Design as Rhetoric
A NSW Technology Education Curriculum Perspective.

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Abstract

The imperatives in education of preparation for work and the ability to be active (productive) participants in the evolving technological society drive much of the current agenda in technology education. This agenda increasingly privileges technical ways of knowing in design over more aesthetic, creative and hermeneutical ways of knowing or arts oriented ways of knowing in design. Increasingly the aesthetic dimensions of design education are present in curriculum as broad overarching rhetoric with the reality a more specific technical curriculum driven by a conservatism that serves technical interests of control, for industry, training and economic imperatives. This paper will attempt to deconstruct some of the history and curriculum forces that have shaped and are shaping design in technology education. It will examine those aspects of design thinking which gave rise to its central pedagogical positioning in design & technology and general curricula and have since isolated designing in many curriculum from their aesthetic hermeneutic and cultural beginnings. Design is now being realigned and re-designed within current technology literacy statements and technology curricula. This association brings together the engineer and the designer, science, mathematics and technology education and is poised to loose much of what originally defined its unique aesthetic knowing and design literacy.

Introduction

A committed designer and Design and Technology teacher in NSW, looking at current technology syllabus documents in NSW may conclude that their pioneer efforts to drive Technology and Applied Studies curriculum (TAS KLA) from the legacy of an industrial skills basis to one that addresses design thinking and embeds technacy have lost a significant round in the fight when they deconstruct the new collection of technology syllabus documents in NSW. The imperatives in education of preparation for work and the ability to be active (productive) participants in the evolving technological society drive much of the current agenda in technology education. This agenda while initially shaped by the 'creative knowledge nation' rhetoric in the 90's and embedded in national curriculum documents such as 'A Statement on Technology for Australian Schools' (1994) has given way the power of the vocational and competency agenda driven out of the Mayer Key Competencies (1997) now firmly embedded in all curriculum and the campaign of 'ready for work' which has seen large numbers of students streamed into trade/vocational curriculum (Saul, 1997**,** Seemann, 2000). While the Vocational curriculum are privileging technical ways of knowing, other technology curriculum, including new Design & Technology curriculum, through outcomes statements and pedagogical implementation also support this knowing and are failing to address the knowledge revolution needs of the future identified by Cole (2002). Current curriculum continue to privilege empirical ways of knowing, over more hermeneutical and critical dimensions of curriculum. In so doing they abandon the aesthetic and creative or arts oriented ways of knowing in design. Increasingly the aesthetic and values dimensions of design education are present in curriculum as broad overarching rhetoric or embody new technological hybrids of design driven by a conservatism that serves technical interests of control, for industry, training and economic imperatives.

Background

Technology and Design education was born out of the art and crafts movement at the turn of the 19th century. It was during this period that craft/art curriculum became identified by its association with the term skill or 'know-how' or good design was synonymous with good workmanship. Art and Design emerged as separate curriculum areas but both remained in the camp of the creative arts, valuing creativity, imagination, aesthetics and responding to problems in new and original ways. Art positioned itself at this time in Dewey's world of art as experience, while design education emerged in response to the identification of rapid social change and a need to position design process, problem solving as a vehicle for learning (Green, 1974 in Lenton, Darby, Miller & Sibbel, 1986). It was acknowledged at this time that design is a basic human activity, all that we do most of the time is design and that the difference between design as a basic problem solving strategy and Design as a school of thought was that Design as a process gave meaningful order and was a complex functioning of which aesthetics is but one dimension. Other knowledge dimensions included processes, psychological underpinnings, technical, spiritual and intellectuals needs combined with issues such as social goals and values all defining a design epistemology. Thus design education emerged, concerning itself with forms of 'techne', or know how, and related aesthetic functional/ ethical considerations. Design remained aligned with the arts but emerged as a new curriculum area with its own theory, emergent methodology and associated learning.

