Design for Experience: a New Rationale

Dr P John Williams, Edith Cowan University
Shaun Wellbourne-Wood, University of Western Australia

Abstract
Solving problems is a dominant rationale for technology education students engaging in design. This is evident throughout various technology education curricula; and subsequently influences teaching and learning.

An alternative design paradigm supported by prominent examples within commercial design theory and practice examines the notion of 'design' as facilitating human experiences rather than predominantly solving technological problems. It argues that this 'new' paradigm has, through social and commercial imperatives, become the dominant rationale for most contemporary design contexts.

Applied within an educational context, both paradigms have implications for teaching and learning. The *design as problem solving* paradigm of technology education has been elaborated for a number of years through curriculum documentation and teacher support material. The *design as experience* paradigm of some commercial designers is developing, and may represent a new and progressive dimension of student designing.

Key words
Design, experience, education, technology, problem solving

Introduction
Solving problems is a dominant rationale for technology education students engaging in design. This is evident throughout various technology education curricula, and this paradigm subsequently influences teaching and learning.

An alternative paradigm supported by prominent examples within commercial design theory and practice examines the notion of design as encompassing human experiences rather than predominantly solving technological problems. It argues that this new paradigm has, through social and commercial imperatives, become the dominant rationale for most contemporary design contexts.

Applied within an educational context, both paradigms have implications for teaching and learning. The *design as problem solving* paradigm of technology education has been elaborated for a number of years through curriculum documentation, research and teacher support material. This paper proposes that the *design as experience* paradigm represents a focus which may well apply to technology education and provide an impetus to progress and enable technology education to continue to develop.

This paper will elaborate on and critically examine the validity of a *design as experience* approach to technology education, its rationale from a general design perspective, and the implications of this approach to teaching and learning in technology education.

Designing for experience
The thesis of this paper is that design is now less about solving problems of human existence, less about developing products that improve standards of living and less about overcoming limitations of the physical world. The role of the designer is now largely to create human experiences through design, to differentiate products from the competition and to create stronger emotional links with customers.

Designing for experience is an approach which focuses on the quality of the user experience which encompasses a product or environment. This experience exists from the time of the first interactions, through use, cultural and values relevance, durability and the memory of the relationship. The user is active in, and at the centre of, the design process, and then consequently also the product life cycle.

Any experience is of course the result of many factors and cannot totally be designed. Some factors are very personal such as a person's mood, their internal state or the idiosyncratic ways in which they associate the various elements around them. These factors are beyond the control of the designers. There are however many other facets of an experience which can

RESEARCH

Design for Experience: a New Rationale

be manipulated for intended outcomes such as sound, smell, texture, feedback, sequence and logic. These facets affect a person's experience anyway, and the extent to which the interactions they stimulate can be understood by designers determines the extent to which the experience can be controlled. Using a public bus transport system is an example: from the stage of searching the route on the internet, purchasing a ticket, waiting at a stop, enjoying the ride and confidently arriving at a destination. Designers need to be aware of the host of cues and interactions that guide and influence behaviour and perception.

In the past designers just designed 'things': lamps, chairs, cars, buildings and signs. While these things affected people's experience, the designer's focus was on the thing, and to bring their skills to bear to conclude a process with a satisfactory outcome. The focus has been on the trees rather than the forest. It has become apparent however, that consumer preferences have moved from a product to an experience (Budd, et al), and consequently mass production has given way to mass customization; utility and function have given way to a new set of qualitative requirements, beyond the object (Thackara, 1988).

This trend began with the modernist movement's reaction against the decoration of objects and a focus on the pre-eminence of function, typified by the Bauhaus approach to derive the design of an object from its natural functions (Gropius, 1926). Redstrom (2006) sees the next stage of design evolution as communication, articulated by Kazmierczak:

> The position presented here redirects the perceived ground for design away from objects themselves, as independent from mind, toward the conceptual characteristics these object embody as a means for communication. It redefines designs from finite, fixed objects of aesthetic and practical consideration to semiotic interfaces enabling the reconstruction of meaning by receivers. (2003: 45)

The number of designed products that have failed indicates that designer's ideas about the constituents of successful design may differ from that of the consumers of the designs (Mitchell, 1993). So the next logical step was to not only design the communication process, but to also design the user's experience of the object.

