

DESIGN- ING/EDU- -CATION

Proceedings of the 7th International Conference of The Association of Architecture Schools of Australasia

3—5 OCTOBER 2013
MONASH UNIVERSITY
RMIT UNIVERSITY AND
UNIVERSITY OF MELBOURNE

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"While the architectural field has changed more in the last 30 years than in the previous 3,000 thanks to the rapid acceleration of globalization and the convulsions of the market economy architectural education has mostly failed to keep pace." - Amo

This conference will bring together academics and practitioners to speculate on the future of the design studio as a pivotal platform for architectural education and production, and to consider modifications required in response to the changing demands of society, pedagogy, research and practice.



Editing: Diego Ramirez-Lovering, Jacqui Alexander, Alison Fairley

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Design / Education: Proceedings of the 7th International Conference of the Association of Architecture Schools of Australasia ; 2013 Oct 3-5; RMIT University, Monash University and The University of Melbourne, Australia. Victoria: Melbourne.

ISBN - 978-1-921994-29-6

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All articles published in these proceedings have been double-blind peer reviewed by a minimum of two referees.

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RE- CONSTRUCTING PEDAGOGY

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**DESIGNING/
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CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

Abstract

This paper explores model of architectural education formulated to introduce and extend tactile, full-scale learning opportunities across the undergraduate design curriculum. The pedagogical experiments conducted to date attempt to distill lessons from advanced fabrication courses and distribute them throughout the traditional core curriculum in order to better prepare students for the complexities of full-scale projects and contemporary, critical practice.

Commonly referred to as “design-build” these full-scale pedagogies engage issues of making, site, typology, precedent, budget, consultants, and client/constituency that demand expertise beyond the scope of work typically associated with the individual architect/student working in isolation. This type of hands-on learning presents a significant opportunity to re-construct architectural education through an immersive, cross-disciplinary approach to architecture that integrates design with technology, history, landscape, urbanism, and social justice.

In addition to the tectonics of details and joinery, teaching at full-scale introduces students to a contingent complexity located in the realistic realm of inter-personal and inter-professional dependence. This discourse offers an alternative to the fragmentary nature of traditional architectural education in which site and building, as well as drawing and making, are too often seen as separate, codified realms of isolated expertise.

Attempts to implement design-build throughout an undergraduate curricula have encountered significant logistical hurdles. For example, extraordinary financial and time commitments from the participating clients, faculty, and students combined with legal concerns at the administrative level conspire against widespread implementation. As a result, design-build has had a compelling, but somewhat limited impact on the fundamental organization and delivery of architectural education.

Lessons learned from completed projects, (PORCH_house PreFab, The Wall and The Cube), at three different scales, (House, Furniture, and Object), will serve as case studies to illustrate the challenges and potential benefits associated with expanding full-scale education across the undergraduate curriculum.

Introduction

In North America, the term “Design-Build” is the standard nomenclature used to describe a particular system of professional project delivery in which a single entity is responsible for both architecture and construction. The format purports to streamline the project schedules and clarify legal responsibility. The Design-Build Institute of America notes that, “Design-build is a method of project delivery in which one entity - the design-build team - works under a single contract with the project owner to provide design and construction services.” [1]

The same term, ‘design-build’, is also used to describe a particular form of full-scale, hands-on pedagogy in architecture education that has emerged over the past 45 years. Beginning with the Yale Building Project and exemplified by programs such as the Rural Studio at Auburn University and Studio 804 at the University of Kansas enthusiasm for the hands-on education has led to a sharp increase in the number of schools offering design-build programs. [2]

As recently as 1997, William Carpenter found that, “There are over one hundred schools of architecture in the U.S.; less than ten have design-build programs”. [3] Since then interest in, and acceptance of, design-build as a legitimate pedagogical model has expanded dramatically. Bolstered by a renewed interest in John Dewey’s axiom “learn by doing” and social conscience largely inspired by the Rural Studio, the number of university-based design-build programs increased to approx. 40 by 2004. [4] Today it is difficult to find an architecture curriculum in the United States that does not include some form of design-build coursework. A report authored by W. Geoff Gjertson found that 100 of the 123 accredited architecture schools in North America have a design-build component in their curriculum. [5]

The typical design-build studio consists of 8 to 18 advanced students, along with a faculty member, working directly, at full-scale, on all aspects related to the design and construction of a small building project over the course of a single, academic semester or year.

Design-Build Pedagogy

Contrasted with the conventional education of architects that privileges studio based design exercises incorporating scale drawings, renderings, and models, ‘design-build’ is seen, primarily, as an opportunity to reunite architecture and construction through the hands-on manipulation of material fabrication and detailing.

A review of the literature on ‘design-build’ education reveals the focus on the physical, full-scale ‘build’ and the privileging of ‘making’ as a means to recover a lost tradition. Speaking to this point, Brian Mackay-Lyons, founder of the “Ghost Lab” in Nova Scotia, argues that, “Pragmatism is the best teacher” and “Technology is best learned by making” and he links design-build to, “The apprenticeship model of architectural education—its roots in the master-builder tradition of the Middle Ages”. [6] Brian Carter describes the pedagogical focus at the Ghost Lab, and by extension in the majority of design-build programs, “Design and construction ran in parallel, ideas were tested by building on-site at full scale, and details were modified and improved throughout the construction.” [7]

Curricular Integration

Design-build offers an alternative to the fragmentary nature of traditional architectural education in which design and construction, as well as theory and pragmatics, are too often seen as separate, codified realms of isolated expertise. As a result, design-build has been widely adopted in an attempt to address perceived deficiencies in design education vis a vis the integration of building technology and construction. However, this remedy remains largely tangential to the core curriculum of most, if not all, schools.

As the design-build paradigm evolves and its popularity increases educators have struggled to address the relationship, or lack thereof, between the complex nature of

these projects and the introduction of associated construction skills in the core curriculum. The isolation between core education and the design-build experience exacerbates a disjunction between the expectations for a well-crafted project result and the near total lack of incremental preparation required to produce architecture at full-scale. Even when students have completed a required sequence of material/construction-based coursework the lecture format in the technology sequence tends to segregate book knowledge from direct experience.

Thus, at the beginning of a typical design-build project students faced with an already steep learning curve imposed by new responsibilities to clients, budgets, schedules, site safety, code compliance, gravity and the collaborative process are further challenged by the introduction of basic tactile knowledge and fabrication skills.

Implementation Challenges

The most common format for design-build courses locates a single, annual studio course open to advanced students at, or near, the end of the education. As a result design-build tends to serve a relatively small percentage of the student body, focusing almost exclusively on upper level students. Given the logistical hurdles involved in providing even one of these classes in any given year a school can expect, at best, only 10-25% of the typical student body will have the opportunity to participate during their academic career.

Attempts to expand participation and weave immersive, haptic learning opportunities throughout the design curriculum confront a series of logistic and political realities, not the least of which involve accredited curricula requirements, tenure processes, funding cycles and the academic calendar. Extraordinary financial and time commitments from the participating clients, faculty, and students combined with

legal concerns at the administrative level conspire against widespread implementation. Large student populations, limited access to fabrication facilities, administrative legal concerns, and insufficient funding for tools, materials, and instruction present additional obstacles.

In the face of these challenges, complex projects are often artificially curtailed by imposed limits. Lead faculty are forced to limit the project scope and take on the bulk of logistical preparations in order to allow students to focus on some sub-set of reality, most often the design and build aspects, and ultimately to increase the likelihood of an 'on-time' project completion.

Constructing Curriculum

In response to both the logistical challenges, the ongoing 'Constructing Curriculum' project attempts to identify and implement a wide range of learning opportunities for hands-on, material education inspired the design-build paradigm. This effort seeks to augment, rather than supplant, existing educational methodologies by integrating issues of technology, tactile experience, construction and full-scale material manipulation into a wide variety of instructional formats and course types. The goal is to present integrated alternatives to standard technology courses, seminars and design studios by weaving direct, material exploration into existing, required classes while augmenting these experiences with specialized, elective coursework. As such, these pedagogical experiments challenge the fragmentation of design education by presenting materiality as one of several primary design tools.

Where the typical design-build studio occurs as a pinnacle event for a small group of upper-level students, 'Constructing Curriculum' directs specific attention to classes across all year levels in an effort to reintegrate acts of thinking with those of making and acts of representation with those of sensory experience.

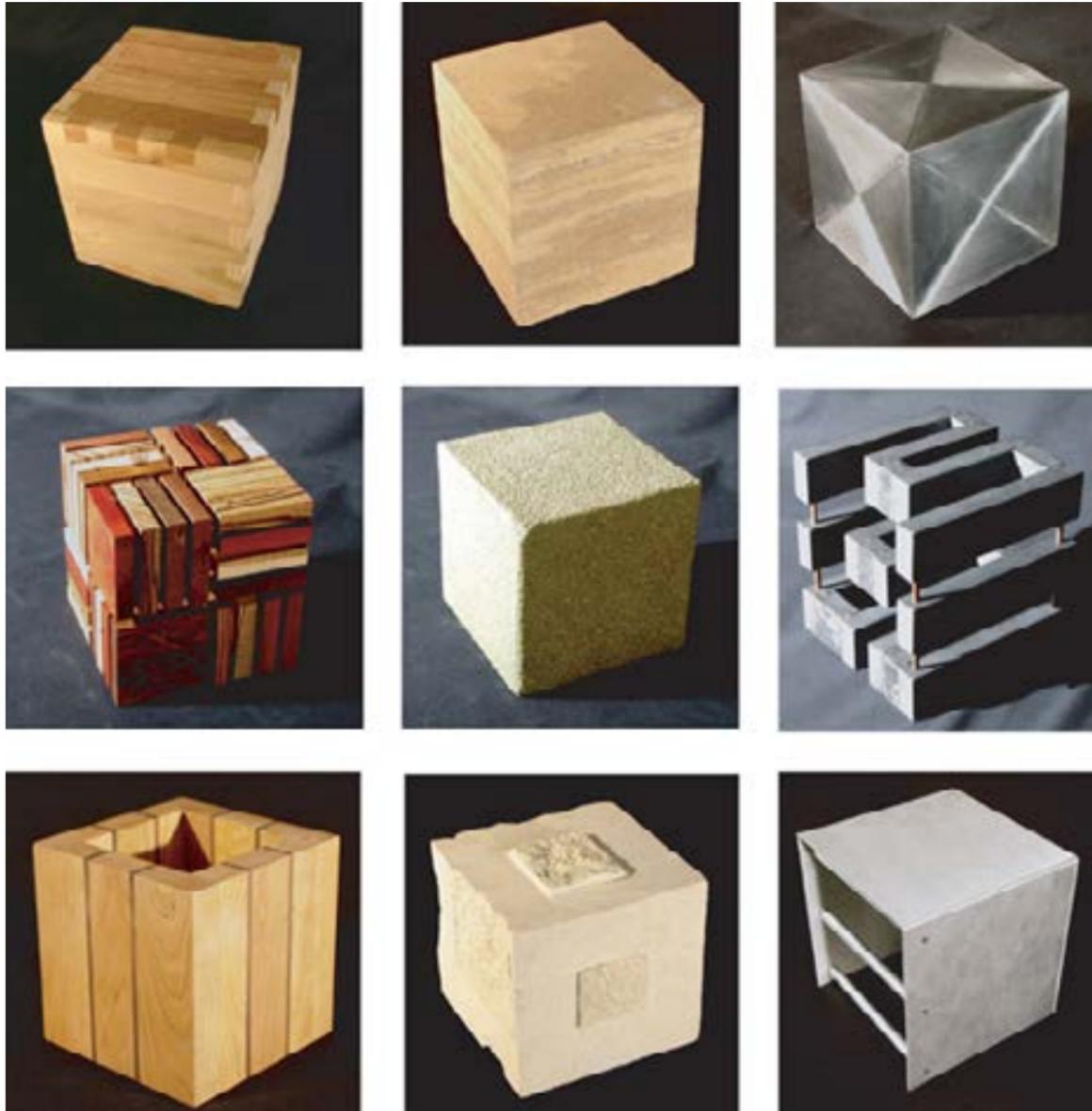


Figure 1: The Cube Project

The experiments, conducted over the past fifteen years, range from short and small insertions into existing courses, such as 'The Cube', (Figure. 1) to long and complex residential projects that require multiple semesters, such as 'TrailerWrap', (Figure. 2). During this time the spectrum of project types and project duration has expanded to include weeklong fabrication workshops, (Figure. 3), semester-long elective courses focused on tectonics, craft and/or furniture design multi-semester (Figure. 4 and 5), as well as large, immersive projects more commonly associated with design-build pedagogy, (Figure. 6).



Figure 2: The Trailer Wrap Project

Case Studies

The following examples serve to illustrate the scope of projects engaged to date. The effort has consciously focused on creating an incremental introduction to haptic learning by exposing students to full-scale projects at multiple points and in multiple formats distributed across their four or five year undergraduate education. As is common in most academic disciplines course content is dissected into topics appropriate for students at the beginning, intermediate, and advanced stage. Introductory projects are small in terms of physical size and relatively simple in terms of the issues and number of variables. Intermediate scale projects introduce more complexity and a wide range of potential inquiry and experimentation. Large scale projects mirror the full-spectrum of complexity engaged in professional practice. As a result, collaboration and dialogue between students, as well as between students and consultants is a fundamental component.

Case Study 01- Introductory Scale

The large lecture class, common for teaching building science and technology coursework, proved to be the most challenging environments to introduce full-scale projects inspired by design-build methodology. In this example, an attempt was

made to combine pragmatic, construction knowledge with a broader, academic dialogue encompassing the historical, theoretical, and social themes influencing both contemporary tectonic and architectural discourse. Similarly, an attempt was made to combine lecture and reading-based learning with direct, hands-on experience. Rather than supplant the large lecture format, 'The Cube' project was developed to augment more traditional lessons delivered through lecture-based teaching methods. The resulting experiment engaged the largely uncharted hazards and opportunities presented by full-scale construction and tactile experimentation within large, (60 students), and sometimes very large, (192 students), introductory Materials and Methods lecture courses.

Working in teams of four, students were required to produce an exquisite 8"x8" cube using metal, wood, concrete, or recycled material. During the semester long project students explored the specific traditions, characteristics, capacities, construction techniques/conventions, and detailing options as they attempt to articulate a definition of exquisite relative to their chosen material. An exhaustive series of drawings, fabrication research, precedent analysis, and most importantly hands-on experimentation, in the form of prototyping, combined with research into the histories, techniques and traditions of a particular material established a high level of intellectual and tactile familiarity. In addition, students were required to seek mentorship beyond the walls of the university by approaching craftsmen in the building and construction trades. The team structure combined with the outreach requirement establishes the fundamental role of collaboration and dialog.

Complementing the projects delivered in the lecture class, small hands-on exercises have been introduced to the first-year design studio. These projects range from one to six weeks in duration and are explicitly linked to issues being addressed in the studio. For example, within a studio devoted, in part, to unit-based repetition students in a second-year core studio spent one week translating their abstract drawing-based exercises into a full-scale masonry wall, (Figure. 3).