The Technical Approach to curriculum informing technology education

Technology curriculum concurrently concerned itself with a focus industrial skills, trade or production 'know how' (distinct from design 'know how'). This way of knowing which was empirical and analytical, fitted neatly into a curriculum that was objectives driven. One could identify on a national level the needs of a society and industry, plan and specify the objectives and execute a linear learning program which was designed to meet these pre specified objectives. Within an objectives based curriculum framework Industrial Arts curriculum content was characterised by learning that traditionally emphasised the skills of precision and practice, over creativity, innovation or critical thinking. This vocational skills curriculum prepared students for their role in industrial

productivity. The emphasis of curriculum to meet vocational needs still resonates with communities and governments as well as fitting comfortably with outcomes based education. This resonance has been a primary factor in the stability of traditional technology education syllabus (many not having been rewritten until recently), since the late 60's, in NSW.

This conventional way of knowing has been the 'technical' way of knowing, the right and wrong way or empirical knowledge determined by conventions, observation and experimentation and scientific thinking. This knowing is fundamental and necessary, however by no means represents the breadth of knowing. This knowing, however, has been privileged in industrial technology curriculum over more hermeneutic and interpretive ways of knowing that require the negotiation of meaning through communicative knowing (Smith and Lovat, 2003). This hermeneutic and communicative knowing as a second dimension of knowing was traditionally linked to 'techne' that had the dimension of aesthetic meaning and was negotiated via a design process within the function of the design object informed by theory. 'Techne' in its original form had a deeper/wider dimension embracing social, cultural and historical dimensions of knowing, than many appear to interpret current technological knowing in curriculum. Buchanan as early as 1985 stated that:

> *' There is a general attitude that technology is only an applied science, rather than a part of design art, and this approach has led many to abandon hope that technology can be seriously influenced and guided by human values and a discernment of beneficial ends in the human community'*.
> (Russell, Grushka & Middleton, 1998:18).

With the implementation of Design & Technology syllabus into the Technology curriculum there was a moment when it appeared that design may well impact from a more critical dimension through the implementation of design knowing.

Ways of Knowing in the Design and Technology Curriculum.

Design and Technology curriculum embedded the design process and the reflective design loop in learning opportunities. This learning was to foster the negotiation of meaning through application of the hermeneutic circle, which was an understanding of the parts in terms of the whole and the whole in terms of the parts within a critical reflective problem-solving strategy (Grushka, 1998) and was emergent through technological applications. It is in this light that the technology statement within Technology- a curriculum profile for Australian schools (1994) was formulated:

> *'Technology in the school curriculum combines theory and practice. It includes much that is scientific, ethical, mathematical, graphical, cultural, aesthetic and historical. It explores the synthesis of ideas and practices, and the effects of technology on societies and environments'* (p2).

It was this model of technology education that was embraced by NSW Board of Studies in 1991 and one that offered opportunities to explore the centrality of values when making decisions about appropriate design and the use and impact of technology:

> *'Decisions about the development and use of technology reflect a range of cultural issues and environmental factors. They are influenced, for example by the values and experiences of different people and communities, by the political beliefs held by different groups, by the actual or predicted impact of technologies on environments, and by the processes by which the decisions are made. Making decisions about technology often involves a complex mixture of consensus, conflict and compromise'* (Gordon, 1996)

This curriculum appeared to offer much of what was determined as essential learning for all students, but it had a range of interpretive and implementation orientations which have shaped its pedagogical realities. Design was now represented in two KLA (key learning Area) camps in NSW the creative arts and technology curriculum both offering different orientations to ways of knowing in design.