> If design used to be a matter of physical form, its subject matter being the material object, it now increasingly seems to be about the user and her experiences. Starting with the social ambitions of modernism and the interest in shaping the use of things, the discourse has developed and expanded. Now, we face the question of what it means to design experiences, as in the following description of experience design by The American Institute of Graphic Designers: "A different approach to design that has wider boundaries than traditional design and that strives for creating experiences beyond just products or services". (Redstrom, 2006: 6)

An alternative view of the chronological transition from designing objects to solve problems to designing experiences is through an analysis of the use of metaphor (Lund and Waterworth, nd). In the traditional approach to designing, the metaphor is the tool of communication between the designer and the user: the aim is for the user to develop a mental model (metaphor) that matches the designer's idea about the ideal product. The metaphors are generally objective and static. The extent to which the metaphor match is successful determines the success of the design.

The use of the metaphor is not problematic. Lakoff and Johnson (1980) hold that many of our everyday experiences are shaped by different kinds of metaphors and that they build on each other in an individualistic and constructivist kind of way as a mechanism for interpreting the world in which we exist. The use of a singular metaphor may represent an object or an action, but does not represent an experience. When designing for experience, multiple metaphors are essential as a way of representing the richness of an experience. These metaphors are developed

Design for Experience: a New Rationale

and constructed to present an experience. Alessi (1994) uses the term "metaproject" to refer to the generation of design ideas he has produced since the 1970's. He says, "Working within the metaproject transcends the creation of an object purely to satisfy function and necessity. Each object represents a tendency, a proposal and an indication of progress which has more cultural resonance", design for an experience in other words. Many of Alessi's well known designs portray thinly veiled metaphors representing the experience. His famous coffeemakers, bottle openers, corkscrews and nutcrackers reflect the metaphor which freed the mundane and seemingly fixed and boring designs of kitchen ware for reinvention.

We live in a society based on experience, so objects need to blur experience with form (Rashid, 2004). Rashid's avenue for integrating products with experience is a philosophy he terms "Sensual Minimalism", design that communicates and inspires without excess. Objects, for Rashid, should be "de-stressors", helping to bring pleasure to a complicated world. Rashid has brought this theory into practice with a series of products that combine an artistic sensibility with real-world pragmatism, from curvilinear polypropylene "Garbo" wastebaskets and "Oh" stackable chairs for Umbra to snow shovels for Black & Decker. These solutions require an understanding of what makes a good experience, and then translating these principles into the desired media without the technology dictating the form of the experience. (Shedroff, 1994)

Jonathon Ive, Apple Computers senior Vice-President in charge of Design and responsible for the iMac and iPod, recently discussed the significance of understanding how people relate to his designs (Garratt, 2006). He once developed a telephone that explored a more logical relationship between ear, mouth and hand, ending up with something that looked like a microphone. He thought it was great until it was obvious others felt uncomfortable using it; they were self-conscious and felt stupid using such an odd thing. He had not designed for the experience. Ive believes that to be truly innovative you have to examine the ideas and

assumptions that shape a design; "asking what it is for, how people use it and whether you can make that experience nicer." (17).

Alben (1996) developed a set of criteria for assessing quality of user experience in order to judge Design Awards entries for interactions. The jury was interested in how effective interaction design could provide people with successful and satisfying experiences. The criteria fall into two categories: those that directly impact user experience (e.g., learnable and usable), and those that make their contribution indirectly (e.g., understanding of users and effective design process). The criteria were:

- **Understanding of users:** refers to how well the design team understood the needs, tasks and environments of the users, and how well this understanding was reflected in the process.

