting recycled projects for their students. Also, if design tutors are not regularly engaged with their own creative tasks (other than through the support of the students' work) then before long creativity is likely to be replaced with orthodoxy, (Steers, 2004). Like other cognitive skills it requires dedication and practice.

There was little insight offered by the tutors from the interviews, as to how to teach, develop or facilitate creativity in their students. Instructive methods are unlikely to be successful in engendering creativity. There is skepticism expressed, both by the research presented here and within the general

literature that creativity can be taught in this way. The literature suggests that developing the *creative environment* is perhaps more likely to lead to creative outcomes, where tutors actively encourage an open, risk-free, supportive and *constructivist* culture, so that the students can engage in self-direction, group-working and discussion, based around tasks and projects. It is argued that the environment is more likely to lead to the generation of ideas and for the students to operate in a creative way (Amabile, 1996; Csikszentmihayli, 1996; Nichol and McLellan, 2008). Perhaps not all tutors need to be creative to facilitate it as a skill within their students; however, they may still need to be able to spot the creative potential in their students' work.

Within the design studio assumptions regarding creativity need to be challenged; with some staff, and nearly all the students in this study assuming that by being 'designers' they are by default creative. This is problematic. As Lyotard (1984) asserts, in the postmodern condition, we gather more than we create; the plethora of precedent and inspiration available to students may well be leading to orthodoxy (through reproduction) rather than creative design solutions. In the early years of their design education setting the appropriate values, attitudes and cultures is therefore paramount.

In summary, it would appear that many aspects of creativity in the university design studio remain shrouded in mystery. The lack of knowledge and general understanding of creativity and how it facilitates design may well be compromising the education of design students. There is, however, clear interest from both the design tutors and students regarding creativity, and the value of domain-specific versus general notions of the concept of creativity in developing this cognitive skill. Both design tutors and students believe that creativity can be developed, and there is consensus between staff and students on the importance of making and exposure to creative tasks and environments. The students argue, however, that more could be done by the design tutors to help them utilise their latent creativity to enhance their design processes.

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