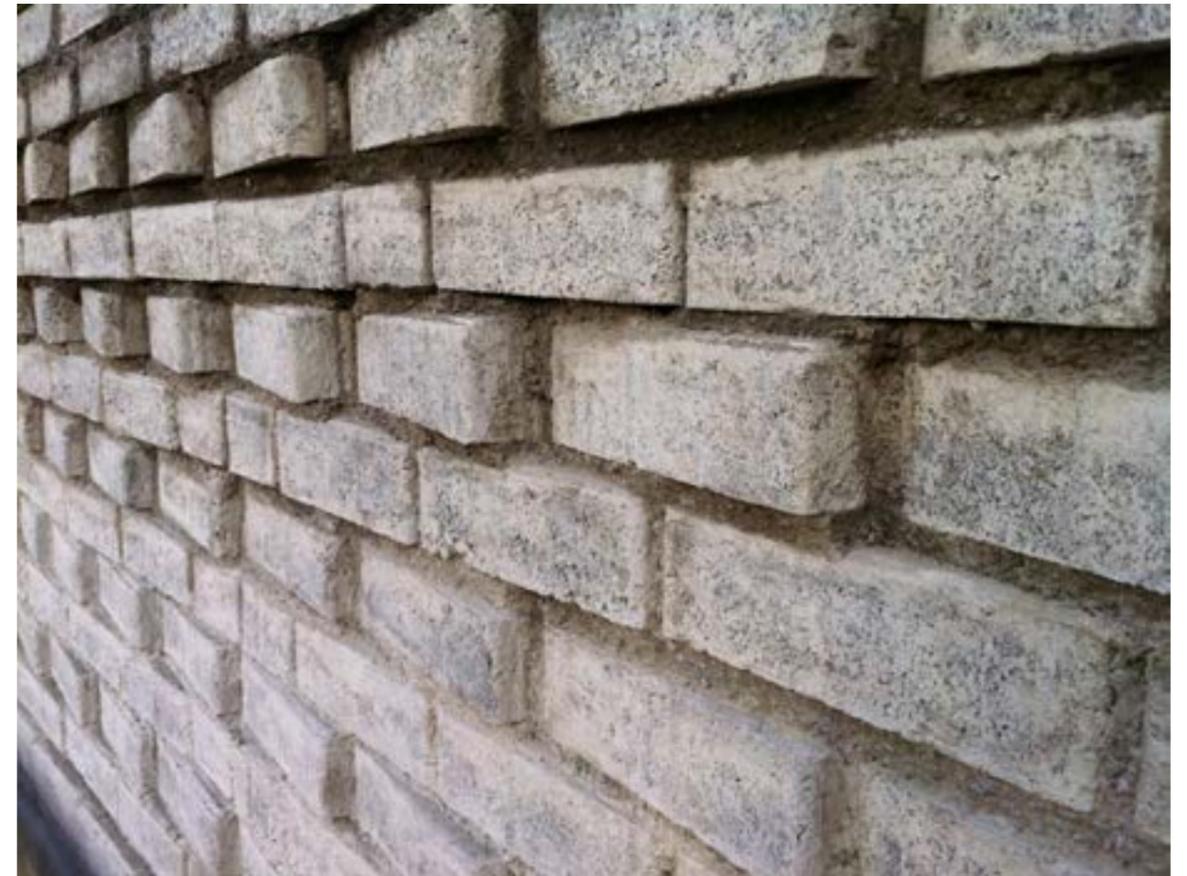


Figure 3: The Masonry Wall Exercise

The translation from drawing and computer modeling to brick and mortar exposed students to potential subtleties in the material reality, which was difficult to see or assess in representations. As a result, in the subsequent return to abstraction students were able to modulate their work with a greater degree of sophistication. The addition of a wood and steel bench extended the lesson to include more fabrication techniques while also adding a level of structural and pragmatic complexity.

Case Study 02: Intermediate Scale

Building on the introductory cube and masonry exercises a series of elective seminar courses introduce opportunity for more advanced tectonic explorations. These courses explore both analog and digital fabrication methods along with a wide range of materials and tectonics to create outcomes at the scale of furniture and small installations. The development of contingent skills becomes a key issue at this scale as students are encouraged to engage projects that do not have a clear or fixed trajectory.



Figure 4: The Thinker's Chair. Designer: Maha Habib.

The furniture course taught by Prof. Bill Sarnecky at the American University of Sharjah serves to exemplify the integration of thinking and testing encouraged in these courses. Each student in the class is responsible for designing and fabricating a unique piece of furniture, (Fig. 4, 5 and 6). Typically, the unique designs necessitate the invention of unique, often complex fabrication techniques and processes that range from welding to steam bending to CNC operations. Similarly, the designs often necessitate the invention of processes and jigs for complex operations. [8]

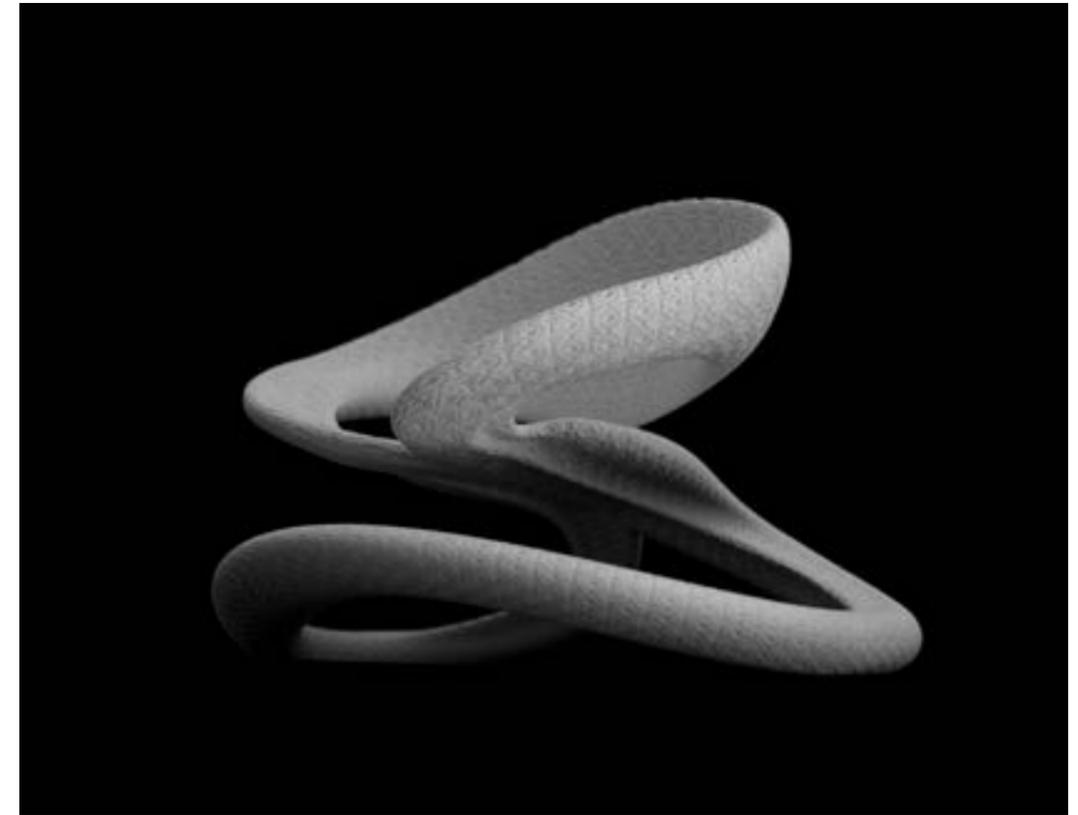


Figure 5: Amal's Prayer Chair. Designer: Sarah Algrobi

For example, Prof. Sarnecky notes,

"One student designed a chaise lounge with moving plates that he hoped would conform to the shape of the lounging user. Unable to find compression gas springs to support the plates, the student invented a way to reverse the action of a typical hinged surface-mounted door closer—from pulling to pushing. The final result, while far from an aesthetic masterpiece, represents a triumph of ingenuity over local constraints. Inculcating students in the art of fabrication—convincing them of the value of making (something almost all the students have immediately embraced) creates a sense of mastery that encourages experiment." [9]

Case Study 03: Large Scale

Large design-build projects, at the scale of a residence or interior installation, introduce students to the craft of contemporary architectural practice in all its complexity. The PORCH_house Prefab project serves to illustrate the scope of learning possible in an advanced design-build studio.



Figure 6: PORCH_house Prefab

Located in Little Rock Arkansas the project involved a non-profit community developer, the homebuyer, a low-income mortgage provider, the mayor's office, a contractor of record who provided the legal structure for building inspections, two different municipal code enforcement agencies, and a diverse group of community organizations invested in the specific neighborhood. For this project the city where the prefabrication occurred was 200 miles from the city where the units were installed and each city had their own codes governing zoning, building and inspections. In addition, the transportation logistics involved required coordination with state and federal highway regulations as well as the truck and crane operators.

Thirty-seven people representing twenty-eight companies donated time and expertise to assist participating students as they worked from the initial, conceptual stage through construction documents and finally to the full-scale construction. Students developed mentor relationships with craftsmen in the building industry and developed new skills by working with professionals in the electrical, plumbing, and metal-working trades as well as equipment operators and consultants from from the allied professions of Engineering, Contracting, and Landscape Architecture.

This engagement with the allied disciplines is fundamental to the pedagogical intent. Working directly with skilled craftsmen and consultants breaks down antagonistic relationships that often arise between designers, engineers and the building trades. As the project developed students learned to ask questions and value the craftsman's skills.

Conceived as an open, loft-like interior oriented toward a series of outdoor living spaces the project privileges experiential conditions that elevate the rituals of everyday life. The house is a modest 1200sf, but the open plan, attention to detail and spa-like bathroom subvert conventional notions of modularized affordable housing and result in a house that feels much larger and more gracious. The expansive interior extends out to define and incorporate a variety of exterior living spaces including a front porch, screened porch, back patio and courtyard. Programmatically, this extension takes advantage of the temperate climate to expand the visual and functional limits of the home into a cohesive domestic landscape.



Figure 7: Hands-on Education

Participating students were immersed in the complexities of a small, but complex project. Working from the initial, conceptual stage through construction documents and finally to the full-scale construction every aspect of the project was designed and actually built by the students, (Figure. 7). This includes all foundation work, masonry, steel fabrication, framing, and landscaping. Through the process of working in the field, meeting with the city's building and zoning officials, interacting with the trades, and learning to confront/overcome logistical hurdles in real time, students encountered both the agony and ecstasy of making architecture at full-scale. The experience exposed students to the act of construction as a fundamental component of critical design practice.

Students began design work in August, moved through the construction documents phase in October, built a full-scale mock-up in November and began construction in December. Eighty percent of the construction took place in a warehouse 200 miles from the site, (Figure. 8). This included all of the framing, interior finishes, roofing, windows and doors, plumbing, and electrical work as well as the majority of the exterior skin. Exceptions included the interior and exterior finishes at the joints between the modules and the foundation, which was prepared on-site. The house is composed of the three interior modules and one porch module that all measure 35ft in length. Three of the modules, including the porch, are 12ft wide and one is 14ft wide.



Figure 8: PreFab Warehouse

Over two days in April the four modules were prepared for transit, rolled out of the warehouse and loaded onto trailers. On the third day all of the modules departed Fayetteville, AR at 645am for the 210 mile journey to Little Rock, AR where they were installed by crane on a site-built CMU stem wall, (Figure. 9) Installation was completed at 3pm and there was no damage to any component or surface



Figure 9: Prefab module in transit

The breadth of experience gained by the participating students is difficult to encapsulate and even more difficult to compare with a traditional studio-based design education or undergraduate theses. In addition to taking a project from schematic design all the way through construction documents, detailing, prototyping and final construction students were engaged in all of the parallel disciplinary skills demanded in contemporary, critical practice.

Conclusion

In addition to the material and construction lessons other, latent, forms of learning are embedded in the design-build educational model. While the images and acts of construction and production dominate the publicity material as the aesthetic seduction overwhelms the minutia of budget spreadsheets, client meetings, or legal contracts, these under-appreciated operational minutia carry a pedagogical content equal to and potentially greater than the haptic lessons embedded in making. The processes involved with project management, material acquisition and consultant coordination are seldom addressed in an academic setting, but these fundamental components, common to any architectural endeavor, offer ample opportunities for skill development in communication, coordination, planning and negotiation.

The examples provided suggest the need for more new and inventive alternatives that promote experimental intelligence and prepare students to excel at the highest levels of contemporary practice.

Endnotes

- 1 "What is Design-Build?" *About DBIA. Design-Build Institute of America*. n.d. Web. 18 May 2012. <http://www.dbia.org/about/designbuild/>
- 2 William J. Carpenter, *Learning by Building: Design and Construction in Architectural Education*, p8. (Wiley, 1997)
- 3 Ibid
- 4 Andrea Dean, "Samuel Mockbee: A Life's Work", *Architectural Record* (June, 2004)
- 5 W. Geoff Gjertson, "House Divided: Challenges to Design/Build from Within", *ACSA News*, p. 23-35(February 2012)
- 6 Bryan Mackay-Lyons, *Ghost: Building an Architectural Vision*, p. 135 and 138 (Princeton Architectural Press, 2008)
- 7 Bryan Mackay-Lyons, *Ghost: Building an Architectural Vision*, p. 46 (2008)
- 8 William Sarnecky, "Building a Material Culture in Dubai." *Journal of Architectural Education* 65.2: p80-88.
- 9 Ibid

Biography

Prof. Hughes directs the ongoing "Tectonic Landscapes Initiative", which focuses on small, unremarkable, and often forgotten urban places adjacent to the lives of underserved people. Located in the boundary between architecture and landscape these projects seek to create experiential delight out of small-scale design opportunities. Hughes refined his vision of full-scale, design-build pedagogy while teaching at Cornell University, the University of New Mexico, the University of Colorado, and the University of Arkansas before moving to the American Univ. of Sharjah where he is currently the Head of the Department of Architecture.

DESIGN NEGOTIATIONS

KERSTIN THOMPSON
RMIT, MONASH AND VUW UNIVERSITY
& KERSTIN THOMPSON ARCHITECTS

**DESIGNING/
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CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

ABSTRACT

The design studio has, more often than not, been structured around the generation and delivery of the individual and autonomous project. While studio participants may have a common problem around which they focus their individual efforts the expectation is that they are working alone or at best parallel to their colleagues. This reinforces unrealistic and problematic expectations that are then taken to the workforce.

A series of studios that have been undertaken at RMIT and more recently VUW have challenged this mode of teaching and learning, and ultimately key assumptions around architectural practice, by instead emphasising the negotiated and collaborative approach that is fundamental to effective design practice, whether in the context of the school or architectural office. This paper will present examples of these studios to demonstrate how an alternative methodology for the design studio has considerable consequences for both modes of practice and design outcomes; how a shift from individual design generation to one that involves team work and collaboration, negotiation and responsibility to a group agenda can expand the consequences of the design outcome. It prioritises the architectural project as relational and connective. The interest is in emphasising architecture's role as 'link' rather than simply 'object' it also offers a counter argument to the reduction of architecture to merely the 'iconic' in the fashioning of our cities.

The reality is that most design practitioners work in groups, across a range of disciplines and between a number of parties with very different, often conflicting, agendas. The success of a project will rely on team players who can work effectively with others and who can work opportunistically with the contingent, the imperfect and the conflicting forces that are at play in any project. These studios seek to simulate this complex and non-linear situation to impart to graduates the kinds of skills and understandings desirable and necessary for more effective design management and ultimately design outcomes. It is also predicated on fostering an appreciation for the necessarily interrelated efforts by many people rather than the sole heroic genius that is essential to the delivery of quality projects in the built environment.

INTRODUCTION

This paper is a study in relations – between the people who are the various players in the making and delivery of a project, between their actions connected through the process of design and between the buildings that are the outcome of this process.

Just as the design process of current practice is rarely a solo activity so the architectural product of design is rarely outside of a context, a situation composed of, forged by multiple kinds of relationships.

Yet the design studio is often focused on the individual stand-alone project divorced from its situation and designed by the single author, unrealistically exempt from the problematics of other interested parties, or the demands of the existing conditions of place.¹ It seems that this kind of focus fails to engage with, and prepare graduates for, the actualities of current practice.

What kinds of pedagogies might better prepare graduates for future practice that will likely be collaborative, integrated and negotiated? What formats for design studios can emphasise buildings and landscapes as integrated, situated, relational and connective?