- **Effective design process:** refers to having a well thought-out process that addresses various project concerns and included user involvement, iteration, and multidisciplinary collaboration.

- **Needed:** refers to whether the product meets some recognized need, and makes some significant social, economic, or environmental contribution.

- **Learnable and usable:** refers to how well a product communicates its purpose and operation, and how well it supports different personal styles, given users different knowledge, skills, and strategies for problem solving.

- **Appropriate:** refers to whether a product solves the right problem at the right level, with a good fit to social, cultural, economic and technical factors.

- **Aesthetic:** refers to whether the product is aesthetically pleasing and sensually satisfying, and whether it performs well within its technological constraints. There is also some reference to contributing factors, such as cohesive design, and continuity across interaction, information, visual, and industrial design.

Design for Experience: a New Rationale

- **Mutable:** refers to how well the product can adapt both to individual needs and over time.

- **Manageable:** refers to whether the designers have taken a more systemic view of the product, for example by thinking about how the product might be purchased, installed, maintained, and disposed of.

These criteria provide an overview of select characteristics of designs which provide satisfying experiences for consumers through their interactions.

Reasons for the change

This movement toward designing for experience is partly due to advances in the technologies to which many people have access and which influence their behaviour. These technologies connect and integrate a range of individual products, hardware, spaces and services such as mobile digital services or systems of linked elements such as experienced when using public transport. Designers' response to technologically integrated lifestyles is to design for that experience.

Design for experience is also a response to failed designs. Viewing a failed design as the result of insufficient knowledge about people, their needs and interactions, results in a desire to improve that knowledge as a basis for more successful designs. "Thus, a range of methods for studying users, testing prototypes, involving potential users in the design process, etc., have been developed within the general area of user centred design. With respect to this, the interest in experiences is an attempt to broaden the knowledge about use and users as a response to established ideas about usability and utility being overly constrained." (Rudstrom, 2006)

The movement is also due to "a maturing confidence in the human-centred design profession. Designers now often challenge the wisdom of a focus on designing individual artefacts – the thing as an isolated object – when people's interactions can be better supported by thinking more holistically about their activities and processes." (Suri, 2003: 40)

An additional impetus toward designing for experience came from the area of business. As articulated by Pine and Gilmore (1999), in an increasingly competitive market place in the which the life cycle of products was becoming shorter, particularly the time from product release to market saturation, businesses needed to add competitive value to their products and services, and moving from a product and service based economy to an experience economy was seen as one method of achieving this goal.

Pine and Gilmore (1998) viewed this as the most recent stage in economic evolution: from agrarian to industrial to service to experience. From a business perspective, they interpreted success as the ability to wrap products and services with deliberately designed engaging experiences. They suggest that a model for designing memorable experiences should involve the following principles:

- theme the experience;

- harmonize impressions with positive cues;

- eliminate negative cues;

- mix in memorabilia;

- engage all five senses.

Each year, thousands of new 'existing products' hit the global design markets. Largely experiments in aesthetic redefinitions, it is about style and fashion. Having a cup of coffee is no longer about substance, it is an experience. The interior design of the café, the coffee cups, the presentation, the execution of the service, the accessories, the furniture: all designed to support the human experience, the social experience, the solitary experience, but rarely about sustenance.

This experiential paradigm develops from an historical articulation of how objects are defined to a focus on what is being defined. A table is a table. The problem and solution of table is embedded in our cultural history. Can a furniture designer engaged in this process of defining a table claim to be a designer? Is the task for the designer to simply select existing components and formulate a pleasing combination: a top, legs, proportion, structure? The role of the

Design for Experience: a New Rationale

designer will expand and extend to an analysis of the social and cultural notion of dining and eating meals. The substance of what defines the purpose for a table will increasingly be entwined within the professional repertoire of the designer. To challenge the aesthetic forms of a table is a staple of design; however it is increasingly also to challenge the notion of table, the notion of meal time, the notion of communion, the social act of dining and the physical dimensions of sitting.

