

TEACHING CREATIVE THINKING TO DESIGN STUDENTS AS FUTURE-PROOFING

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ABSTRACT:

In place of inevitable social chaos and planetary degradation, meta-design offers a new framework for the future of humanity. Meta-design expands the concept of design, and the designer, and implicates society as a whole in the process of producing a designed future. An essential ingredient in discovering new ways to deal with existing and as yet unknown aspects of our present predicament is creativity. This paper considers how design students may be encouraged to develop their creativity through appropriate training and to widen individual understanding not only of what they are personally capable of achieving but also of their position in society. How the brain creates new patterns of thinking through ideational code switching and contextual focus is considered in relation to appropriate methods of engendering creative conceptualisation. It concludes by briefly sketching how design education might respond in terms of curriculum development to what is an increasingly urgent predicament of unsustainability

Keywords: **Design Education, Creativity, Meta-design**

INTRODUCTION

Within the context of an increasingly dysfunctional economic system, this paper considers the position of the design profession as an adjunct to business and how meta-design points the way towards a remodeling of this relationship, and even changing the global framework in which design operates. Education is a key factor since it has the capacity to develop new understandings and fresh ideas by nurturing creativity, yet education is complicit in delineating acceptable limits to creativity, boundaries that are set by dominant political and commercial interests. Paradoxically, to exercise

creativity is to relax limitations and dissolve boundaries. Reflecting on how the brain connects different ideas to make new patterns suggests open-ended [i.e. unrestricted] creative thinking should be encouraged if fresh ideas are wanted. It concludes by briefly sketching how design education might respond in terms of curriculum development to what is an increasingly urgent predicament of unsustainability.

DESIGNER AS HANDMAIDEN TO COMMERCE AND INDUSTRY: DISSOLVING THE NEXUS.

The prevalent belief in design as a service industry permeates the culture of commerce and the culture of design as a whole. This view is reinforced by an education system that essentially follows the dictum 'design is a business', with the implicit constraints that accompany such a view. The upside of such a view is that business, while being indirectly the causal agency of much damage to the environment, is focused on innovation and change [Ehrenfeld 2007]. Creativity, and how it is taught, is a key component in changing the way we think of design and its relationship to business. This is recognized by those who have a foot in both camps:

'Creativity is seen as a central prerequisite of innovation. Creativity is not well understood by industry nor well taught [explicitly] in design schools. Design skills and ways of thinking are the principal access to creativity now recognized by most industrial, commercial and non-profit organizations.' [Gornick, 2005]

A repositioning of design and changing what has become the norm for design education is overdue and meta-design provides a model for this [Ehrenfeld 2007, Fischer 2000, Gornick 2005, Wood 2007]. Meta-design encourages end-users to act as designers and to provide input into the system that then has a transformative effect on that system, thus democratizing the design process from being top-down to being not just bottom-up but also inclusive. This avoids design decisions, which may be irreversible, being made at the beginning of the design process when the least amount is known of what is really needed. The approach is grounded in the need for 'loose fit' whereby unforeseen elements may be incorporated into the system as needed. Fischer point out that, 'If systems cannot be modified to support new practices, users will be locked into existing patterns of use.' [Fischer 2010, 53]. A key feature of meta-design is therefore the negotiation of meaning that is ongoing: there is no 'final' outcome because meaning is contingent.

The great advantage that designers have when compared with many other professions is that they are educated to challenge the status quo and to seek innovative ways of dealing with problems [this holds true for other disciplines in the creative and performing arts]. This questing role is, however, severely mitigated by a culture that so frequently locates them towards the lower end of the management hierarchy, brought in when fundamental decisions have been made, plans already put in place, and budgets determined. This situation reflects the way in which design and designers have for long been perceived—as service providers. As Wood observes, '. . . in general they lack the confidence to seize the initiative. By virtue of its relatively recent evolution, design is what Shön [1985] has called a 'minor' profession [Wood 2007, 171].

Design education can easily find itself following a systems approach that is inadequate for dealing with 'wicked problems' that have no single or obvious solution and which are always symptoms of another problem. The view that

'...planning is a component of politics' [Rittel & Webber 1973, 169] would have essentially the same meaning substituting the word 'design' for 'planning'—a position that Fry elaborates [2011].

Wood notes that the preoccupation with 'form' has limited the manner in which designers contextualise objects, with an emphasis on shape, surface texture, etc., rather than problemising the object as an aspect of an interconnected web of social, political, technical and commercial matrix. Meta-design tackles problems from just such a global perspective, using multi-disciplinary creative teams that provide the necessary skill base and varied perspectives:

'It is rare for designers to be asked to re-think the whole political, ideological, technical and economic context that conditions these issues. Metadesign would need to augment this narrow remit by inspiring a broader, more transdisciplinary level of understanding.' [Wood 2007,172]

All of which highlights the limitations of much design education while raising questions as to how specifically the curriculum may be improved. Before addressing how the curriculum might accommodate meta-design it is important to bring the discussion back to the role of creativity. Meta-design relies upon the manifestation of creative thought and this happens through insight. An understanding of this process can indicate the conditions that encourage creative thinking.