Since 2004 I have as an educator taken lessons from practice to the academy and devised design studios that enable students to appreciate the 'game' that is practice. In these studios I encourage the deployment of the kinds of skills they will require to revel in and improvise with the messy, changeable, imperfect state that is practice, and most importantly to find tactics to elicit from this state design integrity and value. These studios have therefore sought ways to use the elements *out of ones control* as in fact a source of architectural opportunity and empowerment.

Parallel and complementary to this *process* of design is an interest in architecture as necessarily connective and relational. In the practice of KTA this interest is pursued through an emphasis on the role of buildings as interval and link over icon. Napier Street housing is an early example of this and more recently four projects for Victoria Police, treated as a series, have collectively pursued this idea that architecture is primarily 'connective' and 'relational'.² This position offers a counter argument to the reduction of architecture to merely the 'iconic' in the fashioning of our cities. Since

icons do not necessarily produce the fabric that holds a city or suburb together there is therefore the need to direct architectural effort to producing quality 'b' grade or interval buildings – a general competency of the stuff in between the architectural highlights. These studios respond to this need by focussing on this in between b grade stuff. They consider the legacy that these buildings leave collectively that is arguably greater than the one-off or signature building, and place greater demands on the individual building in so far as it contributes to the composite quality of our built environments. If as this paper contends the design method and the design outcome are inextricably linked then this emphasis on the quality b grade or interval building requires a working method that deemphasizes the singular and disconnected arch object; that foregrounds the necessarily negotiated practice that is architecture.

The following discussion of some case studies – four design studios undertaken at RMIT and VUW Universities since 2004 - demonstrate this link between design process and design product and more broadly the learning opportunities of taking the contingency of practice to the academy.

CASE STUDIES

Case study 1 - ADJACENCIES 1

Adjacencies 1 was held at RMIT in 2004 with 3rd to 5th year students.

Key themes for design exploration were:

Adjacency – lying near, contiguous to;

Relativity – having mutual relations, corresponding in some way, related to each other; not having absolute existence but conditioned by relation to;

Contingency – of uncertain occurrence; fortuitous; incidental to; true only under existing or specified conditions; conditional or dependent.

It comprised of three projects each one increasing the degree of variables and the degree of interfacing required with neighbours.

Project 1 – simple infill.

Participants developed a small house between two existing structures. This was completed individually.

Project 2 – row housing.

Participants developed a unit within a row house complex in relation to and designed simultaneously with the one/two adjacent sites of other participants. (Figure 1)

One exercise for this project was a speed esquisse. Held over a two week period each participant was given 24 hours to design their row house, relative to the one that preceded it, and then pass the 'chain' on by email to the next student who added their portion and so on. An architectural version of heads, bodies, tails.

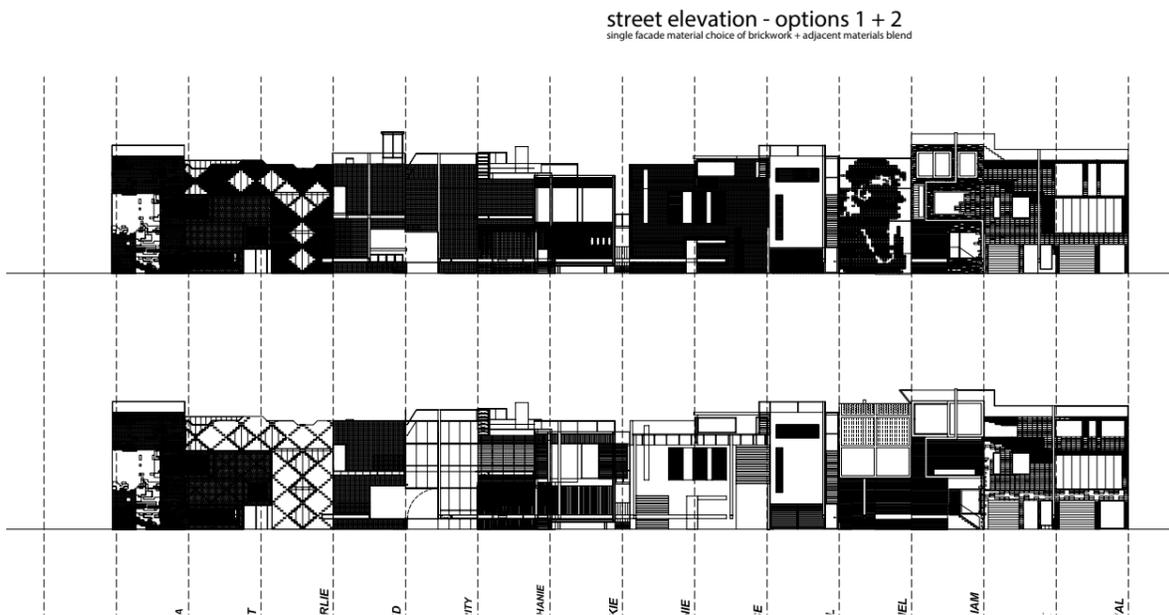


Figure 1: Composite elevation from a row housing exercise in Adjacencies 1.

Project 3 – high-density block

As a group participants developed a strategy for subdividing a larger site - this time an entire city block in Melbourne's CBD - and then designed a portion of it relative to adjacent portions. This project required the most complex interfacing - with multiple neighbours - and with the increased difficulty of having to frequently adapt one's own design relative to the numerous changes made by neighbours. (Figure 2)

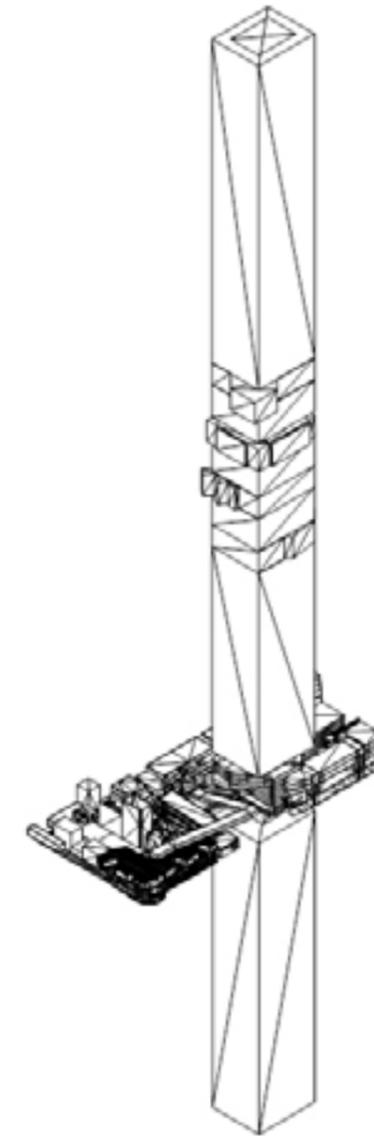


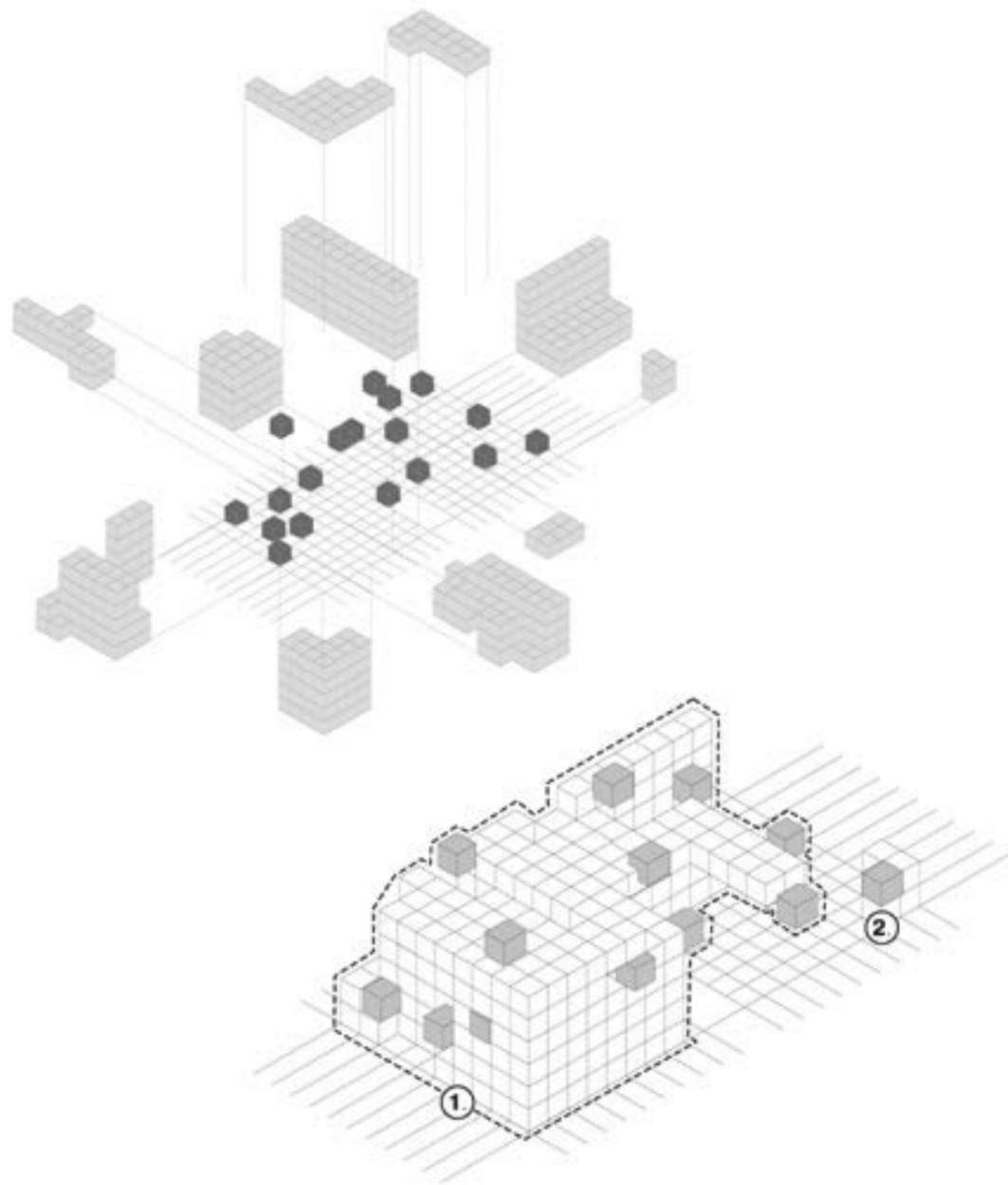
Figure 2: Composite model of high density block exercise from adjacencies 1

Projects 2 and 3 also required participants to develop what rules might guide the relationships of the process and the architecture.

Since their individual designs for these projects were required to be integrated within a composite group drawing the group had to establish drawing, model and other protocols to facilitate the coordination and integration of the individual effort into the collective outcome. One of the participants Charity Edwards effectively became the project manager overseeing the integration of the various projects within the composite. Her own outputs included a project archive of group work that included her diagramming and recording of each participant's design intent. (Figure 3)

Charity: service, infrastructure, systems, record, collation

performance: This project marks a shift away from issues of representation to engage architecture as a material practice.



Service considerations:

1. consolidated volume - minimise connections and share infrastructure (how to resolve conflicts?)
2. isolated objects....consider stand-alone servicing or borrow infrastructure from outside site volume

Case study 2 - ADJACENCIES 2

Adjacencies 2 was held at RMIT in 2006 with 3rd to 5th year students.

Building on the lessons from *Adjacencies 1* this studio also worked with contingency, relativity and adjacency as key concepts. This time Melbourne's Docklands was the area to which these concepts were applied which seemed pertinent since Docklands exemplifies exactly the kind of failed process and design outcome that can be attributed to the lack of consideration of exactly these concepts. Participants were asked to explore how the masterplan process can be structured to exploit productively the many hands or parties to large scale development of this kind: and how to orchestrate the incremental implementation of a masterplan. They also explored opportunities for infill; the curation of built form across a precinct; the relationship between land parcel size, pattern and grain and built outcome. More broadly the studio sought to understand how a better fit between the individual buildings and landscape of a precinct: and between precincts can be facilitated through a process of explicitly negotiated design.

As a group they generated a range of masterplans and sub division options. They also established a list of desirable programs. Then each participant developed a proposal for a site within the group precinct. They were required to design simultaneously and relative to each other so that the buildings - formally, programmatically, materially, and so on - were mutually defining of and complimentary to one another. The goal was to design a rich urban fabric that addressed some of the problems identified in what has been built to date.

After the group had agreed on the configuration of sites and desirable programs for the precinct they were each allocated a site and program through a lucky dip process. (Much trading of sites ensued).

Models in increasing scale were the central mode of testing design outcomes in particular to highlight the relationships between neighbours and the composite quality of the collection, to assess the quality of 'flocking' (Suzuki) that was occurring. The final model at scale 1:100 formed a cityscape of sorts. (Figure 4)

Figure 3: Excerpt from Charity Edward's archive of the group work from Adjacencies 1.



Figure 4: Composite model from Adjacencies 2 testing formal and amenity fit of individual projects with neighbours and overall quality of these as a collection and a precinct.

Case study 3 - CHRISTCHURCH AND CUBA STREET

Christchurch and Cuba Street studios were held at VUW (NZ) in 2011 and 2012 with 4th year students.

They were run across five streams the common intent and content for which was structured and coordinated with Mark Southcombe, Senior lecturer in Architecture Victoria University of Wellington.

Underpinning the brief were issues identified as significant to the community - design sensitivity to heritage and design for the reconstruction of Christchurch. Some client, stakeholder, community, and practice based inputs were incorporated into the studio programs and partnerships with external stakeholders occurred to deliver research outcomes.

Both of these projects took a heritage context as the basis for the design briefs. Individual projects were required to work with a heritage building or design a new building within a heritage context and beside/between existing buildings. Projects were generally infill ones and therefore necessitated attention to neighbouring and adjacent conditions. The immediacy of context inevitably highlights the fit or lack of fit between the architectural proposition and its situation. So again the themes of adjacency and relativity were pertinent. In my stream the further theme of contingency was introduced through students designing relative to each other's projects. So if a neighbour changed their design then one was required to assess the implications for ones own site and revise, adapt accordingly.

The model was again central to the design process and presentation. Participants each built a model of their individual design and this was collated into the group model, which also included the broader context to emphasise the relational quest of the studio and the patterns of development evident in the extended site. (Figure 5&6) Plans, sections and elevations of individual designs were collated into group drawings so this required, as with the previous studios, the establishment and implementation of group protocols and a high degree of coordination and integration of drawings. A 'project manager' was charged with managing the delivery of the group outcomes.

Both projects resulted in a public exhibition and the final models – at 1:100 – were an effective way to communicate and engage with stakeholders and a non-architectural audience. For Christchurch the whole of High Street – a much loved main street virtually destroyed by the earthquake - was built and displayed to the delight of the community who could easily recognize familiar buildings.



Figure 5: Composite model from Christchurch testing formal and amenity fit of individual projects with neighbours and overall quality of these as a collection and a precinct.



Figure 6: Detail of individual project by Declan Burn from composite model of Cuba Street (2013)

(Right) Figure 7: Composite model from Adjacencies 2 testing formal and amenity fit of individual projects with neighbours and overall quality of these as a collection and a precinct.



Similarly for Cuba Street the model of the entire street – measuring approximately 8 metres in length at 1:100 - was constructed and displayed. (Figure 7) These streetscape/neighbourhood models enable the students to test the formal and amenity fit between the individual projects. They also effectively situate the individual design project as contextualised, connected and part of a composite rather than isolated, unrelated and singular. They present architecture as instrumental in the formation of a continuous urban fabric rather than a collection of heroic objects.

Lessons Learned

“Eventually Reynolds realised that particular birds reacted only to those in their immediate vicinity. This gave him the idea that it might be possible to simulate a flocking movement by means of a few simple principles dictating how each crow should react to the birds surrounding it. He came up with the following rules:

Separation: Steer to avoid crowding local flockmates.

