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DISRUPTIONS: IMPACT OF DIGITAL DESIGN TECHNOLOGIES ON CONTINUITY IN ESTABLISHED DESIGN PROCESS PARADIGMS

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Abstract. This paper aims to provide a critical understanding of the discipline of architectural education, exploring how digital technology forms part of two Australian architecture schools. Generally accepted as the unbroken and consistent existence or operation of something over a period of time, continuity represents stability without interruption. In the context of architectural design education, continuity aligns almost symbiotically with the design process; a system that facilitates a continuous loop of input, output and feedback for the designer—from defining the brief, collecting information, synthesising and presenting a design proposal. Preliminary findings of a larger research study that investigates the role of technology in architecture education, suggest that cultural patterns of technology adoption and valuation exist, valorising particular tools and establishing a framework for design teaching and practice that might disrupt the continuity of students' design process. Moreover, the study shows evidence of a disruption of continuity in design school narratives, emphasising the need to rethink design pedagogy and the place of technology herein. Reflecting on these observations, this paper explores the question: when the tools of digital technology challenge the established design process paradigm of an architectural school, how do educators respond to such a disruption in continuity?

Keywords. Digital design technology; student learning; course delivery; perception; phenomenology.

1. Introduction

The notion of continuity embodies a diverse definition; applicable to almost any function that determines movement from one point to another. Generally accepted as the unbroken and consistent existence or operation of something

over a period of time, continuity represents stability without interruption. In the context of architectural design education, continuity aligns almost symbiotically with the design process; a system that facilitates a continuous loop of input, output and feedback for the designer—from defining the brief, collecting information, synthesising and presenting a design proposal. However, when the tools of digital technology challenge the established design process paradigm of an architectural school, how do educators and students respond to such a disruption in continuity? Through an exploration of qualitative data collected at two architectural schools in NSW, this paper aims to shed light on this question. We will briefly explore the evolutionary design paradigm that underpins contemporary architectural education debate, outline the research design in brief, and explore the question of how continuity and disruption form part of how educators embrace design technology. By exploring the nexus between institutional archetypes, and educational practice, we aim to initiate debate about the role of individual preference, institutional framing, continuity and disruption. The paper pursues a holistic understanding of the impact that digital design has on continuity in the design process and the place of distinct technologies in design school's historic practice.

2. Evolutionary design paradigm

The fields of design education and research are inherently dynamic, yet, currently, a sense of stasis often characterise distinct architectural institutions through definitions of particular directions and schools. Coupled with a perpetual influx of technological innovation and the associated *evolutionary design* paradigm, traditional design methods and theory are being questioned. The challenge of emergent digital design tools and ideology has positioned design educators and researchers to respond to the driving forces behind this technological shift (Boulton-Lewis et al. 2006; Milne 2007; Brill & Park 2008). Influencing the prevalence of emerging digital technology is the exploration of new educational, which support the movement towards an evolutionary design education.

With the continuous expansion of digital design tools into the educational sphere, educators and students are presented with an increasing amount of opportunity and diversity. Changes within professional practice are placing novel questions on design educators and institutions on how to incorporate expanded technological fields with core architectural techniques in the curriculum (Yanik & Hewett 2000; Savage 2005). Pressures from professional practice and governing bodies on creating 'work-ready' students force consideration of what skills architecture graduates must possess: specific technological skills or life-long learning skills that develop technical resolutions?

(Oxman 1999, 2006a,b,c). In its shadow, educational institutions, educators and students must negotiate the question of whether to embrace the emerging technologies within their curriculum and pedagogy or remain loyal to the traditional methods characteristic of the school's approach to design. This question is at the heart of this paper, which looks at how adoption of new technology is paralleled by continuity of practice due to the presence of strong archetypes that guide student and staff adoption of novel approaches.

3. Research design

The study on which this paper is based, explores the tension between traditional and emerging design technology within two distinct architectural schools. In contrast to conventional research on the topic—which generally use traditional quantitative research methods and case study based exercises—the study of which this paper forms part adopts a phenomenological approach and a qualitative research design. Adopting the research techniques of participant observation and semi-structured interviews, the project attains a detailed focus on moments of learning and creativity, as they materialise. As such, it aims to develop a novel understanding and provide a rich foundation from which to better understand how technology can, and should, form part of architectural pedagogy, specifically.