This raises some interesting questions. Is the notion of design now dominated by the affluent and self actualizing? Does this new paradigm decay the potential for tackling some of the real issues concerning global problems through design? Has the reality of a dominant commercial imperative conquered design?

It is not only within the realm of commercial affluent imperatives that the application of design for experience lies, even though the rationale for this approach has been derived from commercial design. A particularly appropriate application of a design for experience approach is the context of technology transfer as a methodology for technological development of underdeveloped countries. Much of the technology that has been transferred from one country to another would be more appropriate and sustainable if the experience surrounding the use of the technology had been considered. Take the classic example of the water sanitation system which resulted in running water being available in all houses in a village, but it was not utilized because the women of the village continued to collect water from the central well that was part of the social dynamics of the village. Had the total experience incorporating the use of the technology been considered, the outcome may have been quite different.

Design for problem solving in education
Despite attempts to resolve the use of the terminology, confusion still remains in technology education literature about design and problem solving, and generally speaking, there is little differentiation between the terms.

McCormick (1996) attempted to clarify the term 'problem solving' by differentiating the three main types of problem solving – global; specific, small and regularly occurring; and problem solving as a task.

Not all discussion differentiates between these very different types of problem solving. For example, Williams (2000) proposed that design and problem solving are examples of two different types of technological processes, and together with renovation, troubleshooting and innovation, form a suite of approaches to technology education from which students and teachers can draw as ways of understanding and interacting with technology.

In his discussion on the topic, de Vries (2005: 49-52) implies all technological processes are design and that while the nature and understanding of the process has changed over time, it remains fundamentally about solving problems, albeit wicked or undetermined problems (51). Owen-Jackson (2002) summarizes the confused use of terminology by noting that "…not all design starts with 'a problem', and so some people do not see design as a form of problem solving. Others, however, consider that as a general procedure is being employed to tackle design tasks it could be said to have a problem solving approach." (97-97).

A survey of curriculum documentation from a number of countries confirms the thesis that the dominant paradigm for activity in technology education is problem solving; that is in the 'problem solving as a task' approach as described by McCormick (1996).

In the United States' Standards for Technological Literacy (ITEA, 2002), Standards 8, 9 and 10 are placed under the heading of Design. The Standard statements are:

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an

RESEARCH

Design for Experience: a New Rationale

understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

While in the context of these standards, design could be interpreted in a number of ways, it is clear that it is portrayed as problem solving. "Design is regarded by many as the core problem solving process of technological development." (ITEA: 90) And later, the design process is defined as "A systematic problem solving strategy, with criteria and constraints, used to develop many possible solutions to solve a problem and satisfy human needs and wants to winnow (narrow) down the possible solutions to one final choice." (ITEA: 237)

In Technology in the New Zealand Curriculum (Ministry of Education, 1995) the orientation of technological activity is clearly the solution to problems. In the introduction to technology education it states that:

"Technology education is a planned process designed to develop students' competence and confidence in understanding and using existing technologies and in creating solutions to technological problems." (7)

And on the next page in the introduction to the aims of technology education, it states that the main aim is solving practical problems, although there are a number ways to achieve that aim.

"Learning in technology implies becoming confident in using a variety of means to address needs and opportunities and solve practical problems within society. It focuses on know-how as well as knowledge itself, gathering information from diverse sources. It encourages risk taking, lateral and divergent thinking, the development of multiple solutions to problems, trial and error, teamwork, and the management of resources effectively and efficiently." (8)

The introduction to the Technology and Enterprise Learning area Framework in Western Australia relates technology education activity to the satisfaction of needs and wants – arguably a little broader than solving problems, but equally as mechanistic.