Alignment: Steer towards the average heading of local flockmates.

Cohesion: Steer to move towards the average position of local flockmates.

These rules, which are more negative than positive, precautions rather than precepts, entail no large view of the flock’s purpose, nor do they relate to its conduct – that is to say, they are not analogous to an ideology. They merely prescribe the nature of the relations between neighbouring crows.”

- from *Do Android Crows Fly Over the Skies of an Electronic Tokyo?* Akira Suzuki.

Some lessons learned from these design studios:

1) That it is useful to establish rules of engagement for both the design process and the design outcome;

Central to these studios is the development by the group of rules to guide the design outcomes and design outputs. For example in the Adjacencies and Cuba Street studios the group developed built form and performance guidelines to supplement or replace existing development guidelines. These covered aspects such as heights, light access, use and other considerations they deemed essential to define preferred

neighbourly relations and to direct the design outcome towards a common goal such as an increase in density. It has been observed from these studios that the usefulness of these rules in procuring quality design outcomes is influenced by the quality and rigor of the rule.

The key outputs of these studios are composite models and drawings: the collation of all the individual design contributions. In order to achieve a more seamless integration between the various individual projects and these composite outputs, protocols need to be established by the group to guide their eventual ‘fit’ and consistency.

2) That negotiated design practice takes time and commitment;

Deploying this negotiated structure for design teaching adds a significant layer of extra complexity to the design generation process. This in turn has considerable time implications for design tuition. From these studios it can be noted that a high proportion of studio time is required to be spent on group negotiations. These include the review and assessment of individual projects and how effectively they relate to their neighbours; how the built form of a proposal impacts on the immediate and broader context; and what adjustments and design decisions are required to address problems identified by this review of the individual design relative to the collection and the on-going monitoring of these sorts of issues.

3) That severe time constraints can expedite design decision making;

The speed esquisse (such as that referred to in Adjacencies 1 and other similarly intense and truncated design exercises undertaken as part of Cuba Street) produced a comparable amount of design output to that produced over a more extended time period. This may be partially explained by the momentum that is generated in time intense design workshops. Further, as is evident in design practice, the deadline is a useful device for prioritising and structuring the various steps and considerations of the design process. Because of the time constraint, and the need to produce an iteration of the design in a limited amount of time, then decisions about the key direction and design intent of the project cannot be deferred and are required to be acted on immediately. In this regard the thinking is necessarily undertaken through the doing.

4) That the allocation of site and program (rather than the student selecting these) can increase the time available for actual design by directing design effort towards the kinds of variables (such as form, material, tectonic, typology, etc) typically within the realm of architectural control and expertise;

While brief generation, program curation and site selection can be instructive aspects of a design studio these can use up a considerable amount of decision making effort prior to the commencement of the design process. Commonly referred to as "pre-design" activities this trio of considerations towards project definition can be exploited by the reluctant design student to defer the commencement of actual design activity such as the testing, exploration and generation of ideas and design intents through the medium of space utilising drawings and models. By determining some of these factors such as site and program selection from the outset more time early on in the studio can be allocated to develop design intents and expedite the design generation. In turn this provides greater opportunity for undertaking more iterations during the remainder of the semester.

5) That a sense of responsibility to the group can increase the quality and quantity of an individual participant's output;

Within these studios the collective quality of the design output – the neighbourhood – and the representation of this – the composite drawing and/or model - is contingent upon the quality of each participant's individual contribution. The non-performance of a participant is likely to be more noticeably evident in a studio requiring composite outcomes. For instance on a group model of a neighbourhood the missing building is extremely obvious and compromises the group's capacity to test and assess the quality of the fit between neighbours. In this regard the failure of a participant to fully complete a task on time has demonstrable impacts on other participants and the group as a whole. This personal responsibility and accountability to the group appears, on the basis of these studios, to act as a significant incentive to the timely completion of tasks (and in turn assists students to develop their design skills and time management).

6) That project managers can be useful and a range of collaborator types are desirable;

Intrinsic to the performance of group tasks in these studios has been the management of the working relations between the participants and the formal or informal allocation and enactment of roles between them as collaborators. As in practice situations the groups tend to arrange themselves into project finders, minders and grinders. i.e. those who find or drive the project direction, those who oversee the execution of this direction and those who are given tasks to complete towards this execution. These types of studios have foregrounded the need for, and the complexities of, managing the interpersonal relationships between colleagues in design collaboration, the methodologies for the collaborations and the valuable contribution that each type of collaborator brings to the final project.

Also evident in each group has been the surfacing of a project manager. A particularly compelling example of this occurred in Adjacencies 1. A participant self-assigned their role as Project manager. Not only did they drive the design direction of the group and produce an exemplary series of individual design proposals, they were instrumental in coordinating the joint efforts of the group and as archivist recorded the design process of each participant and documented how this contributed to the collective outcome for the site.

7) That the experience of working as a group to: establish project objectives and methodologies; implement these through a combination of individual and group tasks and then coordinate and integrate individual efforts into composite outputs can provide valuable skills directly pertinent to future practice.

These studios have been structured to offer a range of approaches to group and individual work and different degrees of collaboration. For instance some tasks required a group of three or four students to design a section of a street, which was then integrated, with the sections of other groups towards the formation of a neighbourhood. In this scenario the design process was explicitly based on a

collaborative model for design. It was subject to the risks and rewards of collaboration (especially the potential to develop or disguise the less skilled participant's design capabilities and contributions). Other exercises instead required the students to design individually but relative to group objectives. This approach had the benefit of providing a clearly defined (and assessable) individual output but one, which was also, importantly, regulated by and integrated within a collective framework.

In all scenarios participants were given certain conditions – fixed and variable - over which they had limited control such as choice of neighbor and site. The design instruction emphasised how to extract architectural opportunity from these givens and how to effectively negotiate mutually beneficial outcomes with even the seemingly most difficult of neighbours. In this way the design studio mirrors something of the experience of design in practice: the extent to which the success of a design outcome is intrinsically linked to the quality of the designer's response to the constraints of a project.

Conclusion

The design studio has, more often than not, been structured around the generation and delivery of the individual and autonomous project. While studio participants may have a common problem around which they focus their individual efforts the expectation is that they are working alone or at best parallel to their colleagues. This reinforces unrealistic and problematic expectations that are then taken to the workforce.

By contrast these studios that have been undertaken at RMIT and more recently VUW have challenged this mode of teaching and learning, and ultimately key assumptions around architectural practice, by instead emphasising the negotiated and collaborative approach that is fundamental to effective design practice, whether in the context of the school or architectural office. They demonstrate how an alternative methodology for the design studio has considerable consequences for both modes of practice and design outcomes; how a shift from individual design generation to one that involves teamwork and collaboration, negotiation and responsibility to a group agenda can expand the consequences of the design outcome. It can prioritise the architectural project as relational and connective

thereby emphasising architecture's role as 'link' rather than simply 'object'. So it also offers a counter argument to the reduction of architecture to merely the 'iconic' in the fashioning of our cities.

These more negotiated design processes and outcomes add a significant degree of complexity to the design studio and also add to time demands. Over and above the effort required of a participant to complete their component of the design work is the further commitment to participate in the formation and implementation of a broader group agenda. This experience has parallels with that of practice: that projects with more players demand increased time for the effective interfacing, coordination and synthesis of information.

But this paper contends that the extra effort is justified because the reality is that most design practitioners work in groups, across a range of disciplines and between a number of parties with very different, often conflicting, agendas. The success of a project, of future practice, will rely on team players who can work effectively with others and who can work opportunistically with the contingent, the imperfect and the conflicting forces that are at play in any project. These studios seek to simulate this complex and non-linear situation to impart to graduates the kinds of skills and understandings desirable and necessary for more effective design management and ultimately design outcomes. It is also predicated on fostering an appreciation for the necessarily interrelated efforts by many people rather than the sole genius that is essential to the delivery of quality projects in the built environment.

Key Terms For Design Negotiations/Negotiated Design

Interface

v. Interact with another system, person, etc.

Integrate

v. combine with another to form a whole; bring into equal participation in a group

Coordinate

v. bring the elements of (a complex activity or organization) into a harmonious or efficient relationship

Negotiate

v. obtain or bring about by discussion; find a way over or through (an obstacle or difficult route)

Improvise

v. create and perform spontaneously or without preparation; produce or make (something) from whatever is available

Collaborate

v. work jointly on a activity or project; cooperate traitorously with an enemy

Relate

v. make or show a connection between

Situate

v. fix or build in a certain place or position

ad. Put in context; describe the circumstances surrounding (something)

Regulate

v. control (something especially a business activity) by means of rules and regulations

Guide

v. Direct or influence the behavior or development of

Subjugate

v. bring under domination or control; make someone or something subordinate to

Contribute

v. give in order to help achieve or provide something

Responsibility

the state or fact of having a duty to deal with something or of having control over someone;

the state or fact of being accountable or to blame for something

Contingent

Ad. Subject to chance; occurring or existing only if (certain circumstances) are the case, dependent on;

n. a group of people sharing a common feature, forming part of a larger group.

Endnotes

- 1 An example of the default design studio, particularly at the upper levels of a course, is the fourth year capstone project. A common brief and site is allocated to students and they spend the semester developing their individual response to this brief. In my role as critic for the final review of these kinds of projects, at Australian and New Zealand schools, I have observed that it is common for the resultant projects to focus on the brief at the expense of detailed site considerations. The site and broader context is more often than not poorly represented and understood. Further, the project variables are limited to site and brief and remain unchanged for the duration of the semester. So the opportunity for introducing a more complex set of variables and tensions into the process of design is restricted. The overwhelming majority of design studios continue to be undertaken as sole authors. For example a current survey of RMIT's upper pool studios reveals that of the 20 on offer only about 20% involve group work.
- 2 The use here of the terms *relational* and *connective* pertain to an architecture that's meaning and effect is generated and experienced with reference to an existing situation. Some parallels may be drawn between context and built outcome. These may be formal, material, typological, cultural, from both permanent or ephemeral aspects of the situation, etc. A relational or connective architecture will demonstrate resonance with and form relations between these existing traits and may use continuity or discontinuity to do so. The crucial point is that the architecture explicitly has meaning and effect through its relationship to its situation.

Biography

Kerstin Thompson is Principal of Kerstin Thompson Architects – a Melbourne based architecture, landscape and urban design practice with projects in Australia and New Zealand. She is also Professor of Design in Architecture at VUW and Adjunct Professor at Monash and RMIT Universities. Her work for both public and private clients has received numerous awards and local and international recognition through publication and exhibition. Recent projects include the Monash University Museum of Art, the Carrum Downs 24 hour police station and the Big Hill House. The practice focus is on architecture as a civic endeavor with an emphasis on the users' experience and enjoyment of place.

BEHAVIORAL COMPOSITES AND ROBOTIC FABRICATION

ROLAND SNOOKS
RMIT UNIVERSITY & KOKKUGIA

**DESIGNING/
EDUCATION**
CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

ABSTRACT

The design studio offers a unique platform to synthesize emerging trajectories of research in algorithmic design, material innovation and fabrication that are arising from a complex systems approach to design and formation. The contemporary conceptualization of form has shifted from a stable macro-scale understanding to a focus on the complex processes that underlie formation. The micro-scale local interactions of complex systems provide the basis to posit a behavioral strategy of design that has been interrogated through both practice and the academic design studio.

Architecture is inextricably tied to the tools of design and their feedback with the materials and techniques of construction. A new hacker culture is emerging with custom robots and end-arm-tools being designed by architecture students, which is opening up a new space of design experimentation. The research studio operates as a unique platform for exploring the interaction of these robotic tools and computational design.

Engaging with materials and fabrication within the design studio necessitates working at a 1:1 scale and foregrounds the prototype as the critical medium for the studio. Over the past 2 years I have been working with students within the design studio to design and fabricate composite fiber prototypes, developing a strategy I describe as behavioral composites. This behavioral strategy draws on the logic of swarm intelligence and operates through the self-organisation of multi-agent systems. Simple architectural decisions relating to form, organization, tectonics, structure, ornament, material and fabrication are encoded into a distributed system of autonomous computation agents. The interaction of these agents at a local-scale, give rise to the self-organisation of a macro-scale design intent and an emergent process of formation. The material reification of this micro-scale design process requires a shift from designing the composition of architectural elements, to the self-organisation of matter within composite materials.

BEHAVIORAL COMPOSITES AND ROBOTIC FABRICATION

The design studio offers a unique platform to synthesize emerging trajectories of research in algorithmic design, material innovation and fabrication that are arising from a complex systems approach to design and formation. The contemporary conceptualization of form has shifted from a stable macro-scale understanding to a focus on the complex processes that underlie formation. The micro-scale local interactions of complex systems provide the basis to posit a behavioral strategy of design that has been interrogated through both practice and the academic design studio. Specifically this research looks at the intersection of multi-agent algorithmic design, composite-fiber materials and robotic fabrication. The integration between these often-discrete aspects of architecture is producing new tectonic and formal possibilities as well as a restructuring of the relationship of design and technical experimentation. This behavioral strategy is explored here through two specific aspects of research described as: *fibrous assemblages* and *behavioral composites*, which have been developed through my practice Kokkugia¹ and interrogated within the academic studio.

Architecture is inextricably tied to the tools of design and their feedback with the materials and techniques of construction. While computational has made a significant impact on architectural design and the academic studio over several decades², it is the accessibility of new robotic fabrication equipment and allied material innovation that is generating a new space of design experimentation. This new space is not simply defined by a new set of fabrication constraints and opportunities³. Instead it is the behavior of the robot and its feedback to design procedures that is creating new possibilities. Within generative design processes the behavior of the algorithm plays a critical role in the character of form and articulation, this role of the algorithm is now being extended to that of the behavior of the robot and its tooling.

The research studio operates as a unique platform for exploring the interaction of computational design and robotic fabrication, where neither are situated in the isolation of technical courses. While robotics is often considered to be a highly specialized field, a new hacker culture is emerging with custom robots and end-arm-tools being designed by architecture students in parallel to architecture projects. In this emerging culture, architectural design and tool design are in a constant feedback loop in which the two co-evolve. This culture is beginning to emerge at RMIT University where this semester students have been building new tools to be operated

with a Kuka industrial robot for the fabrication of architectural prototypes. These are predominantly direct deposition processes, where material is accreted rather than milled, through techniques such as: spitting, spraying, taping and carving. The intention is that neither the architectural prototype nor the tool drives the process, but they each inform the design of the other.

Engaging with materials and fabrication within the design studio necessitates working at a 1:1 scale and foregrounds the prototype as the critical medium for the studio. Over the past 2 years I have been working with students within the design studio and through Kokkugia to design and fabricate composite fiber prototypes, developing a strategy I describe as *behavioral composites*. A symbiotic relationship has developed between the expertise of the office and the experimental platform of the studio. With 12 students collaborating on a single design and fabrication project, the studio is a useful platform for testing the interaction of a number of technically difficult experiments or research trajectories such as algorithmic and robotic approaches.

The behavioral strategy that is the basis of this work draws on the logic of *Swarm Intelligence*⁴ and operates through the self-organisation of multi-agent algorithms⁵. Simple architectural decisions relating to form, organization, tectonics, structure, ornament, material and fabrication are encoded into a distributed system of autonomous computation agents. The interaction of these agents at a micro-scale give rise to the self-organisation of a macro-scale design intent and an emergent process of formation. The material reification of this process requires a shift from designing the composition of architectural elements, to the self-organisation of matter within composite materials. Through this research two related strategies have been developed, *fibrous assemblages* and *behavioral composites*.

FIBROUS ASSEMBLAGES

Materials are not homogenous bodies of matter, but instead are assembled from complex micro-scale elements, forming intricate structures, which imbue materials with their bias and specific capacities. This understanding is useful for the architect when considering form and formation. Rather than the creation of an abstract form imposed upon matter, formation can be understood as a process of interaction at the micro-scale that generates heterogeneous assemblages. This understanding of matter has been vividly rendered with the advent of the electron microscope - imagery that has been a useful conceptual and aesthetic reference in this work.