Self-reflective and Hermeneutic Knowing

Firstly, emerging from its traditional art/craft base in curriculum it followed its aesthetic art and design curriculum orientation. Within this curriculum orientation design study paralleled the design fields such as graphic design, architecture and industrial design and learning in this orientation acknowledged design theory and a study of style. Design learning was characterised more by qualitative, creative expressive, conceptual, theoretical and philosophical dimensions which were non linear, and often unintended. In Visual Arts curriculum designing was driven by theoretical, critical and design practice models, and involved the disclosure and subsequent order of form and pattern (Russell, Grushka, Middleton, 1998) and an understanding of design literacy as functional and critical. This knowing offered a heightened understanding of knowing informed by self and the very nature of the problem. Emphasis was on a creative problem solving methodology that acknowledged visualisation, divergent and convergent thinking, and valued creative thinking and aesthetic emphasis in designing as a function of cultural production. More recent theory informing this orientation has acknowledged that knowing oneself, or knowing as designer and ones design thinking is an interpretive epistemology, dependent on our individual understandings or experiences of how our intersubjective world is constructed. The self-reflective consciousness constructs as much as it perceives the world (Husserl, 1970). Our knowing and exploration of the world is informed more from a subjective construct. Therefore ones thinking and knowing is shaped by self and society, by labour and social interaction (Habermas, 1979) and that we create our own beliefs and values (Rhode & Platteel, 1999; Barker,2000, Mansfield, 2000). Acknowledging this ontological dimension of ones knowing is now essential and all processes of analysis and critical thinking need to be determined through an understanding of communicative knowing and personal validation. Pavlov (2002) argues that ‘the increasing role of design in our lives is closely connected to the appearance of the aesthetically spaced world that has the following characteristics: colonisation of cognitive and moral spheres of human life by the aesthetic realms; increasing role of experiences in the life of the sensation-gatherer; manipulating people through cultivation of their desires; dominating role of form as compared to function’(9) and that there needs

to be greater emphasis on the moral dimensions informing our understanding of self as designer. A curriculum and pedagogy able to address this knowing would need to develop students critical cognition and allow for the development of deep understandings, complex relationships and the opportunity to know self from multiple ways of knowing such as the aesthetic and moral as well as cultural perspectives. This type of curriculum would embed the thinking of Habermas and hermeneutical ways of knowing where the negotiation of meaning through language and practice arrived at an interpretive understanding (Smith & Lovat, 2003) defined by the design object. Much of this type of design thinking potentially currently occurs in Visual Arts/Design curriculum rather than Design & Technology curriculum.

Innovative and Creative Thinking in Designing (Technacy)

Secondly design aligned itself with technology eduction offering a cognitive framework that could offer a pedagogical practice appropriate for the types of creative minds needed for the 21st century. The valued aspect of designing in this curriculum was the students' engagement in both conceptual and practical solutions to physical problems. This cognitive trait has been described by De Bono as operacy, or being able to work and enrich the field of possibilities, to design in a way that leads to action. 'If you believe that action springs directly from 'what is', then you are not concerned with the design of action. If you believe that, 'what can be', has to be designed then you apply the design process to action itself '(de Bono, 1993:182). To deal with the future we have to deal with 'possibilities' and for de Bono, analysis will only tell us what is. This aspect of creative designing is best identified by the way designers communicate in terms of their product and their processes and solve problems through practical design solutions. From this thinking technacy emerged in technology education discourse and was heralded as a new epistemological knowing, one that embraced a defined method and conceptual framework. Technacy 'offers a framework to teach and evaluate technology education, technologies in societies and industry development' (Seeman, 2000:1). The model presents 'technacy' as a holistic technology and education practice which critically considers technological factors, human factors and environmental factors and aims to ensure that all dimensions are considered and valid within the science and technology

decision making processes (Seeman, 2000: 5). The Design and Technology technacy model (Seeman, 1997) rejected technology as value free.

