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THE POSSIBLE RIVALRY BETWEEN TECHNICAL SKILLS AND CREATIVITY

Bruce Edward Watson

University of New South Wales, Australia.

This qualitative research initiative explores teaching and learning nuances of design processes and practices as encountered and documented within a specific design research studio at the University of New South Wales, Faculty of Built Environment School of Architecture and Design, Sydney Australia. Technical skills versus creativity and the manner the two may coexist or not within the setting of a design studio will be explored. Can technical skills specificity be taught whilst and an active engagement with creativity is developed or do technical skills become a rival or inhibitor of invention? Through this research initiative a more accurate transparent discourse of design studio teaching and learning deliverables structures and outcomes becomes accessible. The data uncovered from this research will have direct relevance to future design studio practices and syllabus design; successful and less successful design studio methodologies will be identified and the amplification of more successful modes of practice determined.

Keywords: Design education, Studio teaching, Design thinking, Interior architecture.

Introduction

Within the processes of both the making of interior architecture and the learning and teaching of interior architecture two critical practices emerge *Thinking and Making*. One is connected to an invisible territory of creative invention which utilises existing knowledge to assembly new knowledge whilst the other is part of the representation associated with actuality and or production. The two operate in divergent ways, *thinking* as part of cerebral activity utilising creativity and driven in part by the imagination whilst *making* is technical skills based and a proficiency of tools or operations. This paper builds on previous design studio research to unravel how the two are formed from different and at times oppositional ways of operating and how these two components are best strategized as part a design syllabus in a university context.

These two actions associated with designing are a form of discourse the designer engages in with a situation. Snodgrass and Coyne (Snodgrass & Coyne 1991) *describe "designing in terms of a dialogue with a design situation"*. In this dialogue the *'situation'* is the conditions allied with a design that being all the aspects a designer must engage with in the production of a design outcome. Merleau–Ponty further describes the undertaking of designing and engagement with a situation as a manner of operating within the world. *"Our whole perceptual apparatus is driven by this play between expectations and what exists for us in the situation"* (Merleau–Ponty 1962). For Merleau–Ponty the designer brings an over lay of expectations to a situation that then is projected upon that situation to develop a reinterpretation of that situation in the designers own terms.

A thorough engagement with a situation in design terms requires a designer utilise both technical skills and creativity to fully drive an effective dialogue. This paper suggests however, that technical skills exist in relation to design education as proficiency based operations and that they are debilitated by limits or inherent boundaries attached to their very nature. These boundaries and limits are connected to the different technical skills by operational parameters specific to that particular technical skill. In the twenty first century these limits are technologically built and as technology advances at a pace faster than any previous period in technological history the limits of teaching technical skills diverge in an unforseen manner. Current literature deals with this by elevating or setting in place a hierarchy where technical skills operate at a lower level with thinking attached to the imagination and conceptualisation of design at a higher level.

Cowdroy and de Graaff (2005) identify a number of taxonomies of creativity. While the authors suggest that there is some divergence between the various taxonomies, they do identify consistency in the hierarchical arrangement of types of creativity. This hierarchy generally includes *conceptualisation* (the contribution of 'imaginative' cerebral activity) at a high level, the *development of schemata* (constructs, analogies, diagrams, etc) at an intermediate level, and *physical execution* (the activity of making, performing, etc) at a lesser level. Cowdroy and de Graaff argue that while creativity is generally given a "higher order" ability status in higher education, the assessment of creativity often focuses on the end product and the crafting skills associated with the execution stage of the creative process rather than on the higher order skills of conceptualisation and schematisation.

Research indicates that the two, thinking and creativity, making and building are different in there nature it is the learning and teaching syllabus sequencing that requires further debate and understanding.