An understanding of material as an assemblage of micro-scale elements is critical to the conceptualization of *fibrous assemblages*, which is a multi-agent strategy encoding design decisions within the geometry of strands. This strategy draws upon Frei Otto's self-organising woolen strand experiments⁶, but extends the agency of organization from localized bundling based on surface energy minimization (of water), to a complex set of architectural design decisions or behaviors.

While *behavioral formation* focuses design intent at a micro-level, the scale of this operation becomes a critical question. Rather than a concern for the assemblage of discrete elements (steel section beams, mullions, glazing units, prefabricated concrete panels etc), a design process focused on *fibrous assemblages* would have to consider the individual agent to be at the sub-element level – or at least at the level of the elements that assemble into composite materials.



Figure 1: Fibrous House, 2012, form study

Fibrous assemblages emerge from the local interaction of strands, in the formation of architectural form, surface, structure and ornament. Fibrous assemblages can be deployed either at the scale of a single architectural concern, such as structure or ornament, or they can operate across these scales exhibiting for example structural or ornamental behavior depending on the specific local conditions. Taken to its logical extreme this design strategy offers an approach to creating all facets of architecture from a single geometric type – the strand. The Fibrous House project is an attempt to conceptualise this capacity of *fibrous assemblages* and to create complex *polyscalar* geometry. This project was set up as a hybrid of practice and academia, where the academic studio at Texas A&M was set up as an extension of

Kokkugia. A student from Texas A&M worked in the office for several months to develop an understanding of specific design processes and techniques, before returning to the university to lead the project team/studio. The project was structured such that Kokkugia directed the design, while the students undertook the experiments, modeling and prototyping.

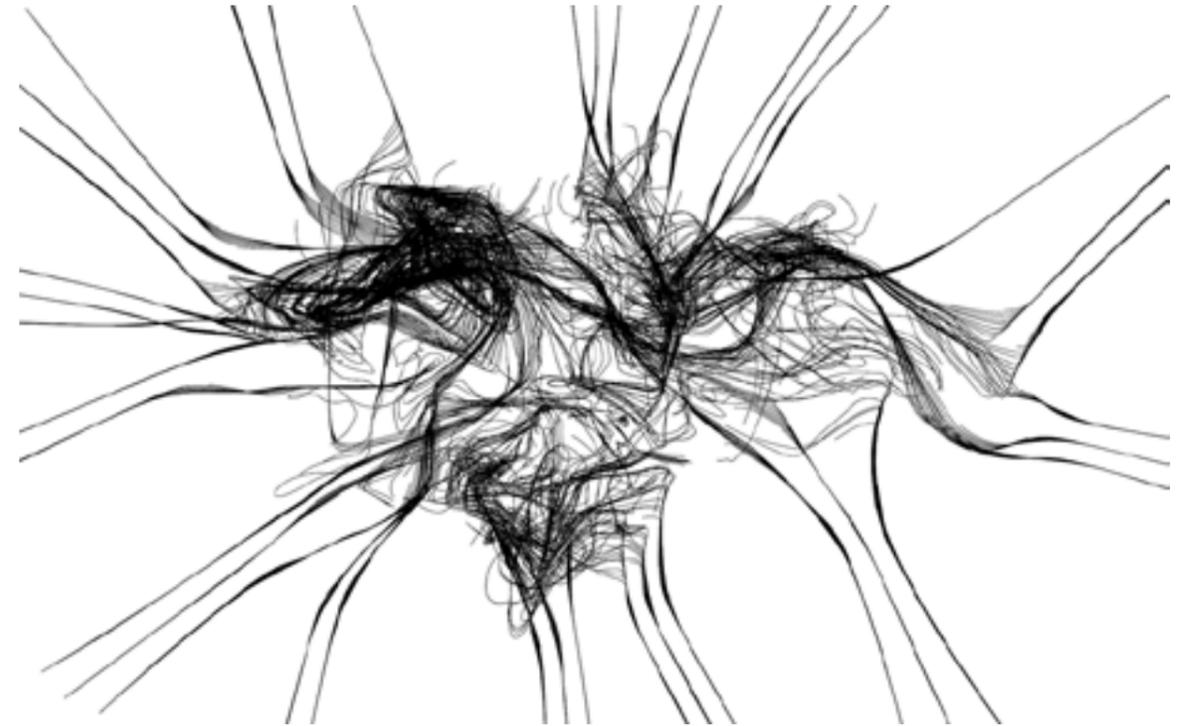


Figure 2: Fibrous House, 2012, agent strands

Fibrous assemblages are structurally non-linear. Hierarchies – rather than being prescribed as primary, secondary and tertiary elements – emerge from within *fibrous assemblages* as variation in intensity, capacity and density. *Fibrous assemblages* resist being categorized as either surfaces or strands. Strands bundle and weave to form surfaces, while surfaces delaminate into strands. Likewise, there is little distinction between skin and structure, instead each fiber operates structurally within a redundant, highly intricate and ornamental assemblage. Kokkugia's Fibrous Tower Studies and Fibrous House explore this at two scales. The bundled fibers of the tower shell defines enclosure, resolves structure and generates ornamental affects, however within this population of fibers there is a uniform rule set, there is no separation of the elements into structure, skin or ornament. Instead the fibers negotiate between these as criteria or imperatives - as behaviors embedded within each fiber. While the towers are designed in monolithic concrete, the Fibrous House explores the excessive matting of composite fibers at the micro-scale as a strategy for generating surface.

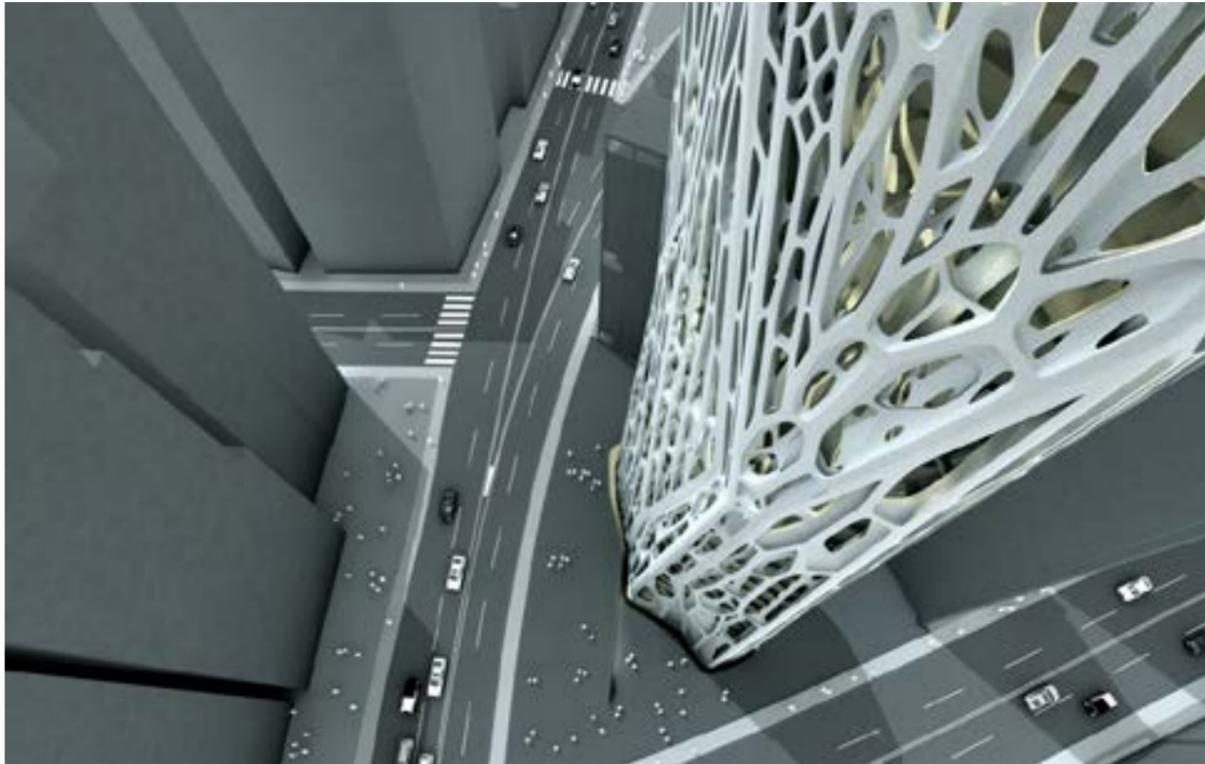


Figure 3: Fibrous Tower 1, 2008



Figure 4: Fibrous Tower 1, 2008, section

Fibrous assemblages have a complicated relationship to surface. While fibers can matt together to generate surface, creating a coherent surface topology is very difficult without relying on surface as an input or attractor to the system. In other words, it is very difficult to generate surfaces with lines without a predefined surface to adhere to. However this is precisely the appeal of these geometries, they resist the simple geometric expression of a surface and instead maintain a fuzziness, they blur the boundaries between surface and line, and unravel in complex and subtle ways.



Figure 5: Fibrous Assemblages drawing (University of Pennsylvania: directed by Roland Snooks, students: Josef Musil, Be Han, Michael Gloudeman)

Fibrous assemblages rely on a sufficiently large population of elements to enable an emergent expression – that of the assemblage rather than the expression of the individual line. While fibrous assemblages often exhibit interesting local characteristics through the bundling and weaving of fibers, it is the expression of the self-organisation of the system as a whole that is most compelling – the emergence of complex order readable at the macro-scale. Consequently a deliberate attempt has been made in this recent research to increase the population of fibers with the belief that at higher populations another level of qualities and characteristics emerge. This is perhaps most evident in the fibrous assemblage drawings. The population of the strands in the Fibrous Tower studies, renders the strands as subservient to the surface geometry of the tower⁷. A dominant expression of the emergent whole is only legible in projects such as the Fibrous House where surface and form are inseparable from the fibers.

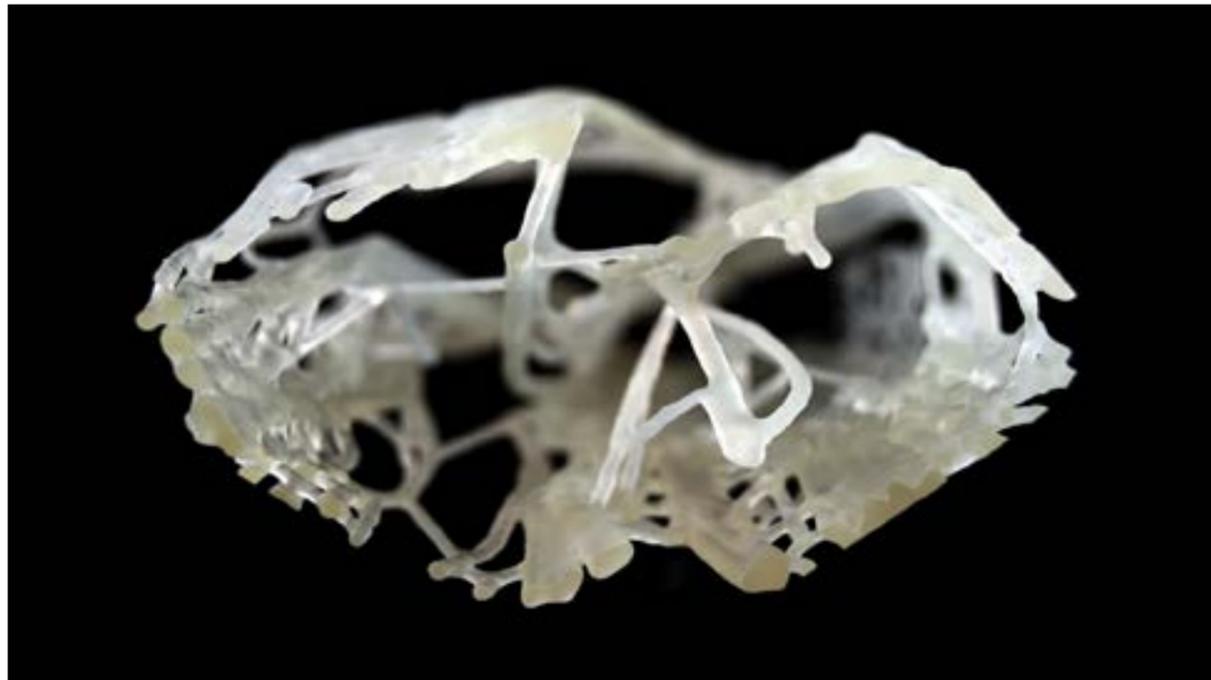


Figure 6: Fibrous Tower 2, 2009 model



Figure 7: Fibrous House, 2012, detail

BEHAVIORAL COMPOSITES

An argument, and indeed motivation, for composite fiber construction is frequently premised on the desire for efficiency and structural performance. In contrast, the argument posited here is based on the ability of composite materials to negotiate competing design intentions within a continuous whole and an interest in the expressive nature of these generative assemblages. The premise of *behavioral formation* is to encode design decisions at the micro-scale, and to allow complex architectural order to emerge at the macro-scale. Composite fiber fabrication enables these micro-scale design decisions to occur at the level of the individual fiber.

Within fibrous assemblages structure or any other quantifiable criteria are not the drivers of formation, but merely principles that condition design decisions. Likewise material behavior can be considered an input but not a principle generator of form. Material properties such as flexibility and elasticity can be algorithmically encoded within geometry. The interaction of these parameters with more expressive design behaviors enables a highly volatile generative process that simultaneously responds to, or is conditioned by, material behavior and more pragmatic constraints.

The tools for the fabrication of fibrous composites are still largely emerging. Sophisticated robotic fiber placement techniques are being utilized within the aerospace and yachting industries, however these techniques are primarily geared to creating uniform surfaces as opposed to the complex and intricate geometry of the fibrous assemblages posited here.

A prototype, rather than be reduced to a test of the actual, can be considered as a tool for imagining the future. As such the prototype, or architectural precursor, is often a fake, rooted in the current construction paradigm, straining to evocatively suggest a future architectural vision – in much the same way that Corbusier's brick Villa Savoye masquerades as a concrete vision of modernism. We are now in a position to imagine a robotically generated fibrous architecture, but left to partially handcraft its prototypes. The Fibrous House explores the implications of fibrous assemblages and behavioral composites at the level of the prototype. This prototype is less an attempt to reify the digital model and is more concerned with the fabrication of the emergent characteristics of the behavioral algorithm. Designed through an iterative feedback loop between material experiments and digital generative processes, this prototype was fabricated through a similarly messy interaction of CNC forming and manual craftsmanship.



Figure 8: Fibrous House, 2012, composite fiber prototype

The *swarmBodies* and *prototyping complexity* installations are prototypes, a material test of the geometries we have been designing digitally. They are not objects of architecture in themselves; instead they are a prototype for a larger architectural strategy that has been tested in the Flinders Street Station and Aalto University projects. The prototyping complexity installation was developed through an RMIT University design studio, which focused less on algorithmic sophistication in favor of exploring material and fabrication options for constructing these complex geometries. The *swarmBodies* installation applies a singular algorithmic strategy in the design of form, structure and ornament. The design process consists of a swarm of components or bodies that interact to generate a coherent surface (manifold topology), through an intricate weave of agent bodies. These bodies provide a structural network, and define a clear surface topology. The intricacy of the bodies is inherently ornamental but is inseparable from the projects structural logic. The form of the project is influenced by both the bottom-up swarm behavior of the bodies and their top-down starting positions, while the double curvature of the form is intentionally structural, giving stiffness to the surface.

