Positioning creative design in Technology ?

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Abstract

In an effort to enhance the education of young designers in New Zealand this paper looks at the key role of design thinking and methodology in Technology education. It suggests that the inclusion of 'designerly thinking' (Cross 2001) will shift the current emphasis in the learning area of Technology in the New Zealand curriculum from an information gathering, declarative and procedural knowledge viewpoint towards a state of balance through the development of creative, innovative and curious minds. In comparison, innovation developed by curious minds through a "wealth of design experiences, a way of seeing and perceptive reflection-in-action," Mc Glashan (2010) is at the core of creative design practice.

Introduction

Where is the wisdom we have lost in knowledge?
Where is the knowledge we have lost in information?' T.S. Eliott (1934) laments the loss to human existence of the gaining of wisdom in the pursuit of knowledge and information. Where an acknowledgement that human perception, sensibilities even the gaining of enlightenment should equally have their place in human development.

We are all recipients and participants of design decisions every moment of every day, be they made by a landscape, website, fashion, graphic, product or interior designer, or by an architect, engineer, artist, dentist, hairdresser, novelist, music composer, butcher or rugby coach. In short, all people involved in decision making to address a situation, issue or need, utilize 'designerly thinking' to address the task in hand.

This paper argues for a renewed focus on design with all of the intricacies of its practice and its recognition as an essential element in the learning area of Technology. Even though technology education in New Zealand is said to be making significant progress, I argue that it has done so in recent years in denial of the place of creative design. This omission has left the learning area impoverished, because it has removed the human element that is intrinsic to design thinking and the decision-making that is at the core of technological practice. The paper begins by giving a historical background to the place of design in the New Zealand Curriculum, it discusses the New Zealand Curriculum and debates some of the issues involved in giving creative design a more prominent role in the curriculum. Next it describes the methodologies used to look into the practice of three professional designers, identifies the activities in creative design and professional practice, and discusses how these might be applied to a classroom design context. I argue that this would help move learning in technology away from its current procedural practice, and closer to its creative roots. Hope's (2009) writing on

the way children learn to be creative argues “that the ability to design is close to the core of what it is to be human.” She emphasises that “equipping children with practical design capabilities is probably one of the most essential components of their education” and, further, that our species and planet could “depend on their design decision-making” (p.54). To heed Hope’s warning and prompted by Lawson’s (1997) suggestion that “it would be much more interesting to know how very good designers actually do work than to know what a design methodologist thinks they should do” (p.39), I looked to the design community to establish how designers actually design. My research into the practice of three prominent New Zealand designers has provided much that can be transferred to learning for design and technology. The research gave valuable insight into designers’ underlying philosophies, and the nature of their daily practice.

Background

The draft New Zealand Technology curriculum (MOE 1993) stated: “Design and graphics includes the use of different materials, graphics, and modelling to develop designs and communicate ideas and technical information” (p.9). Recognition that technological activity could not occur without design prompted the inclusion of the following statement in *Technology in the New Zealand Curriculum* (MOE 1995): “Whichever technological area is selected… design….is an *essential* component of the activity” (p.12, emphasis added). Although the intent of this statement was to give design increased prominence, the reality was otherwise: Design is little understood and has been consistently overlooked by curriculum and assessment writers for technology and therefore by teachers. Historically, the place of design in senior school education in NZ has depended on individual teacher expertise and school programmes in Art design. Prior to the introduction of *Technology in the New Zealand Curriculum*, in 1995, an optional subject Design Technology provided “design and make” experiences where idea development and resolution was visually communicated and reference made to related societal or environmental issues. At senior levels of learning, emphasis was placed on skill development to high standards. Since the late 1980s the subject Graphics has been developed to address the changing world of graphic communication and design. This subject has built on the original precision drawing subject of Technical Drawing and the design aspect of the former Design Technology subject to provide a place in the curriculum where ways of designing are developed to prepare learners for their futures in design related careers. Although the name Graphics has caused some consternation, because it could be seen to reflect only the two dimensional nature of Graphic Design, the subject now encompasses the design methodology and visual communication at the core of design practice, reflecting the domains of architectural, landscape, spatial, product, media, engineering, fashion and graphic design. At present, Graphics is an optional subject with its own autonomy under the umbrella of Technology, and provides an effective venue for design at the senior levels of learning (12 – 17 year old students). However, I believe that the origins of design-related thinking and communication skills should also be developed in our very young learners and that a valuable opportunity is being missed (in New Zealand) to

fully explore and utilise design processing knowledge and skills at earlier levels of learning.