"In the Technology and Enterprise learning area, students apply knowledge, skills, experience and resources to the development of technological solutions that are designed to meet the changing needs of individuals, societies and environments." (Curriculum Council, Western Australia: 289)

The Design and Technology National Curriculum for England presents the core of design and technology as developing autonomous and creative problem solvers:

"Design and technology prepares pupils to participate in tomorrow's rapidly changing technologies. They learn to think and intervene creatively to improve quality of life. The subject calls for pupils to become autonomous and creative problem solvers, as individuals and members of a team. They must look for needs, wants and opportunities and respond to them by developing a range of ideas and making products and systems." (Department for Education and Employment: 15)

In South Africa, one of the newer national curricula in the world, technology education is defined as:

"The use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems while considering social and environmental factors." (Department of Education, South Africa: 4)

Again the recurring theme of meeting needs and wants by solving problems is clear. Despite hints in the language about being creative and relating to needs and wants, the focus is invariably developing (and sometimes designing) solutions to problems. Whether the process is designing or problem solving, the end point is solving a problem, and the thesis of this paper is that such an approach is limiting and outdated.

Design for Experience: a New Rationale

Progress in design and technology education
Numerous frameworks for conceptualizing the nature of progress in technology education have been proposed. The majority of these appear as levels of attainments in curriculum documents. In the National Curriculum Design and Technology in the UK, progression is categorized across eight levels in the areas of developing ideas, planning, communicating ideas, producing quality products and evaluating processes and products.

A significant study was commissioned by the Ministry of Education in New Zealand into the constituents of student progress in technology education. The study elaborated notions of progress in the areas of the nature of technology, dimensions of student technological practice and conceptual, procedural, social and technical aspects; while emphasizing that "…progress cannot be thought of in simplistic terms or as having a definitive singular end point. Progression in learning…does not proceed in any linear format that can be applied to all learners." (Moreland, 2001: 4) Progression was seen as holistic judgements, made in order to reflect the whole of student learning in technology (p 2).

Across a number of the states of Australia, student progress in technology is defined through eight levels across the understandings of materials, information and systems, and the performance of applying a technology process to technological activity. For example, in Western Australia, judgements are made about student performance in terms of the levels, with Level 7-8 achievement expected at Year 12 for university entrance, and the standard being Level 4 at Year 9 (Department of Education and Training, 2005).

These notions of progression are formulated to serve a formative judgemental paradigm. They are developed so teachers can make informed judgements about the level at which students are performing, and then construct experiences to enable each student to make further progress. They do not, in an explicit way, provide a framework upon which teachers could construct a learning program, although they may contribute to such a construction. In this sense, notions of progress are judgemental rather than constructive.

In a less defined but more constructive paradigm, teachers derive conceptions of what it means to progress in technology education, derived from their teaching and experiences with a range of age groups at different ability levels. A recent professional development discussion with technology teachers (Williams, 2005) exposed conceptions related to:

Individualization: students become less focused on themselves and their immediate environment as they progress. Because of a broader range of experiences they are better able to envisage others needs and incorporate general social and environmental considerations into their technological activities.

Complexity: the number of variables students can bring to bear on a technology task increases as they progress. This enables more complex tasks to be undertaken in which a broad range of materials, applications, techniques, environmental and social considerations can be incorporated.

Self direction: as students progress they are more able to accomplish tasks without the assistance of the teacher. They have a broader repertoire of procedural, technical and conceptual skills upon which to draw in solving problems and addressing design briefs.

Initiation: students are more capable of initiating independent action as they progress in their technological abilities. They are more confident about their conceptions and their skills and their ability to apply themselves to tasks.

From these types of understandings developed by teachers through their practice, they develop a scaffold from which to design students' tasks which become, over time for a student, more other centred, more complex, less teacher directed and with more room for individual initiative. So while they assess according to

Design for Experience: a New Rationale

devised progression paradigms, they structure tasks according to their own conceptions of progress.