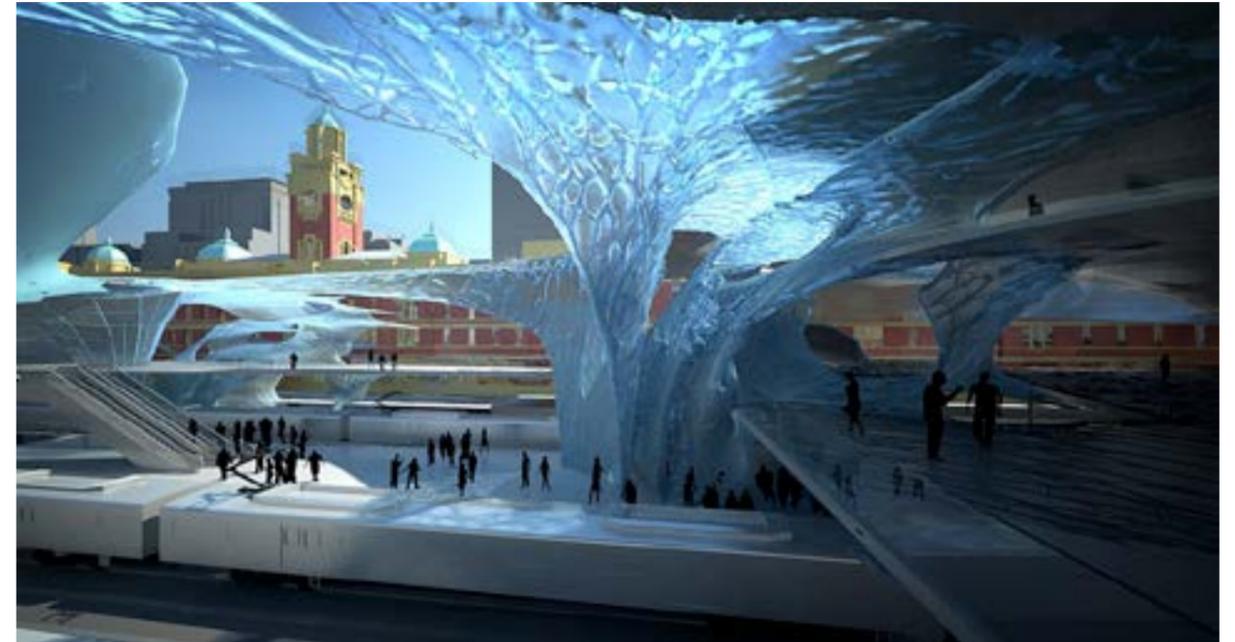


Figure 9: Flinders Street Station project, 2012



Figure 10: Aalto University project, 2012, glass fiber composite skylight study

The two installations are fabricated as fiber composites, with a fiberglass surface and polyurethane foam bodies sandwiched within the surface - consequently they are composites at two scales. Both the surface and the bodies are flexible, but composited together they create a surprisingly stiff surface due to the small-scale ridges and local thickening that the foam bodies impart on the fiber composite surface.



Figure 11: swarmBodies installation, 2013



Figure 12: swarmBodies installation, 2013 detail



Figure 13: RMIT Prototyping Complexity Studio, installation, 2013.

The architecture that is being argued for here is possible, but not feasible, without a change in construction paradigm. While imagining this architecture through prototypes and the robotic strategies arising from a hacker culture is important, the ambitions of this work will ultimately be realized through industrial scale robotic strategies. The shift to robotic techniques is not driven by a desire for the seamless perfection of the current generation of fiber-placement technologies such as those used in the construction of aircraft, but instead by a desire to reify the intricacy and intensity of complex systems at a large scale. This intricacy, the emergent outcome of *behavioral formation*, doesn't require a precise replication of the digital model, but instead a precise translation of the algorithmic behaviors into fabrication operations – *behavioral fabrication*. The emergent characteristics are more important than the exact dimension of topology of the geometry. This is an argument to compress design and fabrication into a single behavioral operation – one premised on stigmergic feedback between the form and the instrument of formation.

Stigmergy describes a self-organising system that operates through the indirect interaction of agents.⁸ Stigmergic systems are common in social insects such as termite colonies, where the termites interact collectively through their operations on the termite mound. This logic provides a powerful tool of self-organised fabrication where the generative algorithm or decision-making is encoded directly as robotic operations triggered by the local conditions of the material it is fabricating. This logic enables volatility to enter into the fabrication process, where volatile material behavior interacts with precise algorithmic logic.

The last few years has witnessed the adoption of robotics within progressive architecture schools as the possibilities inherent within the tighter integration of design and construction begin to evolve. The hacker culture of custom-built machines, end-arm tooling and the misappropriation of sophisticated robotics in the service of design, rather than simply fabrication, is gaining momentum⁹. In these experiments it is the behavior of the machine, with all its hacked imperfections, that is critical to the characteristics of the generated architecture.



Figure 14: Kuka industrial robot at RMIT Design Hub

The feedback between material behavior, robotic logic and non-linear algorithmic techniques are beginning to coalesce into a coherent and realizable design/fabrication approach. The instrumentalisation of high population multi-agent models in the design of composite materials is blurring fundamental hierarchical distinctions within architecture. These behavioral composites dissolve tectonic hierarchies in generating a continuous and irreducible complex assemblage. This integration of algorithmic design and robotic fabrication has the potential to reform the nature of the design studio and foreground the prototype as the primary architectural design experiment

Endnotes

- 1 Kokkugia is an experimental architectural practice led by Roland Snooks and Robert Stuart-Smith.
- 2 Although computation has been experimented with in architecture since the 1960's, it can be considered that computation began to have an important impact on design studios since the advent of the paperless studio at Columbia GSAPP in the mid 1990's.
- 3 A distinction is made here between robots used simply as fabrication tools, divorced of design, which fabricate that which is already designed, and robotics used in the design process. It should also be noted that an industrial robot is rarely as precise or efficient as custom built CNC milling, bending, forming machines, but what makes them interesting is the ability to customise them.
- 4 *Swarm Intelligence* describes the collective behavior that emerges from the interaction of a population of autonomous agents. Commonly cited biological examples include the flocking of birds, schooling of fish and behavior of slime mold. See: Bonabeau, Eric. Theraulaz, Guy. Dorigo Marco. *Swarm Intelligence: From Natural to Artificial Systems*, Oxford University Press, USA, 1999.
- 5 The multi-agent algorithms used in this research are developed from Craig Reynolds *boids algorithm*. Reynolds, C. W. (1987) Flocks, Herds, and Schools: A Distributed Behavioral Model, in *Computer Graphics*, 21(4) (SIGGRAPH '87 Conference Proceedings) pages 25-34.
- 6 Otto, Frei. Rasch, Bodo, *Finding Form*, Fellbach, 1995
- 7 While still subservient to the underlying surface, the population and emergent affects are increased in *Fibrous Tower 2*
- 8 Stigmergy has become a major area of research within swarm intelligence. see: Bonabeau, Eric et al. *Self-Organization in Biological Systems*, Princeton University Press, 2003.
- 9 The increase in experiments in architectural robotics is evident in last years RobArch conference held in Vienna. <http://robarch2014.org/>

Biography

Roland Snooks is a partner of the experimental architecture practice Kokkugia, and teaches architecture at RMIT University, having previously taught at Columbia University, University of Pennsylvania, and SCI-Arc. Roland's design research is focused on emergent design processes – drawing on the logic of swarm intelligence and operating through multi-agent algorithms

DESIGN AS UNDERSTANDING- ILLUSTRATIONS FROM AN ACADEMIC EXPERIMENT

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PROVOCATIVE STUDIO PEDAGOGIES

ABSTRACT

More than 50% of any city in India consists of informal settlements of which majority are slums. Only around 5% of the buildings if not less in India are designed by architects. In practice only a fraction of this 5% is studied and archived, as Amos Rapoport puts it "Architectural Theory and history have traditionally been concerned with the study of monuments. They have emphasized the work of men of genius, the unusual, the rare" and the irony is that majority of a city are "usual". This paper questions the trend of an architect as a designer of spaces for the elite, with reference to an academic experiment¹ conducted from January to May 2013 in three settlements across two states of India.

Often studios try to emphasize on design so much that the students' mind intuitively looks for problems and innovative ways to solve them. This problem solving attitude fails miserably in informal settlements, which majority of Indians call home. The experiment mentioned above started with the question –What if the project is not about finding a problem or suggesting a solution? What if we architects acknowledge the fact that the residents of a settlement are repositories of local knowledge which architects don't have? The result is an extra ordinary outlook on the society as well as on the profession of architecture. The role of an architect changes from that of a designer to a much bigger facilitator of quality life and leaks beyond the boundaries of mere buildings.

This paper illustrates the pedagogical learning outcome of the participatory studio process and the resultant projects. The projects which the students did with active participation of the residents clearly steer away from the normal processes and methods of analysis, so creating a foundation for architecture – UNDERSTANDING, so as to design with the 'other 90 percent'².

“That the new era will bring with it grave and complex challenges with respect to social and functional degradation of many human settlements, characterized by a shortage of housing and urban services for millions of inhabitants and by the increasing exclusion of the designer from projects with a social content. This makes it essential for projects and research conducted in academic institutions to formulate new solutions for the present and the future,”³

states the first point in the ‘UIA/UNESCO charter for Architectural Education’. This emphasis on the formulation of ‘new solutions’ becomes the core of architectural education today, and with it comes the ‘problem seeking attitude’, for which the solution is. The Beaux Art studio type of teaching where the design problem is assigned in the beginning and solution is sought throughout the studio is the most common format in architectural schools today.

The essential lacuna of a problem seeking attitude is the construction of the ‘problem’ itself. Definition of a problem is a highly personal view point which essentially is a historical construct. What one architect may see as a problem may not be so for another architect. Like the ‘Falling Water’ discussion⁴ where one set of architects can argue that a marvelous design came because F L Wright decided to house the Kaufmann family right on the spot which they appreciated; while on the other hand the opposite argument from an environmentally conscious set of architects can be that, the ‘Falling Water’ spoils the serenity of the stream, Kaufmann family liked the stream and construction of ‘Falling Water’ took that spot away from them. While one may or may not support either of the arguments but the idea that problem seeking is a highly personal and biased approach is fairly clear. Similar contradictory problem definitions are quite evident in many other architectural and urban discussions. Slums for instance were considered a problem but post De Soto⁵ this paradigm has changed; similarly modernists thought, the personal motor vehicle as a marvelous invention that changed the way they looked at architecture, while in the contemporary world the personal motor vehicle is seen as a big urban issue, and the list continues.

As the definition of the problem, so will be the solution. Idea of the problem is constructed based on the way the problem-seeker is nurtured, and his/her priorities and values, thus this clearly establishes that the very ‘new solutions’ which ‘UIA/ UNESCO charter for Architectural Education’ and many architectural education system seeks, is biased and baseless. The very basis of innovation for an appropriate solution is skewed and thus an architectural education system based on this will obviously sway the learning outcomes.

If seeking a problem is biased and thus the ‘new solution’ is skewed then the question arises on ‘what then is the role of an architect?’ “Architectural Theory and history have traditionally been concerned with the study of monuments. They have emphasized the work of men of genius, the unusual, the rare”⁶, thus the attitude of the students to produce master pieces rises from what they study. This ‘master piece’ designer attitude was also emphasized by the Beaux Art way of teaching, as the students were usually asked to design monuments⁷. Aspirations to design ‘master pieces’ of the sorts which Tafuri⁸ argues, are manifestations for development of capitalism, which takes away the power of architecture to bring social transformations. This outlook is academically jeopardizing as design is often seen as improvising and adding value to an existing typology, and development of a new typology essentially ends up in sheer mix matching of functions. Innovation gets limited to improvising on what already exists, and this is difficult to overcome as long as we have typology based studios.

Almost every 6th urban Indian lives in a slum⁹, a settlement where usually architectural services never penetrate. With rapid urbanization and the double digit growth rate that India targets, population living in informal settlements are bound to increase. Specific to Delhi, approximately more than 76% of population lives in informal settlements, and this juxtaposed with the fact that accessibility of an architect for the rest 24% is also limited, poses serious concerns about the profession. In the given context, can architects never serve the majority of the population? Is architecture just a profession for the elite and can never make profit by servicing the ordinary? If the answer is yes then there is a serious threat to our urban systems, and if the answer is no then the quest begins.

“How architects construct an understanding of the social world and how that construct affects possibilities for practice and pivotal concerns for architects who seek to challenge the status quo, construct new social formations and new identities, and help reconstruct a viable democratic public life in the face of inexorable forces driving economic growth, destroying global ecology, homogenizing culture, and privatizing the public realm. These questions frame (the) point of departure for reconstructing architecture in the current period.”¹⁰

From January to May 2013, a course on ‘Informal Settlements’¹¹ was held at ‘Sushant School of Art and Architecture’, Gurgaon, India, to explore the above mentioned possibilities. The biggest hurdle in the course was how to conduct it without probing for problems and students deriving innovative solutions. Though an innovative methodology was used, but here, it is not a claim that all answers were sought. The course was based on two basic principles, firstly ‘understanding’ and secondly ‘participation’. Students were divided in three groups and given three sites; Chirag Dilli and Anna Nagar in Delhi and Nathupur in Gurgaon, India (see Figure 1: Map showing the three settlements (Red boundary) in same scale). Chirag Dilli and Nathupur are urban villages; an urban village is a village that got trapped in a city due to urbanization. Urban villages have special development rights under *Lal Dora land* which keeps them out of the ambit of building byelaws. Chirag Dilli is a historical precinct developed because of the residence of a Sufi Saint, while Nathupur was an agrarian village which now sits next to the prime real estate of Cyber city (CBD of Gurgaon). Anna Nagar on the other hand is a slum touching its boundaries with the WHO (World Health Organization) building in Delhi. It should be noted here that all three sites were selected to create interesting juxtapositions, a slum next to WHO, an urban village next to cyber city and another urban village with a 14th century Sufi shrine at its heart, even though this is not implicitly presented to students.



Figure 1: Map showing the three settlements (Red boundary) in same scale

Students were encouraged to engage with the community, which came as a reflection on what Brian Anson pointed out as the problems plaguing the profession,

“pandering to developers and lack of ground roots community communication (which) were a result of a deeply flawed education system.”

Thus now for this course the education system itself was grounded on community communication and participation. Over the course of time, many assignments were done to understand both the living and non-living aspects of the assigned informal settlement and the final assignments¹³ were a student-community initiative. Students were told that the final project is not about finding a solution to a problem; neither has it got an objective. Students were asked to do *‘something’* in the settlement itself and with participation of the community. Thus when architecture students are given the freedom to do anything and think beyond problems of a building, their role completely swayed away from that of a problem seeker and solution provider. The crux of all the three projects without emphasis became to *‘understand’*, to understand much beyond the paradigms of problems and solutions.

Final project was based on student’s understanding and the relationship with the community. Following were the three projects –

First one is *‘Kala Mahotsav’* at Chirag Dilli. *Kala Mahotsav* is a hindi term for art festival. After the whole semester’s site work and interaction with the community, students felt that the settlement is a hidden treasure. A lot of things happen in the settlement but at a city level, it is not visible. The settlement is surrounded by areas which have got established markets and malls, so no one ever visit it. Thus the students decided to do something very spontaneous. One morning the students went to the settlement and one of the group members dressed as a traditional announcer and went around the streets like the *‘Pied Piper’* asking kids to join him. The group gathered at a small open space in the community and were provided with art supplies and asked to do anything they like. Kids as inquisitive they are soon started to explore and the students also became one among them. With the help of the group an installation was exhibited in front of the settlement.



Figure 2: Students working with Chirag Dilli kids to develop an art installation

This innocent act gave them the first hand experience of how public relations and publicity works in an urban area. Chirag Dilli, unlike other examples is a fairly closed society because of a large number of floating population and relatively less networked residents, thus public participation is a difficult task for any professional. Interestingly the students picked up the nuances of public participation, as in a closed society they realized; kids are the entry point for any participatory work. Soon the parents and others on the street started to interact with the students and a bond was established. A trust that can easily be scaled up to a fully fledged participatory project got generated.