I regard the technology learning area as the most appropriate venue for teaching design thinking and methodology at early levels of learning. However, Design has had a somewhat chequered career in technology education, and has been noticeably absent in junior programmes. The current position of design is still only intimated in the learning area of Technology NZC (2007), which describes technology, in the essence statement, as "intervention by design: the use of practical and intellectual resources to develop products and systems (technological outcomes) that expand human possibilities by addressing needs and realising opportunities" (p.32). Use of the word *design* in this statement may be interpreted in two ways: (i) *design as a way of thinking*, or (ii) *design as an intent* but not necessarily involving design thinking and processing as a means of resolving issues in technology. It is interesting also to note that achievement objectives at the earliest levels of learning about the made world (within the Nature of Technology strand) encourage children to "understand that technology is purposeful intervention *through* design" (http://www.techlink.org.nz). Here, use of the expression "*through* design" rather than the essence statement's use of "*by* design" perhaps signals a different intent. Does "*by* design" mean that intervention happens by informed decision making, while "*through* design" means that one needs to take part in a process as an initial stage to learning about technology?

Although there is some evidence of a creative design presence in the technology learning area documentation, especially when students are encouraged to *develop a range of outcomes*, including *concepts, plans, briefs, technological models*, and *fully realised products* or *systems* (NZC 2007), few of the broad range of activities evident in creative design processing feature in teacher guidance material. It is the reality of rich design learning experiences that have relevance to student's lives and will motivate them and encourage exploration, creativity, inquiry and reflection. While it is tempting to try to teach young people explicitly and purposefully how to design, using some kind of generic template, such an approach seems doomed to failure. In contrast teachers of technology who enter teaching from a design-related career and approach technological practice with the experience and confidence of real working experience seem to automatically implement an approach that underpins, drives and provides coherence to students' technological practice. It is no accident that student responses evident in national assessment results that have been guided by teachers with experience of a creative design career display confident use of design decision-making with ongoing in-depth reflection on their practice. Their work demonstrates recognition of the human interactions that are integral to design processing and an ability to communicate their ideas to a professional standard. Conversely in a climate where teachers are unfamiliar with design practice, often also coming to terms with extensive curriculum change, and the school community's demand for clear directions and results, there is understandably a sense of uncertainty. As Mawson (2001) notes, in a climate of insecurity, easily recognised and implemented models are often adopted. A pared down, linear model of design processing is introduced by teachers, with little understanding of how designing actually works. This approach to design education "has caused

teachers and students to structure designing activities as a sequential rather than an iterative process" (p.30). Thus, in the majority of NZ secondary school Technology programmes, creativity in design processing (if it is evident at all) is presumed to follow a prescribed pathway, resulting in a somewhat pedestrian student response. Indeed a paradigm shift has happened in contemporary design, such that Hall (2009) notes: "the 20th-century definition of good design was driven by form. Today the stakes are too high, and the world too complex, for a superficial response." Sharma and Poole (2010) also refer to a shift in the role of contemporary design practice "Design…is changing; where once it was purely a matter of signs and objects, now it has entered the realm of behaviour and perception – a way of knowing through thinking and doing." p.65. Responsible design decision-making that understands the human and environmental condition should be an essential component of design, technology and therefore classroom practice.

Indeed, it is interesting to note that much of the research informing the development of the New Zealand technology learning area, and its ongoing support, has stemmed from the fields of science and engineering, where design thinking is seen in terms of *problem solving*. As Scrivener (2000) observes, it is essentially concerned with the testing of an emerging solution to a pre-established problem that "satisfies specific norms and tests and which, in being designed to meet these criteria, contributes systematically to the development of the discipline" (p.12). The *problem solving* approach regards events within a design process as following a prescheduled pathway. A formulaic, linear model of designing is evident in New Zealand students' design work, indicating a nationwide pedagogical approach. Further, a formulaic approach to designing can be seen as discouraging of innovation and the ability to effectively engage with unpredictable and unexpected outcomes. While working with design doctorate students, Scrivener observed another type of design activity, which he refers to as a *creative production* project. While it is concerned with the production of an outcome, it exhibits few of the other features exhibited in the *problem solving* approach. He suggests that the *creative produ*ction approach occurs as a series of stages that are addressed *as they arise*, and vary with the nature of the task in hand. A creative design approach aligns itself favourably to the many aims of the generic NZC (2007) that encourages human-centred, collaborative and inquiry based learning. Teachers and students new to design processing, however, are encouraged to better reflect design approaches that occur in the broad design community of practice. The designer as motivator, decision maker and driver of the task and the people for whom they design are inexorably linked in a dynamic and evolving relationship. Baynes (2009) notes the significant role of the designer and the way they go about design activity as "essentially concerned with human behaviour and human potential [that goes] far beyond the obvious boundaries of [the development and creation] of *things*, reaching out into the wider field of intentional activity in general" (p.4), While Sharma and Poole (2010) posit the notion that "Design is not just something that is done to things – it is a way of *doing* things" p.65. William McDonough alludes further to the wider nature of design activity in his observation that "design is the first signal of human intention" (p. 58).

My research into the day-to-day practices of the design community has identified some key components that can be translated into classroom

practice at all levels of learning The overarching aim would be to develop in students *designerly* thinking and skills at early levels of learning that will better reflect the practice of designers who have developed their tacit knowledge through a wealth of design experiences, a way of seeing, perceptive reflection-in-action, and constantly challenging the familiar.