There is an alternative conception of progress that could relate to the thesis of this paper: design for experience is a sophisticated approach to technology education. Given the foundational nature of technology education as problem solving, established now over a number of years through curriculum documentation and teacher practice, it is proposed that extending this practice to encompass designing for experience represents a progression. This notion is elaborated in the following section.

A model encompassing design for experience
The substrate of the following model is adapted from an elaboration of Maslow's (1987) well known hierarchy of needs (Figure 1). This model has been utilized because of its developmental associations, the structure of the model, the level of common understanding and the prior application of the model to design contexts (Lidwell, Holden and Butler, 2003: 106).

**7. ASTHETIC NEEDS –
SELF ACTUALIZATION**
Realize one's potential, achieve personal autonomy.
Order, privacy, beauty, truth, spiritual goals.

6. COGNITIVE NEEDS
Knowledge, understanding, comprehension,
exploration, environmental and personal mastery.

5. CREATIVE NEEDS
Self-expression, creativity, production, usefulness.

4. ESTEEM NEEDS
Dignity, respect, self esteem, individuality,
sexual and personal identity.

3. BELONGING AND LOVE NEEDS
Security, love, affection and companionship.
To affiliate and communicate.

2. SAFETY NEEDS
Free from fear or threat of injury – to be able to
depend on others and to orientate onself.

1. PHYSIOLOGICAL NEEDS
Fluids, food, shelter, comfort, oxygen, to eliminate
waste products, sensory function, exercise and rest.

Figure 1: Mastlow's heirachy of needs

Each element of the model has been adapted to form a hierarchy of design. The nature of the adaptation has been to some extent informed by notions of progress in technology education as discussed above; other elements of the adaptation are purely speculative and designed to stimulate discussion and further research.

The hierarchy is cumulative in that each level must be addressed in order to proceed, and the ability to design for experience is predicated in all lower levels.

1. **Problem solving** (Basic Needs): the basic ability to identify a problem, deal with all its variables and develop an isolated solution.

2. **Safety** (Safety Needs): the assurance of physical safety in a work environment, and also a psychologically safe environment providing a degree of psychological freedom to enable progress to continue and innovative and creative ideas to be explored.

3. **Group work** (Belonging Needs): the development of social characteristics that enable effective performance in a group working toward a shared goal.

4. **Self expression** (Esteem Needs): individuality and personal identity reflected in designed outcomes.

5. **Creative outcomes** (Creative Needs): new, innovative and creative outcomes are developed.

6. **Personal intellectual fulfilment** (Cognitive Needs): sound philosophical rationale for activities and a cognitive approach to the tasks that result in intellectually satisfying outcomes.

7. **Design for experience** (Self Actualization): the highest form of design is the creation of an encompassing experience.

Implications for education
Designing for experience is a more sophisticated form of design and involves a more complex process of designing. Designing

Design for Experience: a New Rationale

for experience will broaden the range of variables students need to consider in the satisfaction of a design brief. They will need to be aware of people's goals and aspirations, values, personal and social contexts, the effects caused by colour and texture combinations and emotional reactions to sequences of stimuli. They will not only need to know if people can use an MP3 player, but what features of the design ensure that they want to carry it around with them and identify with it. Objective data are not enough when designing for experience. Suri (2003) identifies four types of methods that can assist in understanding designed experiences:

1. Learning from primary and secondary data: this provides useful design guidance but is restricted to specific aspects of the product.

2. Looking at people in context: this is heavily reliant on pattern recognition and inference by the observer to determine what is significant.

3. Asking people to participate: documenting others' experiences provides a rich texture of visual and narrative expressions that capture important insights that designers can relate to.