Second project was called *‘How I see you’* by the Anna Nagar group. This group after entering the social structure of the slum soon realized that the way they see the settlement is very different from the way the community perceives it. This view point was established on more than one occasion when the community pointed out the spaces they liked which the students have judged to be the most undesirable. Thus

the project was to capture how the youth in the slum see their Sunday. Students arranged digital cameras for the youth of the settlement to shoot their Sunday. Soon they started exploring spaces in the settlement which the students have never experienced, a cycle repair shop that was heart of the young men's interaction, a leakage point on a water pipe which was like a retreat, a railway track which was a personal solitary resort and many such other spaces. Reading of a space and understanding comfort zones are based on the way an architect lives, so it becomes immensely important for a professional to understand his/her client's needs, this understanding would not have been possible unless such an exercise was intuitively carried out.



Figure 3: Student helping the kids of Anna Nagar Slum to learn to shoot the way they look at their spaces

The third project was titled '*Jiski Bhaiwa uski aishwa*' which is in Hindi and it means 'Happiness to those who have a buffalo'. Villagers in Nathupur sold their farm land to a private developer who is making immense amount of profit out of it. Now the villagers know the game and don't want to sell their land anymore. Nathupur village sit next to glass towers of the Cyber City. This background projected a strange aspiration which the students quickly picked up, e.g a shop owner didn't want a bigger shop in future, but a new beauty parlor, and similarly there are other cases.

This led the students to juxtapose the existing with the aspiration. Students found out that like a typical village there are many buffalos in Nathupur too. They juxtaposed the existing buffalos with the aspiration for glamour and arranged for a fashion show for buffalos.

This project led them to persuade the buffalo owners to decorate their buffalos and get them to the nearby ground for a fashion show. For the villagers it sounded very bizarre as they saw no logic in what was happening and students had a tough time convincing them. The interaction started with the women of the house as they take care of the buffalos and soon the students realized that to bring the buffalos out to the ground the male consent was needed. This was a very important social and micro economics lesson that they learned about such communities- namely that women are powerful in their own house but not so much outside the house, where their initiative is often not supported and is at times even mocked at. On the other hand, it was socially acceptable for men to take up risky initiatives outside the premises of the house. When the fashion show started, both the students and the residents could be seen having a participatory dynamics.



Figure 4: Buffalo owners of Nathupur urban village after the event

It is interesting to note that in all the three projects the level of interaction with the community and the depth of understanding seemed to be deeper than what could be achieved through traditional analytical tools or community participation workshops.

This course was conducted parallel to the housing studio, and while the author was not part of the housing studio, understanding of the lives and other nuances of a community indeed had an impact on the way students designed their formal housing projects. One of the examples is shown in Figure 5: One of a student's work - a formal housing studio is trying to create informal spaces (Image Courtesy: Deepanshu Arneja), where the student (*Deepanshu Arneja in this case*) tries to design informal interstitial spaces in his design. This is an example of informality in interstitial spaces (of the many other aspects) that is hard to achieve in a planned settlement. The exterior spaces thus generated are private for the clusters but at the same time are physically connected to the larger movement networks.



Figure 5: One of a student's work - a formal housing studio is trying to create informal spaces (Image Courtesy: Deepanshu Arneja)

The experience with this course leads to believe, that 'understanding without prerequisites' is a more potent methodology to comprehend the complexities of Indian society. This understanding is undoubtedly critical in Indian architectural education. By deeper understanding, an architect realizes that architecture is far beyond the sensual appeasement for human body.

"Much of what we know of institutions, the distribution of power, social relations, cultural values, and everyday life is mediated by built environment. Thus to make architecture is to construct knowledge, to build vision."¹⁴ To contribute for the development of the society, architectural education now should look deeper and understand more so as to be an essential part in the development of societies, and this understanding needs to be more wholesome.

A participatory design approach is particularly interesting at this point of time in India, as most of the new policies for development are promoting participatory approach. Many projects on ground, of which the author has witnessed does the exercise of informing the community rather than participating with the community. E.g. the RAY(Rajiv Awas Yojana), a scheme by the government to in-situ rehabilitate slum dwellers has resulted in public meetings just to inform the community of the designs that architects make in their offices, mostly completely disconnected from the social patterns of the settlement. Similar is the case with 'Local Area Planning' which is part of the master plan of Delhi, where the planning maps are displayed in public for information and no sense of participation is practiced as originally envisioned in the master plan. Though academic experiment being discussed, due to various constraints was just limited to understanding and participation, a further exploration is required to find new ways to design, for then the questions asked in the beginning will have a positive and inspiring reply.

Endnotes

- 1 Nipesh P Narayanan, in *Informal Settlements - Understanding + Interacting* <<http://infoaset2013.wordpress.com/>> [accessed May 2013]
- 2 Phrase in *Design Other 90 Network* <<http://www.designother90.org/>> [accessed 01 July 2013]
- 3 "UIA/UNESCO Charter for Architectural Education", in UNESCO <<http://www.unesco.org/most/uiachart.htm>> [accessed 11 June 2013]
- 4 Resultant of a discussion during one of the studio crits at Sushant School of Art & Architecture, Gurgaon by Dr. Rupinder singh, Thomas Oommen et al. [February 2013]
- 5 Hernando De Soto, *The Other Path: The Economic Answer to Terrorism* (New York: Basic Books, 1989).
- 6 Amos Rapoport, *House Form and Culture* (New Jersey: Pearson Education Limited, 1969).
- 7 Jeffery A Lackney, "Educational Design Institute", in *Mississippi State University* <http://www.edi.msstate.edu/work/pdf/history_studio_based_learning.pdf> [accessed 10 July 2013]
- 8 Manfredo Tafuri, *Architecture and Utopia: Design and Capitalist Development*, illustrated, reprint ed. (Massachusetts: MIT Press, 1976).
- 9 Rukmini Shrinivasan, "17% of urban India lives in slums: Census", *The Times of India*, 22 March 2013.
- 10 Thomas A Dutton and Lian Hurst Mann, eds., *Reconstructing architecture : critical discourses and social practices* (Minnesota : University of Minnesota Press, 1996).
- 11 See endnote 1 for more details.
- 12 Richard Rogers, "Brian Anson obituary: Architect, planner and tireless battler on behalf of the underdog", *The Guardian*, 17 December 2009.
- 13 This paper discusses only the final project. For other assignments see endnote 1
- 14 Thomas A Dutton and Lian Hurst Mann, eds., *Reconstructing architecture : critical discourses and social practices* (Minnesota : University of Minnesota Press, 1996)

Biography

Nipesh P Narayanan is a registered Architect & Urban Designer from India, whose keen interest is in inculcating social equity in rapidly urbanizing agglomerations. He is currently Assistant Professor at Sushant School of Art and Architecture, Gurgaon, India. He takes studios based on cultural understanding and reinterpretation of functional notions. Apart from teaching undergraduate students he also works in slums of India.

ON THE ABILITY TO DISABLE - PROVOCATIONS ADVOCATING THE NECESSITY OF PHILOSOPHY IN DESIGN STUDIOS

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Abstract

Friedrich Nietzsche's poetic description of architecture as "eloquence of power in forms" has resonated in many authors, Le Corbusier's "magnificent play of masses" to name only one. But there is another intriguing remark Nietzsche made about architects that has drawn little attention, where they are *disabled* by actors. "The maddest and most interesting ages of history always emerge, when the 'actors', all kinds of actors, become the real masters. As this happens, another human type is disadvantaged more and more and finally made impossible; above all, the great 'architects'." ¹

Throughout *Human All Too Human*, Nietzsche sketched out an ethico-aesthetic theory that gave a stronger valuation of the apparent, sensory world than his contemporaries, and this, he believed, was because he possessed more sympathy with his fellow man. This stems from an opening opposition, that there is an apparent world as given by our reasoned senses, and a true world which is a logical extension of that world, but subject to all of the inevitable speculative convolutions of language. In his time, Nietzsche sought a reconciliation of the true world with the apparent world through critical engagement with other authors and ideas - he philosophised with a hammer - but he also recognised the need for embodiment, for projective metaphors.

This paper uses this explanation as an opening for an interpretation of Nietzsche's remark about actors' diminishing the power of architects, and thereby notes a series of reasons why designers need to become better acquainted with philosophy: to clearly differentiate between the principle of sympathy and antipathy and the principle of utility, to learn the rhetorical skills in an increasingly logocentric environment, and to better understand and engage with the ethical consequences of speculative projections.

On the Ability to Disable - Provocations Advocating the Necessity of Philosophy in Design Studios

A remark often made by junior students in the design studio, perhaps in disoriented consternation or outright frustration, is that the values imposed by the assessment criteria are subjective; but as students advance through more senior years, such comments become less common. The pedagogical process at work is a transformation in perception: as students learn to perceive designed objects as an assembly of design decisions, and recognise that design decisions are the operation of the designer's values, then designed objects may be perceived as statements of value.

Designers may, in many ways, merely reproduce pervasive unconscious cultural valuations. The superabundance of value statements announced by the millions of designed objects encountered in a single day of city life inculcate particular proportionings of values - their cumulative effect on our psychological and axiological lives is great beyond reckoning. It is in this context that we may understand the somewhat counter-intuitive remark from Surrealist Salvador Dalí, that architecture "creates moral structures and ethics."²

In the studio, designed objects can explore alternate assemblies of values, the confines of the studio allowing such propositions to appear minor and "contained", but the emotional, psychological, socio-political and philosophical consequences may be profound if the proposals are enacted broadly. What, in art, are called "movements" (a peculiarly peristaltic word) such as Modernism, engage all these valuations transformatively; they are, in Friedrich Nietzsche's words, transvaluations. Thence, if successful, from their initial position as a radical transvaluative departure from custom, they slowly become a conservative virtue.

The slow change in the valuation of custom from a more or less conscious drive into habituated virtue, is a subject explored repeatedly by Nietzsche. In most general terms, "the great principle which stands at the beginning of all civilisation: any custom is better than none,"³ then from his 1878 book *Human All Too Human*, which provides his most extended examination of the subject, "at first it is but custom, later free obedience and finally almost instinct. At last it is (like everything habitual and natural) associated with pleasure—and is then called virtue."⁴

When the conditions in which an action was beneficial and morally good for a community change, an unproductive or counterproductive action may persist as custom - morally good from a traditional perspective, but materially, apparently, harmful. Nietzsche explained,

a potent species of joy (and thereby the source of morality) is custom. The customary is done more easily, better, therefore preferably... Moreover it does not require deliberation... The error herein is this: Because a certain custom has been agreeable to the feelings or at least because it proves a means of maintenance, this custom must be imperative, for it is regarded as the only thing that can possibly be consistent with well being... Even when a custom is exceedingly burdensome it is preserved because of its supposed vital utility. It is not known that the same degree of satisfaction can be experienced through some other custom and even higher degrees of satisfaction, too.⁵

The most common expression of value in a beginners' design presentation comes from the principle of sympathy and antipathy: I like it, for example. Simultaneously considering the two of the three common meanings of *like* point us directly to the design weaknesses that proceed from it. Like implies both a fondness for something, and a similarity between things (the third meaning - that it denotes the beginning of a simile is endorsed toward the end of this paper). Taken together there is a direct connection between liking things that are similar to us and liking things that are fondly disposed toward us. By valuing the limited condition of liking, designers have need only to appease a mobile self-serving nihilism: I like what I made, I don't like what I didn't make, for example. If we are to critically engage with the arrangements of values, the sharp words of Nietzsche may clarify the discourse:

*the value of life for the generality of mankind consists simply in the fact that the individual attaches more importance to himself than he does to the world. The great lack of imagination from which he suffers is responsible for his inability to enter into the feelings of beings other than himself, and hence his sympathy with their fate and suffering is of the slightest possible description.*⁶

The problem of architecture, of all architecture grander in scope than an architect's private spaces, is the problem of pleasing others. This case is particularly acute in

those situations where the client is not like the designer, and perhaps does not like the designer, yet the designer must nonetheless anticipate their tastes and expectations and dutifully accommodate them without descending into precisely what Nietzsche anticipates: subtle forms of *ressentiment*.

A designer may wish to consider a private dwelling as the appropriate domain for design decisions based purely on liking, yet the presence of an architectural facade in a streetscape constitutes a political statement about the relationship between private and public life. Design in this manner is a form of applied ethics and therein applied empathy.

The design response that would make architecture an act of applied empathy may be yet another custom. An expansion of empathic reach would require a transformation from the principle of sympathy and antipathy toward the principle of utilitarianism, and an increase in the size of the collective being considered. This would require some degree of a transvaluation of ethics and aesthetics.

Aesthetics and Ethics

In *Human All Too Human* Nietzsche argued that all moral concepts are the ossification of customs and habits which originated in the apparent conditions of biological sensations.⁷ But it is in his notebooks that the ideas are most clearly expressed; here he explained that moral principles may affect a collective will for self-preservation, but their origins in biological sensation are only the repetition of pleasure and the avoidance of pain.⁸ Next, this relatively simple principle was thus extrapolated, "aesthetic values rest upon biological values... aesthetic feelings of well-being are biological feelings of well-being."⁹

Connecting biological feelings of well-being with aesthetic well-being brings a suite of more objective values for architecture. Thermal comfort and acoustic performance, along with construction techniques, have been continually improved by engineers and architectural scientists through the objectification of values, through their translation into mathematical principles. Yet there are many biological feelings of well-being connected to architectural values, connected to an available palette of architectural effects, that are not yet, and indeed perhaps may not be, translated into mathematical values. Many of these may be collectively named experiential: the ease

of navigation is a large public space, the correct placement of a window to compose a view, the privacy afforded by the acoustic separation of adjacent spaces, the acoustic, tactile and performative experience of operating a window, door, drawer or screen, the capacity for a building to healthily endure the most hostile weather, the socio-political value of a facade, a public space, a construction system. These and many such values are not well described by either numbers or words, not in any convention of communication based on symbols. In this inevitable and unavoidable position of explaining and persuading why a certain designed experience is *preferable* to another, designers benefit from training in rhetoric, axiology and philosophy.

Philosophical exercise may be said to include two modes of operation, destructive and constructive. The foundational figure of Western philosophy, Socrates, may be most known for the development of the Socratic method of questioning which undermined the unsupported assumptions of superficially wise sophists through his insistence that accepting ignorance is wiser than asserting dubious knowledge. Yet, Plato recounts many episodes where Socrates develops long imaginary scenarios and similes designed to bring the listeners to imagine alternative ways of life. Socrates' detailed description for the ideal state, that Plato wrote of in his *Republic*, is a philosopher's design proposal for an alternate society.

The separation from normative experience is initiated by artists and philosophers for whom the will to truth and to health is opposed to what is customary and moral. The first step of a reevaluation of values can always be legitimately, if only relatively, labeled decadent, and show similar symptoms; from Nietzsche's note books, "the first shoots of fecundity, insofar as they are a sign of health and promote vigour and resistance, initially have the character of sickness."¹⁰

Projective processes attain maximum value when they have run through objectification phases and moved from an immaterial propositional "truth" to an apparent object, but this final value is necessarily unattained if they are to remain "projective". Although most of Nietzsche's work operated as a critical tool, it was partially, perhaps even centrally, a way to construct a valid projection. In his 1882 *Gay Science*, Nietzsche asked "how far truth is susceptible of embodiment, that is the question, that is the experiment"¹¹ and from 1883 to 1885 wrote *Thus Spake Zarathustra*, the parables of a character who embodied his new truth, and proceeded

to quote this character in every book he wrote thereafter.