The research was designed as a comparative qualitative study. Data was collected from two distinct field sites, which both have an accredited undergraduate architecture program. The two universities were chosen following an Internet-base preliminary analysis of the architectural curriculums of Australian tertiary institutions. This analysis found that Australian architectural education institutions can be categorised into two general groups, distinguished by their approach to technology in design education. Group A contains schools or faculties that are more technically aligned with the use of digital technology or with a specific focus on digital design. Group B contains schools or faculties that follow design process largely informed by analogue design methods, and where computers are predominantly used for documentation and presentation purposes. The two schools chosen for Group A and B present particular characteristics—*Postdigitalism* and *Critical Regionalism*, respectively—which, we argue, have implications for the established pedagogical systems and, subsequently, the students' experience of continuity and disruption in the design process. These two paradigms and the notion of continuity will be explored next.

4. School A: postdigitalism and the digital complexity fetish

4.1. FRAMING POSTDIGITALISM

The data collected during the course of fieldwork at School A is indicative of a *Postdigital* archetype of teaching, suggesting a perception of digital technology amongst the study participants that has become increasingly transparent, primarily due to its popularisation. Negroponte (1998, p.1) defines the postdigital age as the time when:

[t]he technology, is already beginning to be taken for granted, and its connotation will become tomorrow's commercial and cultural compost for new ideas. Like air and drinking water, being digital will be noticed only by its absence, not its presence.

Adding to the establishment of the Postdigital epithet, Pepperell and Punt (2001, p.2) suggest that tools and techniques of the digital are no longer novel, prompting a new approach to conceptual models:

[i]ntended to acknowledge the current state of technology whilst rejecting the implied conceptual shift of the digital revolution...to describe the continuity between art, computing philosophy and science that avoid binarism, determinism or reductionism.

In the digital arts discourse, the term Postdigital can be understood more generally as the constantly changing relationship and attitude towards digital technology; an attitude focused on humanisation, rather than digitalisation of a subject. The essence of this humanistic view in the Post-digital environment is summarised in the words of self-confessed 'Postdigital operative', Mark Burry (2005, p.49), who explains how he has 'no particular interest in the digital per se', just as he has 'no interest in the traditional per se'. Conversely, he explains:

I have a lot of interest in their fusion. And I think that the people who I admire most and work best with are the people who rather than polarising one way or the other are able to form some kind of fusion between the digital and the analogue, without getting too strung out about the difference between the two modes of practice.

This comment, which could be taken as a simple clarification, captures the essence of the Postdigital attitude indicated by the data pertaining to School A: the staff participants from this school demonstrate similar attitudes as Burry, in which past emphasis on the digital is muted by a fusion of the digital and analogue. Subsequently, the school has moved away from its digital focus to a post-digital archetype within which the student's design practice and learning take place.

Both educators and students at School A express an understanding of digital technologies as essential to the design process and a fundamental asset to both producing and representing architecture. The established teaching style at School A has manifested from the opportunities afforded by the digital medium, exploring the extent of innovation in architectural design at both a conceptual and developed level. One of the staff participants, Matt, suggests that past academics involved in the conception of the school's curriculum and agenda approached 'the digital wave' with a philosophical understanding, integrating digital thinking into the program through an abstract understanding of the theory behind the movement.¹ This was largely informed by key teachings of Greg Lynn (Paperless Studio 1994) and Ben van Berkel (UNStudio 1998), who had been seen to be successful in intellectualising digital's role in the design process.

At the time of data collection, the established teaching methodology at School A has been through a period of dynamic change, with an increasingly holistic view that expands the previous emphasis on the digital and, subsequently, moves it towards a Postdigital educational setting. Described as a 'reverse shift' (Mark), this cultural transference in thinking and design with digital media are illustrated in staff accounts about how the school had once been almost entirely focused on the digital process. As Mark explained, 'for a long time it was very much the digital uni, it had a very strong focus on computation', whereas now, it has 'a more nuanced understanding of what digital environments are capable of, in a design sense'.

Nonetheless, within the Postdigital philosophy present at School A, the analysis of the data set reveals a trend towards digital technology being perceived as a tool and technique of reverence and respect; a type of fetish, which we describe as a *digital complexity fetish*, exist. This fetish is identified as a disruption in the established design curriculum, in which the continued, yet subdued, emphasis on the digital restricts students' individuality and, subsequently, restricts individual agency and continuity.