IDEATIONAL CODE SWITCHING AND CONTEXTUAL FOCUS

Creative insight integrates associative and analytical thinking to recombine what may be quite disparate elements to make new patterns which may then be interrogated. The functioning of memory is crucial since associative thinking relies on memory to find appropriate connections. The role of the prefrontal cortex of the brain is vitally important, combining working memory, temporal integration and sustained and directed attention [Dietrich 2004]. Working memory holds the content of consciousness and therefore the accumulation of associative thoughts that produce creative insight. The term *contextual focus* has been used to describe the capacity to shift quickly and smoothly between analytical and associative thought [Gabora 2010]. Because there is a systematic relationship between the state of an input and the location where it gets encoded, an episode stored in memory may respond to stimuli that are somehow similar to it, that is, *content addressable*. The notion that a cell responds to, and only to, a very specific idea has gained traction in the search for a 'creativity quotient' [Bossomaier *et al* 2009]. That memory is distributed across neural cell assemblies and is content-addressable is of significance to creativity: relevant items are retrieved and easily combined. Associative hierarchies refer to the number of associations we make between things. A steep hierarchy will make few associations whereas a flat hierarchy makes many. Because creative individuals think laterally [flat associative hierarchies] and make unusual connections, they notice things others do not and retain the memory of these things. Hence, Gabora suggests mind-wandering is useful because it permits access to the prefrontal and executive memory networks and thus may find unlikely and novel connections. Cell assemblies that encode particular experiences are referred to as *neural cliques*. Gabora describes a type of neural clique she terms *neurds*. Neurds play a special role in creative insight

because they respond to abstract or atypical aspects of a problem, task or situation. Neurons thus draw new features into the conceptualization of the problem. Gabora postulates that creativity is not only a matter using both associative thinking and analytical thinking, but also the capacity to spontaneously shift between the two as the situation requires. When this process produces an insight attention is then focused on how this may be applied to the situation.

It is then a short step for another important attribute of creativity to come into play, what has been termed *ideational code-switching*, which has been likened to a multilingual person switching from one language to another. Ideational code-switching is the jump that occurs between a creative idea that is personally meaningful [mini-c creativity] and one that is viewed as meaningful and original to others [little-c creativity] [Beghetto 2007]. Ideational code-switching requires encouragement and positive feedback of students' ideas as well the negotiation of meaning between teachers and students and therefore represents an aspect of living the creative life. Design education works best at encouraging active learning where meaning is constructed and reconstructed, rather than following the acquisition model of learning in which exceptional learners have been characterized as '... voracious copy machines, as opposed to interpretative beings' [Beghetto & Kaufman 2009, 300].

While terms such as 'contextual focus' and 'ideational code-switching' do not teach us how to become more creative they do provide the means to better understand and interpret creativity and suggest ways to encourage creative thinking. Importantly, what may be inferred from this research is that trying to confine creative thinking within a given set of parameters [existing educational, social, economic and political constructs] is likely to be self-defeating when open-ended 'wild' ideas are the ones that may point to entirely new ways of using the same data but rearranging them to create a new pattern, similar to the visual gestalt experience of seeing marks on paper that were seen as one thing suddenly 'flip' to be seen as a different thing entirely. Also, it is forfeiting the opportunity to avoid 'defuturing', which refers to the way our past and present decisions have reduced, and continue to reduce and even deny, our future options by an approach to design that has ignored the totality of its actions [Fry 2009]. Teaching creativity has to be about changing attitude and behaviour. As educators we can produce more of the same—which is no longer an option—or we can change our approach to begin to address the urgency of the situation. Ways of realising this project, of designing 'The Sustainment' [Fry] are already being delineated [Ehrenfeld 2007, Fischer 2000, Wood 2007].

How does this translate into educating young designers? Crucially, nothing will happen without first providing the student with a broad knowledge and understanding of the socio-political situation; it is impossible to move forward without first grasping the scale of the problem and the multifarious elements that contribute to it. This requires students to engage with thinking critically about these issues. In return, a conceptual framework may be constructed wherein the big questions may be posed, analysed and responded to in a manner that begins to suggest meaningful futures, based on informed debate. Innovative solutions will be found through creative thinking.

CREATIVITY TRAINING

Some key attributes of design graduates should include:

- Having a broad understanding of the multiple factors that have produced our present predicament and which are affecting its continuation [Politics, economics, industry, social structures, etc.];
- Having in-depth knowledge and skills in one or more specific subjects areas *plus* understanding how to redirect these abilities [Redirective practice];
- Being capable of learning how to work in multi-disciplinary teams and communicate effectively internally between team members, and externally with the wider community [Requires comprehensively identifying the characteristics of team members to maximize their potential contribution].
- Having the explicit skills needed and mental flexibility to think creatively [a structured course in creative thinking].