Critical Self-Reflective Knowing

Thirdly the technology curriculum has been presented as going beyond merely a technical making curriculum that for Habermas represented cognitive control interests, to a hermeneutic and then critical cognitive dimension. For Van Manen it is in this critical curriculum that "there exists no repressive dominance, no asymmetry or inequality among the participants of the educational process' (in Smith & Lovat, 2003, p105). It is in the third dimension of knowing that one can achieve a level of personal autonomy. It was a curriculum which would 'go beyond the conventional wisdom that it is intrinsically good for children to learn how to make things… to educational principles that include the value of education in general, the place of education in society, its value in the market place and its contribution to the economy' (Gordon, 1996:23). This curriculum offered the potential for students' to explore issues and values or cultivate what Dewey terms 'operative good judgement' (in Campbell,1995: 139) and were key aspects of Dewey's educational thinking. This was most evident in the curriculum document Appropriate Technologies (Gordon, 1996) which presented the dimensions of design and sustainability as a catalyst for learning through sustained personal inquiry. Eisner (2001) has identified the relationship between the environment and self as qualitative with epistemological transformative potential for the student and emphasises that this knowing is shaped by culture, language, beliefs and values. This interpretation of the Design & Technology curriculum sat comfortably with environmental education and social and critical pedagogy which seeks to empower students to participate in the democratic transformation of society (Gough & Robottom, 1993). However, this function of design knowledge conflicts with other current technology agendas such as vocational education that see the major function of technology education in schools as having pre-vocational accountability (Seeman, 2000) and knowledge (technological) as storage for future use and the enhancement of individual status and economic well being.

The new set of Technology Curriculum in NSW (2003) clearly places emphasis on skills within vocational pathways. It organises syllabus documents and presents knowledge as 'reductive' (Blunden, 1997). It organises key technological fields and areas of study within these syllabi into existing professional areas such as Architectural Design, Interior Design, Information Design & Food Design. These areas of professional study are approached purely from a technical knowing perspective not from a hermeneutic, aesthetic or critical knowing. They are studied in complete isolation from the theory that informs the professional fields of practice. For example, architectural design is essentially architectural drawing as a technical skill taught in the syllabus of Industrial Technology in isolation from design theory or architectural design history. Further examination of outcomes reveals an order that is akin to competency skills sets of materials, tools, techniques and emerging technologies (26). This agenda identified by Feenberg (1991) in *'Critical Theory of Technology'* argues that the degradation of labour, education, and the environment is rooted not in technology per se but in the antidemocratic values that govern technological development …and that the design of technology is thus an otological decision fraught with political consequences' (3). These agendas along with the recontextualising of design thinking as a generic problem-solving strategy and creativity as creative methods seen in terms of 'mind mapping', brainstorming and logical and lateral thinking (Technology Syllabus, 2003.23) and the inclusion of reference to design theory purely as rhetoric potentially skew design towards a technical interpretation. Design is at risk of being represented in secondary education as removed from its communicative and critical dimensions that address the aesthetic issues in society including ecological, moral and ethical. It now appears driven by technological understandings that inform industrial and commercial imperatives such as information and systems.

Design Thinking, as a generic skill

Within this more recent orientations and interpretations of curriculum design has been redefined as a pedagogical tool, removed from its aesthetic values driven design language, its unique way of knowing, being and doing. What appears to have emerged as

most valuable from the theoretical underpinnings of design in current technology education is the notion of designing as a generic problem-solving model. This became known as the design thinking process (Grushka, 1997) and was acknowledged as a key intellectual attribute for all technology students, it was complex, real world, problem situated and acted on goals to produce an artifact (Joassen, 2000). That was the ability to solve problems, think creatively and employ metacognitive thinking to reflect on ones actions in making and designing. It was these aspects of designing as presenting discreet cognitive traits that were identified as offering a generic problem solving process. However, there also emerged a pedagogical mythology about design critical thinking which believed that the critical aspects of designing could be reduced and positioned as a retrospective appraising in making. For example PMI (Plus, Minus and Interesting) evaluation processes became common in all classrooms. Its popularity driven by its simple, rational and systematic logic, a logic which is not parallel in critical thinking in making (Grushka, 1996) and these simplistic pedagogical practices did much to undermine what is discreet and ontologically unique about design thinking. Thinking in design in education became the pedagogical strategy best able to respond to the required cognitive and communicative attributes of students preparing for work in the 21st century (Grushka, 1997) and design thinking became a key cognitive dimension within general education. Because of its range of contextual orientations that could be applied within and across the curriculum, design, as a problem solving general teaching strategy gained momentum. This agenda acknowledges design as a cognitive thinking process but shifted the emphasis further away from design literacy towards technology science and mathematical integrations and the broad interpretation of design as an intentional planning model (Education & Technology Report, 1985). This more generic simplistic design knowing was separated from its theory driven aesthetic and hermeneutic beginnings, did not represent design thinking and become more informed by scientific objective thinking.