Barnett (Barnett 2004) further describes the role of creativity when viewed in the light of learning for an unknown future as *"the capacity to take risks and to adapt to new situations"* this notion is shaped by the premise that technical skills expire due to changes within what is an uncertain future. That abilities fostered through creativity provide a basis for adaptation that recognises there will be situations that cannot be predicted due to the nature of change. Creativity through ingenuity allows a bridge across this gap utilising new knowledge creation through the reassembly and gathering of existing knowledge. Christiaans concludes that while technical aspects are important in terms of augmenting basic design expertise, creativity must be nurtured as a basic part of this expertise, "*This attribute seems to rely on the capacity to integrate existing knowledge from various sources and then transfer what has been learnt to new knowledge.*"(Christiaans 1992).

Technical skills are discussed in terms of tools that characterize design thinking and permit access to a design through representations of that thinking. These specific technical skills that are included (NB: this will vary from course to course) as components of the early stages of a design education are, drafting, drawing, CAD including three dimensional modelling techniques, Model making and contract documentation. *"Technical skill is knowledge about and proficiency in a specific type of work or activity. It includes competencies in a specialized area, analytical ability, and the ability to use appropriate tools and techniques."* (Katz, 1955).

Knowledge Anchoring

Bringing students into a relationship with a new field of study where the outcome is based on a fine balance of both creativity and technical skills require that the educational aspects of the two

and there sequencing within a design syllabus occurs in an optimal configuration. Student *'knowledge anchoring'* must be a consideration within this sequence. Knowledge anchoring is observed where students particularly in the early years of study in a new area of study within a new environment, The University are compelled to know in a definitive and immediate manner what it is that the course and area of study value.

In my experience of design education across twelve years within a university this particular aspect of student behaviour has been observed. The foundations of this behaviour may lie in a number of modes of being, the need to know as a way to achieve immediate success within their studies or a form of panic driven grasping at straws type learning, other more individual reasons or conversely peer driven. Or possibly the simplest reason was that the element of learning emerged first within a learning and teaching sequence and consequently was provided with inherent authority due to the prime position within the particular syllabus.

If students are presented with ambiguity or flexibility as are ascribed mechanisms of creativity, versus the certainty the application of a technical skill can provide the student will anchor within certainty rather than a more problematic and arduous concept such as ambiguity or creativity. Once anchored in that particular modus operandi loosening a student's attitude to the less certain manner of knowledge development associated with creativity becomes difficult and complex. The sequence of subject material that students are presented with in the early stages of their design education require careful and strategic structuring where valued outcomes such as creativity are presented in a prime position and in a valued manner with assessment also built around creativity.

Design > Execute

Each stake holder of design embraces specialist components as parts of the whole that is design. Design within the setting of the university is concerned with the learning, teaching and research of design or what could be described as 'pure design'. This form of design is no less tangible in its own sphere of design, however operates in an undiluted manner, design about design and designing for an unknown future and potential. Learning, teaching and research operate at a forecast level of design, working with an unpredictable future design milieu.

The projects of the academy, which are not built or impeded by budget constraints, codes or other limitations of the built environment engage the practicing student of design in a pursuit of creativity and the imagination and of 'what could be' through experiment rather than 'is'. It is the 'what could be' factor that permits exploration of design at a higher level of experiment to develop and expand design thinking as part of the universities stake holding of design. Conversely designs stake holders within the built environment are concerned with the completion of design, its making and building and the business of operating in the built environment of the world.

These two practices of design, the thinking and the making contain components of each other however, the dominant compositional influence for each remains closely associated with the concerns of that particular stake holding. The university setting is primarily concerned with knowledge creation and possibility, whilst the business of design is primarily concerned with reality and certainty.

Creativity as a Threshold Concept

Within an educational frame work these factors, thinking and making and there relationship as part of teaching and learning for an unknown future become paramount in syllabus strategy and development. Syllabus development for an unknown future requires core componentry that allows the learner to access modes of knowing and operating, which is high order. These high order or elevated components change the way a learner thinks or behaves at a core value rather than in an applied technical skill manner. The notion of *'threshold concepts'* as identified by Meyer and Land (Meyer and Land 2003, 2005, 2006) are strategic approaches to syllabus componentry and design where precise concepts are identified as central to the mastery of a subject area are provided as key narratives within a syllabus. Fundamental and strategic decisions within learning and teaching sequences and structures provide a concise and targeted framework for learning in a less is more approach.