Here we are concerned primarily with the last of these: What sorts of creative thinking skills are needed and how best are they taught and learned?

Creativity training is effective when it addresses four main requirements and these are: 1. It is based on a cognitive model; 2. It is prolonged and challenging; 3. It involves real-life examples, and; 4. It includes domain-specific applications. These factors were identified after reviewing a wide range of training programs that use different approaches [Scott *et al*, 2004]. Cropley and Cropley [2009] affirmed this approach when they incorporated these factors in a course of training for engineering students. Improving self-efficacy is an important part of the process and cognitive training appears to enhance self-efficacy more than lectures or instruction in cognitive strategies, and has led to creative self-efficacy being improved through training [Mathisen and Bronnick 2009]. Efficacy may be strengthened through the agency of appropriate group activity [Bandura 1997, Sawyer 2007].

Experiential learning lends itself to the sort of training outlined above. Also, being the basis of much design education, students are familiar with this mode of instruction. By introducing a range of creative strategies with which students engage in class, individually and in groups, students absorb these methods, appreciate their relevance, and incorporate them into their habitual way of thinking. Learning is reinforced, and critical reflection encouraged, by requiring each student to maintain a reflective journal throughout the semester.

It is not possible to know in advance which methods will resonate with which individuals and thus students benefit from being introduced to a range of methods to accommodate individual differences. For example, compare just two quite different methods; attribute listing and accessing the unconscious. Attribute listing is universally useful in identifying specific dimensions of a topic, which allow for modification and transference of attributes, and may be used to generate random connections. Accessing the unconscious is an entirely different technique that, for some individuals, may lead to unforeseen and strangely productive outcomes [Welch 2011].

An example of how the application of creative strategies that incorporate futures thinking may be put into practice is the reverse brief, which questions assumptions made by the client, acts as a means of educating the client, and provides alternative possibilities. An important aspect of this process is how it begins to change the designer/client relationship from one of service provider

towards a cooperative model of negotiated outcomes. Of course, short-term profit motives play a major role in discouraging clients from engaging in long-term change. Also, many clients are likely to reject this way of doing business since it undermines the hierarchy of the dominant model of client-as-boss and designer-as-servant. This will happen at every scale from the smallest to the largest business yet is no reason to shy away from adopting this approach when we are working towards changing attitudes. For every client that [at least, initially] rejects a futures-thinking proposal there will be another client that appreciates the value in this approach, and the long-term benefits to the company in adopting such proposals.

CONCLUSION: TOWARDS A NEW CURRICULUM

The foregoing suggests a new curriculum to address the exigencies of our predicament will need to incorporate the following [this brief sketch should be considered a work in progress]:

[a] An inclusive pedagogical model that dissolves boundaries between disciplines while demanding critical engagement from the student. It situates the designer as a responsible and responsive citizen of the world.

[b] Understanding why we are in our present predicament and how the very structures we look to support our existence are inextricably implicated in its very unsustainability.

[c] The development of a truly alternative way of living that is not a re-hash of dominant 'isms' [capitalism, consumerism, liberalism, Marxism, etc.] that has been termed the Sustainment [Fry 2009].

[d] Theory into practice: The ways in which the designer can express her/his commitment to the application of sustainment is now emerging [Ehrenfeld 2007, Fry 2009, Wood 2007]. While this process is only beginning to be explored and documented, it is beginning to express itself not only as the only future worth having, but the only future for humanity.

[e] A structured course in creative thinking based on a cognitive model that is prolonged and challenging, that involves real-life examples, and includes domain-specific applications.

[f] To encourage a change to our education system more widely to incorporate design thinking which, as has been noted, challenges the status quo and seeks innovative ways of dealing with problems.

Clearly, this very brief and incomplete outline needs expanding and demands much more work to flesh-out the detail. This should be a collaborative effort across the design disciplines, and across international boundaries—Design is a global phenomenon with global responsibilities.

It is no use wondering who is going to supply all the answers because no-one can. The scale of the problem is too great and the work being done to grasp the complexities and construct conceptual models of how to begin tackling the issues is still in its infancy—but it is happening and guiding principles are being developed. From an education and design viewpoint this moment offers an exciting opportunity to be part of changing a wholly unsustainable system. Many of the 'answers' will have to be found by those prepared to help find

them. This is not going to be easy but we must all start taking the first steps. As designers, we should look towards educating and supporting each other to help effect a shift in societal attitude, while there is still just sufficient time to prevent the worst outcomes of all that humanity has done to the planet from overwhelming us.

Just as in the film 'The Matrix', where Morpheus offers Neo the opportunity to lift the veil of illusion and experience reality, shocking and disorienting as it is seen to be, we too have a limited time to choose either the red or the blue pill, to remain somnambulists or to take responsibility for our future—by design.

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