There emerged a new alliance, where design is married more with scientific, engineering and mathematical ways of knowing in technological literacy. Jacobs (2002) clearly defines engineering design as design in real life situations and clearly argues that

engineers do address issues of ethics, sustainability, appropriate technology, social and historical contexts (31) and argues that this engineering design thinking best suits the design orientations of the NSW syllabus. This discourse presents Design Literacy as synonymous to Technological Design and is reinforced in the American Standards in Technology Literacy (2000) where it states 'Design (sometimes called technological design) is the primary problem-solving approach in technology' (5). Designing and making are defined by the initiative of innovation, with innovation couched as 'the process by which new ideas are transformed, through economic activity, into sustainable, value creating outcomes- into tradeable products, processes and services' (Backing Australia's Ability Statement,2001). Technology curriculum is now revaluing making 'putting things together', 'making things' and 'measuring value through application, aesthetics and cost' as well as valuing tools, materials and processes along with the capacity to use them (Cole, 2002). The language of the new syllabi emphasise working applications of technology, science, mathematics and general literacy and numeracy currency, not specific design literacy. This new approach marries well with the implementation of Mayer Key competencies in all curriculum (Mayer, 1992). Technology literacy is now defined by how well we use, manage, assess and understand technology, by set indicators of knowledge, understanding and skills identified by competency standards. Design education currently finds its unique ranges of cognitive processes embraced by an agenda that has categorised design by a generic problem-solving set of traits, aligned it to the more mathematical and engineering literacy skills and presented them as a set of mythological all encompassing attributes of design, engineering design and technical expertise which do not represent the depth of ontological differences across the design disciplines.

Current Issues facing design educators.

Design, initially emerged on the national platform in the technology curriculum field with a belief that the emerging new and existing fields of design would finally gain recognition in secondary curriculum. Located between the arts and sciences, defined by professional fields such as architecture, graphic design and industrial design, design as technological design, in NSW secondary technology education curriculum appears to be

in danger of mutating into a vocational curriculum agendas that is currently taking centre stage (Saul, 1997).

Design thinking presented educators with a range of discreet cognitive traits which many have argued are essential if we are to educate our students to meet and address the ever more demanding issues of a sustainable and positive future for the planet. Design is now simply rhetoric, current NSW curriculum and practice presents a generic design process as rhetoric for innovative thinking, it compromises much of the aesthetics in design by presenting a curriculum with little theoretical or critical underpinnings, and under the guise of problem oriented learning displays minimal exploration of authentic learning. The complexities of design outcomes have been reduced to a clear set of curriculum outcomes that refect a skills or 'how to' orientation. Pavlov (2002) identified that 'technology education provides a rich context that can easily be moved beyond the concept of utilitarian effectiveness' (p, 11) but this aim seems to have clearly slipped away along with creativity, divergent thinking, values driven debate and a pedagogical climate that nurtures deep understandings, intellectual challenge and opportunities for sustained engagement by students. Such an orientation that emphasises physical technology stops short of educating for the technological society. Design educators need to deconstruct current curriculum documents to examine the ways of knowing that are being privileged. As educators they need to re-examine the function of designing for its cultural, sociological, phenomenological and ethical praxis dimensions and to seek to present a curriculum that best presents to students what is unique about design knowing.

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