This high order thinking or "threshold concepts" as described by Meyer and Land have been suggested as, "exposing the previously hidden interrelatedness of something, unlikely to be forgotten, forming a significant shift in the perception of the learner - Integrative, irreversible and transformative". (Land, Cousin, Meyer, Davies 2005)

Casakin and Kreitler's (Casakin & Kreitler 2005) research deals with the empirical study of creativity in design problem solving, with a particular focus on flexibility as one of the major elements of creativity. The two main components of the current approach are motivation for creativity, and the cognitive processes that implement creativity. Creativity is elevated through this research as a central component of design education. There results showed that both are indispensable for understanding, predicting and improving creativity in design. Cropley (Cropley 2001) provide further support to an argument for creativity as a threshold concept in design education."people need to be able to adjust to change that is both rapid and sweeping, both for their own well-being and for that of the societies in which they live. This means that education will need to foster flexibility, openness, ability to produce novelty, ability to tolerate uncertainty and similar properties – in other words, creativity."

Christiaans (Christiaans 1992) explores information and knowledge that is processed during designing, and the relationship between this cognitive activity and the creativity of the design itself. Christiaans concludes that while technical aspects are important in terms of augmenting basic design expertise, creativity must also be nurtured as a basic part of this expertise. "This attribute seems to rely on the capacity to integrate existing knowledge from various sources and then transfer what has been learnt to new knowledge."

Syllabus Design

It is fundamental that as part of an Interior architecture or design syllabus creativity is amplified as one of the central threshold concepts. *"creativity produces work that has quality of being both original and useful"* (Mayer, 1999) That the components of creativity specific to the preferred outcomes of that particular curriculum or course area are identified and an educational strategy is employed to support fostered and teach creativity in its many guises. In a sequential approach to learning and teaching threshold concepts such as creativity become amplified and valued through placement *up front* in the sequence of course subjects. In addition to the placement in the sequence value of creativity must also be amplified through assessment tasks of relevance to creativity and the learning of creativity.

In a research design studio at the University of New South Wales (UNSW), Sydney Australia between 2008-2011 student skills, design practices, methodologies and outcomes were mapped. The methodology for this research was that an identical studio project brief from a first year suite of studio projects was duplicated by the same student cohort (10 students) in their third year of the Interior Architecture degree. The particular student cohort became the constant and the studio project itself and design artefacts produced became the variable within the research. This mapping of the student's *thinking and making* across three years of their studies permitted a comparative analysis of design artefacts and experiences. The focus of the design studios activities where to map and document design students learning across a two and half year period from the students first year to their third year of a Bachelor of Interior Architecture Degree at UNSW.

One of the central and reoccurring themes that students in their final reflection on the design research studio noted was an effect of 'technical expertise and technical skills' and the possibility for these factors inhibiting experimentation and creativity as part of a design process. Design ingenuity and invention and the creative outcomes of year one design studio were noted by the participating students as a by-product of being 'unskilled'. Students noted they were unavoidably compelled in their first year design studio processes, due to a less technical skill base to be creative and design resourceful and that invention through necessity formed a major component of their design learning and outcomes. The first year experiences were described in terms of an unforgettable learning experience and that the experience had changed modes of practices within their own design process hardwiring. These are two of the descriptions Meyer and Land (Meyer and Land 2003, 2005, 2006) use to describe a threshold concept - *Unforgettable* and *Integrative.*

In answer to a questionnaire as part of a post research studio analysis - in brief - are responses as tabled.

What positives (teaching or learning or design) could you attribute to the year 1 project experience that could not be attributed to the year 3 project?

- A focus on conceptual adventurous design thinking and solution.
- Ability for full creativeness – no stress on restrictions; focus on possibilities!
- Ability to experiment changed my thinking.
- Despite of the gains from the knowledge and experiences that I have been emphasizing before, I feel that these knowledge has put boundaries around the creativity during the design process, compared to the first year when I have little technical and practical understanding of design.
- Uncertainty sometimes maybe lead to interesting results.
- An unforgeable learning experience.

In response to the same question regarding there year 3 project.