4. Trying things ourselves: this helps to appreciate other people's experiences more directly.

Modelling
Conventional forms of modelling are used to both communicate design ideas and as a means of progressing the design process and generally include sketching, prototyping and virtual and 3D modelling. These traditional forms are limited as a means of exploring people's experiences with the things that are being designed. When designing for experience, more dynamic ways of representing ideas are required, so the notion of the forms of modelling will need to be expanded. Story-boards, dynamic sketching, video capture, virtual and real walk-throughs and virtual reality can both represent experiences as possible solutions and act as research tools to gauge people's reactions

to designed experiences. These more dynamic forms of modelling are a useful means of progressing experiential designs, not so much communicating design ideas as is the case with the more traditional forms of modelling. When used early in a design process, new directions may be initiated, providing opportunities for immediate discovery and experience-grounded idea generation and refinement. (Suri, 2003: 46)

Teamwork
Because design for experience is concerned with a broader and more diverse range of elements than product-focused design, design teams are consequently also more diverse in their consideration of a range of elements. The implication for design education in technology is that students will increasingly need to work in teams, with specific and well defined tasks, in order to consider the range of elements that combine to form an experience. The challenge for teachers is to teach students how design teams function, and to refine group assessment strategies to reflect individual contributions that are procedural as well as outcome oriented.

Integration
A positive outcome for design in technology education is the fact that the boundaries between the traditional design areas are blurring in response to the new challenges of designing for experience. In reference to the public transport experience referred to earlier in this paper, the design areas of graphics, human movement, engineering and structure were among the many that were relevant. So in a context where technology students engage in industrial design, product design, architectural design, food design and graphic design, maybe all in the one course, they are being exposed to a less discrete range of activities than was once the case. In the early secondary education in which a student may experience a range of "taster" activities in different areas, a focus on designing for experience may enable teachers to provide a more integrated curriculum, which is still a taster, but it is oriented toward an experience.

Design for Experience: a New Rationale

Skill development

A hierarchy of development, such as outlined above, is the basis for "design for experience" education. As teachers are aware, there are manifold skills students must acquire before becoming independent and successful designers in school. A "design for experience" approach to design and technology education represents more skills students have to learn in order to achieve their full potential. It may be necessary to disassociate the technology educational approach to design for experience from some elements of the commercial approach, or at least to be constructively selective. To the extent that general design and technology is not vocational, it is appropriate to be selective in reflecting the vocation; just as much contemporary technology education involves the combination of designing and making in the absence of vocational models which involve both designing and making. Many designers just design and most makers just make things, but we place them together because of the educational advantage derived from such proximity.

So in utilizing design for experience as a model for technology education, it may also appropriately be the case that elements of the model are selectively incorporated into education experiences subject to the goals of the experience.

Just as is now the case when teachers devise educational experiences for students, the totality of designing and making is rarely brought together in the one task. For example, marketability and profitability will only be incorporated as design considerations in a task if the teacher has set the development of marketing skills and the computation of profitability margins as desired outcomes. Such is also the case with designing for experience. While the broad approach differs from product oriented designing in that the focus is on understanding the user's experience, selective elements of the commercial context within which experiential design occurs will be applied to educational tasks.

Conclusions

The thesis of this paper is that designing for experience represents a progression in technology education from designing to solve problems. The application of this thesis to the classroom has implications for both student activities and teachers' pedagogies. The outcomes for students have the potential to go well beyond a richer vocational preparation for engaging in industrial or fashion design. The extent to which students can incorporate end users experiences into their design processes will affect their developing and later abilities to understand and support human experience in whatever vocational endeavour they pursue. The more that their research and their expression of ideas can be made experiential, the more successful they will be in designing satisfying experiences.

While it is true that there remain many significant and fundamental problems to be solved in the world, an experiential approach to problems rather than a narrow product development approach could well result in a higher level of outcome satisfaction.

p.j.williams@ecu.edu.au

shawn.wellbourne-wood@uwa.edu.au

References

Alben, L (1996) *Quality of Experience: Defining the Criteria for Effective Interaction Design*. Interactions, 3(3). Retrieved on December 20, 2005 from http://spirit1.unitedhosting.co.uk/albendesign.com/albenfaris/downloads/pdf/quality.pdf

Alessi, A (1994) *The Design Factory*. London: Academy Editions.