4.2. DISRUPTIONS: THE DIGITAL COMPLEXITY FETISH

The perceived devotion to digital practices can be attributed to the popularisation of digital technology over the past decade, with students now expected to be familiar with the plethora of digital tools that currently exist, in some cases even before they begin their training. Matt articulated this in our conversation: 'digital means have been popularised, and this corner of the world has access to both sophisticated software and means of production that are digital'. A familiarity and knowledge of technology is expected; as Matt explained, '[students] use [technology] as they use a pen to draw'.

The concept of a digital complexity fetish was initially revealed through discussions with staff participants Matt and Mark. Matt's observation on the role of digital technologies in the design process, particularly in relation to expectations of students to be 'familiar with those tools and use it in a non-fetishist way', initially provoked our investigation into digital technology as a potentially fetishist device. Matt argued that the school's past emphasis on digital design technology delivered via technique-based instruction has left a legacy in which digital design technologies maintain a particular cultural capital, which bestows a notion of preference that might guide students' design choices. Whilst, as Mark explains, this is today contrasted by a devaluation of digital tools, which are rendered as 'one dimensional' in their application to the design process; 'a tool to generate complexity rather than an actual design method', the digital complexity fetish leads to an emphasis on the design tools rather than the process in itself. This observation suggests that if students develop a convention and corresponding design behaviour that is exclusively devoted to the digital medium, they risk 'exclusivity that narrows [the students] capabilities in terms of design thinking' (Mark). Mark suggests that when digital environments are fetishised and exclusively used by students in the design process, 'they actually structure the way that [students] think at a very fundamental level'. This can lead to a risk of predictable and banal design outcomes, despite the use of complex design tools.

To further rationalise the concept of the digital complexity fetish, it is imperative to define the underlying notion of *complexity* in this definition. For example, a student designing in a digital environment could develop an expectation that their design outcome would have inherent intricacies due to its conception in otherwise complex digital realm. However, if the design outcome was not perceived through feedback as a rigorous solution to the brief—a design lacking in complexity—this may present frustrations for the student. Subsequently, we argue, in order to progress and avoid the traps of this perceived digital fetishism, the discipline must further develop pedagogical strategies that incorporate a wide range of working methods: 'to try and understand that digital tools enrich the process rather than fundamentally revolutionise it' (Mark). This is not only the understanding of digital media as a tool to stimulate seemingly inconceivable design outcomes, but more so as an obsession of computationally driven design in an attempt to achieve the complex.

5. School B: critical regionalism and the digital stigma

5.1. FRAMING CRITICAL REGIONALISM

The data collected at School B show evidence of a teaching culture that emphasise an awareness of geographical context in design, the importance of topography, light, climate, and a tectonic sentience of form. Central to this teaching philosophy is the local traditions of the environment in which architecture is placed, which should be honoured and maintained. The school reflects a teaching ethos that bears similar physiognomies to the architectural movement of *Critical Regionalism*, an established approach to architecture associated with architect Kenneth Frampton (1983, 1989, 1992) and architectural theorists Alexander Tzonis and Liane Lefaivre (1981).

When applying this movement as a tool to understand the philosophy of this school, it is first necessary to deconstruct Critical Regionalism to question its values and suitability as a tool for characterisation. Philosopher Paul Ricoeur (1961) frames the beginning of the regionalist developments through an examination of the universalisation of a modern civilization and its predominately negative impacts on traditional culture. He states that ‘every culture cannot sustain and absorb the shock of modern civilisation’ (Ricoeur 1961, p.277). It was, however, not until the two proponents of the movement, Tzonis and Lefaivre, coined the term Critical Regionalism, that it was defined in general terms. In line with Tzonis and Lefaivre, Critical Regionalism has become known as an architectural approach that ‘upholds the individual and local architectonic features against more universal and abstract ones’ (Tzonis & Lefaivre 1981, p.170). Frampton has expanded this philosophy, emphasising regionalist attachment to culture not as ‘something given and relatively immutable but rather as something which has, at least today, to be self-consciously cultivated’ (Frampton 1992, p.315).