What positives (teaching or learning or design) could you attribute to the yr 3 project experience that could not be attributed to the yr 1 project?

- The project demonstrated more practical and technical skills.
- The "buildability" of the design.
- The design would stand up, though the design process and thinking was not as large.
- The resolution of the design was efficient though not as creative or rich in design experiment as in year one.
- Design was very real and buildable, however not as creative process as year one.

In a design degree where experimentation and invention are expressed as valued the knowledge uncovered by the studio research project is suggestive of a relationship that required an adjustment around identifiable educational aims of creativity versus technical skills. Elements of design ingenuity and experimentation as part of the current design studio framework would require teaching and learning re-strategizing if design technical skills were possibly contributing as an inhibitor of a creative process or outcome. Further observations of the studio work in question across the three years indicated that this in fact was a possibility due to the assessment criterion valuing resolution through technical skills as a higher form of design outcome over experiment.

Within a university setting students would and indeed had worked towards their gradable needs and what had been valued *(resolution through the mastery of technical tools*) as part of the higher degree. Higher grades became valued above a less safe or certain grade due to a process of design experimentation through creativity. The students also noted that whilst the two, resolution and experimentation were not mutually exclusive that design resolution could be portrayed with less creative engagement though the representation of the project utilising technical skills. This short cut as described by students relied on the rigorous design presentation of a less explored or creative design or process.

The implications of this if we are to consider creativity and ingenuity as essential to a design process and outcome suggest that creativity as an intrinsic worth of the design process must be engineered as a valued measurement within assessment. That creativity is provided within the syllabus to provoke and encourage design forward experiment where design is built in rigorous creative exploration rather than convention technical skills alone.

This knowledge as highlighted through the research studio project is part of studio teaching and learning data currently driving changes within the particular syllabus in this design degree. The key amendment within a design studio setting was developing an assessment format where creativity is defined and rewarded and that a design process of experimentation was included as an indispensable and key component before resolution thorough technical skills representation could be attempted. The knowledge uncovered will provide and enhance review and development of this particular degrees syllabus and approach, provoking wider design education conversations around design and the academy.

End words

The act of designing involves a number of phases as part of a design process as a means to an end. These processes have been extrapolated to form parts of a design education where mimicry of the process in its professional habitat has been used as a driver. These processes within a university context for academic and administrative reasons take the shape of segments of design education such as technology, history, theory, design studio and communications etc. All of these segments contain an inherence of ‘creativity’ within the segment operating in a mode particular to creativity specific of that segment. Each segment also has technical skills operating in a segment specific manner. However the dissection of the processes of design into manageable segments suitable for the framework of the university, where scientific data is revered, may have accidentally or other amplified technical skills over a robust creative process.

This is due to the inherent nature of the university format and that formats disconnect with a designing complexity. This being the creative development and thinking phase of design, which is not always aligned with scientific values, but rather embraces imagination and ambiguity in a none linear or predictable manner.

Ambiguity is not as easily or clearly assessed as two plus two doesn't always equal four in a design process, this creates a divide were university assessment policies are concerned with easily definable assessable criteria. The assessment of creativity is more complex and not as simply defined and enters the realms of subjectivity, which in a university assessment context becomes problematic.

Barnett (Barnett 2004) describes a complexity that is found in a professional life as *"one is faced with competing entities, but any effort to satisfy one set of claims may lead to indeterminable effects elsewhere." And that a universities role with in the modern mission of a university comes down to "the Western university fulfilling the brief that has been set before it: in short, the project of critical enlightenment."* Creativity must surely be seen as part of this mission and be amplified within a University setting due to the longevity of benefits that an approach such as creativity over technical skills will deliver. Technical skills and there nature have become part of the transient and evolving realm of technological methods, tools and techniques.

The elevation of creativity within a design syllabus provides students with an adaptable and educationally foraging nature, where curiosity and design agility become prime drivers within the process of design education and design thinking.

Such curiosity and design agility as produced through an engagement with creativity will deliver graduates into the profession with immense vision and premonition. This will drive the profession of design forward in a thoughtful, robust and stirring manner.

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