Budd, J, Taylor, R, Wakkary, R, and Evernden, D *Industrial Design to Experience Design: Searching for New Common Ground*. Retrieved on December 21, 2005 from http://www.sfu.ca/~rwakkary/papers/ICSID¬final.pdf

Curriculum Council, Western Australia (1998)

Design for Experience: a New Rationale

Curriculum Framework. Perth: Curriculum Council.

Department for Education and Employment, England (1999). *Design and Technology, the National Curriculum for England.* London: Department for Education and Employment.

Department of Education, South Africa, (2002). *Revised National Curriculum Statement: Technology*. Pretoria: Department of Education.

Department of Education and Training, Western Australia (2005) O*utcomes and Standards framework,* Technology and Enterprise. Perth, Australia: Department of Education and Training.

De Vries, M (2005) *Teaching about Technology*. The Netherlands: Springer.

Garratt, S (2006) *iMan of the Moment.* The Weekend Australian Magazine, January 14-15: 14-17.

Gropius, W (1926) Principles of Bauhaus production. In: Conrads, U (ed) (1964) *Programs and manifestoes on 20th-century architecture*. Cambridge, MA: MIT Press: 95-97

ITEA, (2002) *Standards for Technological Literacy*. Virginia, ITEA.

Kazmierczak, E T (2003) *Design as Meaning Making: From Making Things to the Design of Thinking.* Design Issues, 19(2): 45-59.

Lakoff, G and Johnson, M (1980) *Metaphors We Live By.* Chicago: Chicago University Press.

Lidwell, W, Holden, K and Butler, J (2003) *Universal Principles of Design*. Gloucester, MA: Rockport Publishers.

Lund, A and Waterworth, J *Experiential Design: Reflecting embodiment at the human-computer interface*. Retrieved on December 19, 2005 from http://www.informatik.umu.se/~jwworth/Meta Design.html

Maslow, A (1987) *Motivation and Personality.* Addison-Wesley.

McCormick, R (1996) Instructional Methodology, Ch 3 in Williams, A & Williams, P J *Technology Education for Teachers*. Melbourne: Macmillan.

Ministry of Education, (1995) *Technology in the New Zealand Curriculum*. Wellington, NZ:

Learning Media Limited.

Mitchell, C T (1993) *Redefining Designing; From Form to Experience*. New York: Van Nostrand Reinhold.

Moreland, J, Jones, A, Milne, L, Chambers, M and Forret, M (2001) *An analytical framework for describing student learning in technology.* Paper presented at 32nd ASERA conference, 11-14 July 2001, Sydney, Australia.

Moreland, J (2001) *An Analytical Framework for Describing Student Learning and Progression in Technology.* Paper presented at Technology and Enterprise Conference, 26 November 2001, Perth, Australia.

Owen-Jackson, G (2002) *Aspects of Teaching Secondary Design and Technology*. London: RoutledgeFalmer.

Pine, B J and Gilmour, J H (1999) *The Experience Economy: work is theatre and every business is a stage*. Boston: Harvard Business School Press.

Pine, B J and Gilmour, J H (1998) *Welcome to the Experience Economy*. Harvard Business Review, July-August: 97.

Rashid, K (2004) *Evolution*. Universe Publishing.

Redstrom, J (2006) *Towards User Design?* Design Studies, 27(2).

Shedroff, N (1994) *Information Interaction Design:* A Unified Field Theory of Design. Retrieved on December 20, 2005 from http://www.nathan.com/thoughts/unified/index. html

Suri, J F (2003) *The Experience Evolution: Developments in Design Practice*. The Design Journal 6(2): 39-48.

Thackara, J. (ed.) (1988) *Design After Modernism: Beyond the Object.* New York: Thames and Hudson.

Williams, P J (2000) *Design: the only Methodology of Technology?* Journal of Technology Education, 11(2): 48-61.

Williams, P J (2005) Engineering Studies Professional development notes, August 11.