Critical Regionalism has been celebrated for humanising modernity. At the same time, however, the advocacy of ‘back-to-the-roots’ have led to a criticism of conservatism. A major failing of the movement was evident in its reaction to the populist movement; the dangers associated with an agenda narrowly focused on stemming the gradual post-industrialisation of our technocentric culture, as observed by Tzonis and Lefaivre:

[t]he upheaval of the populist movement – a more developed form of regionalism – has brought to light these weak points. No new architecture can emerge without a new kind of relation between designer and user, without new kinds of programs (Tzonis & Lefaivre 1981, p.170)

Due to this movement’s roots in deep contextual attachment, some forms of Critical Regionalist architecture tend to display a conservative undertone,

deriving architectural forms from an erroneous use of vernacular, ultimately severed from its historical context. In relation to the design studio and communication subjects within School B, the established traditional methodology reinforces similar sentiments of the Critical Regionalist ideology, with the collected data suggesting a high level of importance placed on learning and developing the skills of hand drawing, sketching and model making; techniques synonymous with the conventional core values of architectural representation. As identified previously, the Critical Regionalist manifesto suggests that the styles of both modern and post-modern architecture are ‘deeply problematic’, prompting a resistance of the movements of universalisation in architecture at the time. While the school does not appear to advocate this notion in its entirety, it does present evidence concerning a rejection of *modern* tools. This observed aversion to digital technology as a modern proponent to design thinking and process, is identified in this ongoing research as *the digital stigma*, and will now be discussed as the by-product of digital design technologies impact on the established teaching archetype.

5.2. DISRUPTION: THE DIGITAL STIGMA

In the scope of this research paper one of the key phenomena identified, which characterises this identified rejection, is defined in this paper as the *digital stigma*. The collected data suggests that this attitude existed in the culture of School B during the late 90s, triggered by the transition towards a digital method of architectural production in the degree. The collected data identifies distaste amongst educators and students towards CAD generated drawings, particularly due to the lack of human touch; a quality revered in Critical Regionalist thinking. The current use of digital technology as a tool in the design process has become more accepted in the school, but data suggests that there is still division in the design faculty regarding its use, characterised by an uncertainty of the value of the digital in the design process. The notion of *cultural resistance*, highlighting a ‘threat by crowding out critical thinking’ (Denzer & Hedges 2008, p.3), has been identified as a running theme in the data. This theme is closely associated with the development of the inherent digital stigma existing in the school, a consequence that can be perceived as territorial in nature.

Building on this perceived cultural resistance, the staff participants of School B cited digital media as ‘a weasel word’ (Harry), ‘the enemy’ (Andy), ‘lazy tool’ (Ryan), ‘a dirty word’ (Cindy), and ‘frowned upon’ (Anna). This attitude is suggested to have been cultivated by past and current academics within the school, who possess a conservative viewpoint towards digital technologies application in design education. Ryan explained how the

most senior members of academic staff ‘see it purely as a tool, and they preach heavily on getting to the stage where your eye and hand can work together on a piece of paper’. Harry further describes digital technologies perception in School B as a potential ‘hangover’ from ‘the old days’ when digital design tools became more mainstream. During the course of this research there have been many recorded instances in the student data group that uncover this rejection of digital technology by academic staff, largely perceived as a negative impact on the student learning experience. More than 75% of the student participants reported encountering barriers pertaining to issues surrounding the acceptance of digitally produced work. These barriers ranged from fear of being marked poorly due to their choice of medium—‘if you use any sort of CAD you're shunned and they almost look down on your work’ (Dean, School B Student)—to trying to masquerade their computer generated image to please tutors and critique panels—‘we all create our presentation models using ArchiCAD but then we print it off, then we trace it using pen and paper...because that's what the lecturers like’ (Joanna, School B Student). This data suggests a trend that characterises the current attitude towards digital technology in this learning environment, in which the student’s design choices, the individuality of and continuity in the design process and learning process are impacted by a cultural stigma against particular types of technologies.

6. Conclusion

The process of characterising each of the two selected field sites has established a framework to analyse the data set, facilitating an interpretation of the identified phenomena within the aligned pedagogical agenda. This framework presents an exploration of digital technology from a cultural perspective, reflective of an individual design process and differentiation of the institutions surveyed.

This paper is underpinned by the observation that there exists a disruption in continuity through a shift in design education and practice. We maintain our position that the established pedagogical systems are deeply affected by the evolution of digital methods and media. However, our on-going analysis indicates that there is no distinct divide amongst digital and analogue practices; suggesting that a more integrated use of various tools can enhance experiences of continuity in the design process and promote learning.

Our future research aims to incorporate these results to provide a more inclusive description of the phenomena discussed here. We now seek to explore the student participants' own experience of the digital design paradigm within the defined cultural group, rather than prove these extrinsic ideas and

categories. This paper will contribute to the larger study by enhancing the understanding for academics and researchers of the student perspective in architectural design, allowing for more informed conclusions to be reached regarding the implementation of digital design technologies in today's higher education institutions.

Endnotes

1. Synonyms are used throughout this paper. UON HREC Approval H-2013-0401.

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