Research Methods

The methodology followed an interpretive approach to research via a case study of three designers from the fields of product, graphic design and design education. The researcher focused upon the design practice of each designer, viewing them as unique practitioners of design, actively involved in creating solutions. The purpose of the interviews was to understand the world of design practice from the designers' points of view and to faithfully represent their experiences. The emphasis of the interviews was on stimulating recollection and reflection. It seemed that the most opportune time to discuss the design process was immediately after a project had ended, when the residual influence of that project was still foremost in the mind of the designer. The research methodology employed in this project is best described as a heuristic[1] approach. Heuristics, from the Greek word 'heuriskein' meaning 'to discover,' is a qualitative approach involving intuitive questioning as a means of discovery. A heuristic research methodology adopts a flexible approach to the gathering of data, with the openness and flexibility to change as the preliminary question or preconceptions shift direction. In the research focus described here, the flexible nature of data gathering allowed each interview to take its own direction, depending on the designer's interpretation of the question. Even the lead question was different in each case because the three designers happened to be at different stages of a design project. My opening prompt was: *Think back to one of your most memorable design projects.* Then: *Can you describe, talk me through, the process/journey that you undertook in the realization of the project?*

A range of recording methods was used, including observation, note taking, audio and digital video camera recording of interviews, still camera capturing of images, journals (research and conceptual), models, facilities and environments. Reflective questioning in line with the conversation was employed as prompts, when needed. This method of research enabled me to build complex, multi-layered profiles of verbal and non-verbal data. Data from the three case studies were then compared and contrasted to identify the key elements within each practice.

Findings

The designers' stories gave insight into the way they approach their creative design projects. It was interesting to note that the designers did not refer to any one way to go about design. Rather, the nature of each project

[1] Heuristics is a qualitative method of solving a problem for which no formula exists. It uses informal methods or experience, and employs forms of trial and error. Heuristics relates to the ability to find knowledge, patterns or a desired result by intelligent questioning and guess work rather than applying a pre-established formula. A heuristic methodology often involves using knowledge gained by experience.

dictated the way ahead. The designers' account of activities evident in their practice include becoming immersed in the situation, framing the question, developing better questions, internal and external dialogue, sentiency and being aware of the human interrelations with their environments, a sense of play, making observations, decision making, unexpected outcomes, modeling, testing and serendipitous connections. These activities, such as providing time and guidance to become fully immersed in the theme of a design task or using role-play or digital imagery to become at one with a theme or situation, will enrich classroom sessions, aid student motivation and engender ownership in students (see Table 1 for examples). Hope (2009) emphasizes the importance of narrative in working with children's innate ability to create a paracosm that is a "complete, internally logical and fantasy world where they take time out from the real world," and notes that this ability, often seen as time wasting, "underpins the creation of a design narrative"(p.53). All three designers spoke of the internal dialogue that exists constantly within their design journeys; Newbury (2001) stresses the important place of immediate capture in dialogic journals, Mawson (2003) noted that teachers "seldom indulge in 'ways of talking' that help children become aware of their ability to 'see in their minds eye'(p.123). These attributes can be fostered from an early age and I believe the intent of such activities are transferable to classroom situations at all levels of learning to better encourage a creative response, and enhance learning for all.

Design community of practice activity	**Classroom practice activity**
A state of *immersion* in the situation or theme.	Time given with influences such as music, images, role play at the onset of a design task or throughout to maintain creative focus where learners are encouraged to 'live in' the moment in their imagination.
Framing the question	Provide learning experiences where students learn to prepare questions using pedagogical taxonomies to ask deeper or different questions of an object, person, idea or environment. Prepared resources such as cards with generic prompts so that questions may be asked in a range of applications.

Table 1: Two examples of classroom activities informed by design practice.

Concluding statement

By modeling only the functional aspects of design processing in Technology programmes we overlook valuable learning opportunities for young people to utilize an intrinsic human element that drives design processing from the inside. Translated to early levels of learning in Technology we should develop environments where teachers celebrate and utilise children's natural inquisitive nature and imaginings to introduce key design principles of observation, encouraging them 'to ask better questions.' It

is imperative, however, to maintain a separate creative learning environment where young designers at senior levels of learning are supported and nurtured as they develop and utilise design methodologies and visual literacy. I envisage a learning environment as an incubator where young designers may be steeped in the ways of design thinking and work towards developing their own design persona. Learning experiences will complement other curriculum learning areas, predominately the learning area of Technology. A separate subject will ensure undiluted, faithful coverage of the ways of design, where students may develop tacit knowledge through practice. The incubator approach will avoid the dilution that occurs when a subject is subsumed into another. If learning about the ways of design is not given its own autonomy, it will suffer the same fate that has plagued Technology in NZ. It will be taught in junior learning programmes through integration with science or other curriculum areas, therefore being paid token attention or becoming invisible. To convey the nature of 'designerly thinking' to students we need to assist them to acknowledge, develop an understanding of, and utilize essential human interaction considerations in creative decision-making. Learning to observe the world and ask better questions of it can be introduced and developed from an early childhood level with senior students developing an understanding through; 'a wealth of design experiences, a way of seeing and perceptive reflection-in-action,' Mc Glashan (2010).

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