As with many subjects, it is not always clear what Nietzsche's position is, or what his thoughts add up to, on the subject of how one might *become* or *design* an embodiment of truth, to turn the path from biological sensation to moral fulfilment toward different ends. Nietzsche's relationship to the theatre is complex and he is not without admiration for the actor's crafts, but in embodying new ways of life something much more authentic seems necessary. It is with disappointment that he noted, mirroring Socrates, that instead of wise men he found only the actors of their ideals,¹² and in *Twilight of the Idols* asked this interrogating sequence of questions: "Are you genuine? Or merely an actor? A representative? Or that which is represented? In the end, perhaps you are merely a copy of an actor."¹³ From this I suggest that the actor, as Nietzsche has it here, follows custom but does not connect the custom to its origin, to its cause, to its necessity, and thereby does not have liberty to successfully improvise, and to experience what Nietzsche wrote of the tragic artist: "freedom of feeling."¹⁴

In *Gay Science*, Nietzsche describes the difficulty for the architect in realising great ambitions in a society populated by actors, each dutifully playing their part in society as scripted by their conception of the 'true world', but without the background and mastery of ethico-aesthetics.

The maddest and most interesting ages of history always emerge, when the 'actors', all kinds of actors, become the real masters. As this happens, another human type is disadvantaged more and more and finally made impossible; above all, the great 'architects': The strength to build becomes paralysed; the courage to make plans that encompass the distant future is discouraged; those with a genius for organisation become scarce: who would still dare to undertake projects that would require thousands of years for their completion? For what is dying out is the fundamental faith that would enable us to calculate, to promise, to anticipate the future in plans of such scope.¹⁵

If we are to regard seriously Nietzsche's reading of the immense difficulty facing the architect of in this situation, the issue that must be first addressed philosophically, axiologically, as the devaluation of the 'true' world (valued by actors), and an increase in value of the 'apparent' world perceived through the senses. This intermediate

transvaluation too would require a new prevailing mythology, a new 'truth'.

Nietzsche suggested such a truth; vague as it is, and reduced into the simulacra of language. In his first speech Zarathustra implored an audience assembled to watch a tight-rope walker, "*remain true to the Earth.*"¹⁶ Then, perhaps more logically than naturally, the tight-rope walker fell.

Conclusion

As an initial argument for the expansion of philosophical training in design schools, many of the skills most valuable in design are formal, temporal, acoustic, haptic, cognitive and they exist separate from the domain of words, yet in the socio-political and administrative context, the manner in which design schools are measured is increasingly logocentric, which demands that formal and experiential work must be translated into written language in order to defend and justify its necessity. As Le Corbusier noted almost a century ago with the effect of advanced engineering on building construction, many aspects of an architect's work have been outsourced in recent centuries. The task of promoting and defending design studio practices, and the exploratory necessities of design, can not be so easily externalised. Architecture and all design studios need to recognise the unending task of self-justification within a logocentric culture, not only through a select and eccentric group of literary architects, but in the academic and professional training of every practitioner.

Philosophy of the Socratic discipline remains relevant as a model for destructive criticism and theoretical construction as art forms and as the fundamental cognitive tools of design's analysis and communication. The critical value in design is already part of the standard studio teaching repertoire, so a more conscious public examination of the critique process - and the separation of principle of sympathy and antipathy from the principle of utilitarianism - would lift the quality of the discourse and clarify the ethico-aesthetic expectations. But aside from this general and procedural value, there is the subject of custom and the normalisation of value. At various points a designer has to choose to accept custom, or enter into the labyrinths of transvaluation. Alternatively sometimes a custom must be reconnected to its former ends, and here the transvaluator will have the appearance of an anachronist.

Finally, the disabling of the architect by the mastery of acting is the most troubling statement Nietzsche made about architects. The wonderful lines in *Twilight of the Idols* that architecture is the “eloquence of power in forms” and even that architects are “under the spell of power,”¹⁷ all take on a narcissistic odour in a design studio. In his description of the disabling of architects, during the time of the mastery of actors “the courage to make plans that encompass the distant future is discouraged.” What do actors see of the distant future? The curtain call, or simply being off-stage altogether? Architecture, however, remains onstage, in the public domain, long after the architects and actors have concluded their contracted responsibilities. It is in philosophy that we may find the foundational support the weight for a project that may take “thousands of years” to complete. With its heavy material responsibility and complex ethical consequences, it is only after prolonged genuine reflection that one may take into consideration *the long view*. Here we may find the means to exceed that which our present customs habitually generate, and produce a more distant, grander architecture.

Endnotes

- 1 Friedrich Nietzsche, *The Gay Science*, trans. Thomas Common, 356.
- 2 Salvador Dalí and André Parinaud, *The Unspeakable confessions of Salvador Dalí* (Paris: Creation Books, 1973): 277.
- 3 Friedrich Nietzsche, *The Dawn of Day*, trans. J. M. Kennedy, 16.
- 4 Friedrich Nietzsche, *Human, All Too Human*, trans. Alexander Harvey, 99.
- 5 Ibid., 97.
- 6 Ibid., 33.
- 7 Ibid., 96.
- 8 Friedrich Nietzsche, *Kritische Gesamtausgabe*, V 1, 6 [145], from Gregory Moore, *Nietzsche, Biology and Metaphor* (Cambridge: Cambridge University Press, 2002): 66.
- 9 Ibid., VIII 3, 16 [75], from Moore, *Nietzsche*, 105.

- 10 Friedrich Nietzsche, *Kritische Studienausgabe*, 11, 40 [65], from Pierre Klossowski *Nietzsche and the Vicious Circle* (London: Continuum, 2005/1969): 4.
- 11 Nietzsche, *The Gay Science*, 110.
- 12 Nietzsche, *Beyond Good and Evil*, 97; *Twilight of the Idols*, “Maxims” 39; *Thus Spake Zarathustra* 3.49.2.
- 13 Friedrich Nietzsche, *Twilight of the Idols*, trans. Walter Kaufmann and R.J. Hollingdale, “Maxims” 38.
- 14 Nietzsche, *Twilight of the Idols*, “Skirmishes” 24.
- 15 Nietzsche, *The Gay Science*, 356.
- 16 Friedrich Nietzsche, *Thus Spake Zarathustra*, trans. Thomas Common, “Prologue” 3; repeated in, I.22.2.
- 17 Nietzsche, *Twilight of the Idols*, “Skirmishes” 11.

Biography

Dr Simon Weir is a Lecturer in Architecture, painter, and designer, investigating the foundational mythologies of contemporary architecture from material origins to the theatre of democratic politics.

URBANISM UP TO 11 - A DESIGN STUDIO OF EXTREMES

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PROVOCATIVE STUDIO PEDAGOGIES

Abstract:

The role of the architect and urban designer is becoming more complex, engaging with economic, social, environmental and cultural concerns along with politically loaded usergroups, lobbygroups and complex multi-disciplinarily 'wicked' problems of large scale city design and densification.

This study poses the questions: How do educators provide urban design studio syllabi that encourage students to engage in such complexity in a meaningful, provocative and propositional way; and how can we encourage students to develop breadth of understanding of real urban issues and their interrelated nature but also allow depth of research into specific areas of urbanism?

The method used to investigate these questions was through a cross-disciplinary urban design studio case study. The main project brief was to rework current planning documents to produce and test mini 3D Urban Design Frameworks that emphasised one particular aspect of urbanism in a *reductio ad absurdum* manner using the metaphor of a music recording studio mixing desk, where 'sliders' are manipulated to control the intensity and quality of specific instruments (urban design objectives). Students pushed one volume control 'up to eleven', prioritising and exaggerating a key aspect of current urban design rhetoric such as: cycle-ability; pedestrian connectivity; heritage preservation; transit oriented development; solar amenity; above all other design issues.

The resulting projects were diverse in their intent and execution and each were full of contradiction, strengths and weaknesses as was expected with such a brief. Students all gained an insight into the intrinsically interlinked nature of urban design as they discovered that by emphasising one design aspect over all others, they may 'solve' one urban problem only to have unintended impacts, positive or negative, on other aspects of urbanism.

By designing with one aspect prioritised over all others, undiluted, clearly legible extremes were produced, in some cases resembling interesting precedent cities such as Arlington, US; Venice, Italy; Brasilia, Brazil; and Houten, Netherlands.

This study concludes that this teaching approach provides students freedom to follow through on experimental, speculative forms of urbanism gaining a deep insight into a specific element of urban design, whilst gaining a greater understanding of the interrelated relationships and impediments to the implementation of such design strategies.

Introduction

The role of the architect and urban designer is multifaceted and is becoming more complex (Inam 2011), engaging with architecture, landscape architecture and planning; economic, social, environmental and cultural concerns; with transport and civil engineering; water and waste management (Krieger and Saunders 2009). Large scale city design and densification is a complex multi-disciplinarily 'wicked problem' (Rittel and Webber 1973). The time of a singular urban design vision, at least in the western world, is behind us. The mode of professional operation has changed – there is no longer a lone 'Renaissance genius' architect setting out a clear, fixed vision for cities (Arida 2002, p.127), urban design is a collaborative, messy and compromising discipline.

In this study I pose the following questions:

- How can educators provide urban design studio syllabi that encourage students to engage in such complexity in a meaningful way whilst still allowing students to put forward provocative and propositional design proposals?
- How can we encourage students to develop breadth of understanding of real urban issues, political sensitivities and conflicting lobby group interests and their interrelated nature whilst also allowing depth of research into specific areas of urbanism?

- How can we develop student's ability to coordinate different aspects of design when working in a collaborative team environment whilst developing and testing new methods for an integrated analysis and design synthesis process?
- The method used attempting to answer these questions has two parts. Firstly through a brief review of key design studio teaching models based in part on literature and in part on personal teaching accounts. Secondly through a description of a cross disciplinary architecture, urban design and landscape masters design studio I ran recently at the Faculty of Architecture, Building and Planning at the University of Melbourne where I tested an experimental hybrid studio model with an extreme element 'up to 11' music analogy.

Studio Models –review / personal account:

As a practicing academic, I find balancing the scholarly higher learning objectives with the preparation of students for the 'wicked' collaborative complexity of practice challenging. As Arida suggests in his book *Quantum City*, educators need to 'totally rethink the teaching of architecture and urban design' (2002, p.125).

Over the last two decades through either participating or teaching in design studios I have experience with each of the studio teaching modes described by Schön (1985), Lederwitz (1985) and Sancar (1996) along with more recent cross-disciplinary or digital studio modes (Corkery et al. 2007; Schnabel and Karakiewicz 2007; Oxman 2008). Though the following list of studio types is in no way exhaustive, it offers some context of many of the kinds of studios currently on offer. In the following paragraphs I will describe some perceived successes and failings of each studio model.

The 'traditional' studio:

The 'traditional' studio model where students are asked to provide an effective solution to the hypothetical design problem as defined by the instructor (Oh et al. 2012) or is Arida's 'renaissance genius' model where students develop their analytical skills, and conceptual skills, and represent a singular, themed solo project in a linear fashion. Here, design analysis is a small component of the studio, often completely separate and not integrated into the design synthesis (Lederwitz 1985). In my own

teaching of urban design studios using this method I found that though students had a clear trajectory and learnt many fundamental skills, the studios fell short in preparing the students for the growing complexity of practice described by Arida (2002).

The 'SAD' studio:

The survey analysis design (SAD) design process or the 'analysis-synthesis' model (Milburn and Brown 2003, pp.50-51), like the previous model, is imagined as a series of discrete parts following each other in a set sequence: standard survey, analysis, concept and final design (Filor 1994, p.123) but with a greater emphasis on the initial analysis rather than the design. The approach conceptualised by Scottish planner Patrick Geddes (1854 - 1932), further developed by McHarg (1969), then LaGro et.al (2001), to its current form which includes a strong emphasis on layered mapping and Geographic information systems (GIS) (Fraker 2007). The approach involves the rigorous surveying of a sites conditions and the design coming as a kind of scientific determinism. Tom Turner suggested that the 'SAD method produced sad results. It should be put out to grass like a poor old tired horse'(1991). The studio model tends to 'over emphasizes the front-end analysis, and generally results in solutions lacking in originality' suffering from 'Analysis paralysis' (Sancar 1996, p.136; Filor 1994, p.123). These are rather scathing attacks on this kind of studio, but do identify the key issue of potentially over emphasising analysis over design in a linear nature. To suggest that a design scheme can, or should be derived entirely from physical site conditions misses opportunities for broader intellectual or cultural inputs. The linearity of the SAD approach also potentially misses opportunities of analysis refinement that might occur in a more cyclical or integrated analysisdesign method (Milburn and Brown 2003, p.51).

Utopian design studios:

Utopia studios allow for experimentation, freed from many of the crippling 'analysis paralyse' issues. These studios provide the opportunity for students to develop their lateral thinking skills in a context that encourages the exploration of ideas or concepts in an unrestricted way, freed from the harsh realities of budgets, constructability, site constraints, political and social pressures (Coleman 2012). These benefits could also be seen as negatives as utopian studios might be physically and

socially contextless not grounded in reality and may be associated with the failures of orthodox modern architecture during the post-World War II (Coleman 2012) leaving the utopian studio somewhat stigmatised.

Digital design studios

Digital explorative studios are often similar to the decontextualised utopic studios, technical explorations of rule-based behaviours such as swarm intelligence of flocks of birds and schools of fish, to the complex patterns of snowflakes, ferns, seashells and zebra skins (Leach 2009). These studios often aim to link manufacturing directly to digital design process (Allpress 2011, p.51). Digital design studios may begin with some new digital tool exploration with further detailed tool exploration through the semester. The design output of these studios may be an installation made up of hundreds of machine cut elements manually assembled by hand (Allpress 2011, p.60). In my own attempts at this teaching method, due to the hand assembly of the hundreds of pieces, the 'hightech' automated installation often appears more like 'Tonia Todman-esque' home-crafts lacking the intended precision and finish quality. Where the studios do not attempt a physical output (virtual environments or hyper surfaces etc), the work may be criticised as being 'vacuous' or 'esoteric and spatially difficult to comprehend [...] dismissed as architectural "fad"' (Kolarevic 2003, p. 7). Despite receiving similar criticisms to the utopia studio, the digital design studio embeds very relevant technology engagement which is becoming increasingly important in practice.

Concept – Test studio (iterative):

The reverse model, or 'concept-test' model (Ledewitz 1985) differs from the previous models, where a design concept is intuitively proposed and then 'tested' through drawing and re-drawing. The design process or 'design cycle' is repeated multiple times in a non-linear fashion (Ledewitz 1985). This method is evident in the of studio teaching and practice of Melbourne architect and academic Peter Corrigan (Hamann, Anderson, and Callister 1993), who uses this method to foster student's design thinking, encouraging rapid responses to constantly refined or changing briefs. Each week is an 'intensive design studio' where students must produce a new design scheme fully represented with plans, sections, perspectives and physical models. The studio type develops student's ability to produce ideas and test them

rapidly, teaching students a responsiveness to changing circumstances that may address some of Arida's concerns. The method does however potentially limit the depth of research when compared to the SAD model, and doesn't allow the same level of design resolution that might be the case with the traditional studio model.

The 'Urbanism Up to 11' Studio

My studio syllabus attempted a balanced hybrid of the aforementioned studio teaching styles, with elements of traditional; SAD; utopian; digital; and concepttest/iteration studios. The studio focused on a site in the inner western Melbourne suburb of Footscray. It was run in two parts, the first part (A) ran for 5 weeks involving a mixture of lectures, readings, research/analysis exercises (traditional/SAD studio model); digital workshops (digital studio model); run concurrently with weekly 'up to 11' design exercises (utopia/SAD/digital/iterative model which will be explained on following pages). Students worked in cross disciplinary groups of 2-3 which were shuffled each week – a different group, a different set of tasks.

The second part (B) involved taking one of the Part A design exercises and further developing the scheme through iteration where analysis and synthesis was run concurrently, essentially combining the analysis and design process to become what Sancar calls 'situational research'(1996, p.136).

Digital workshops

The studio began with a series of digital design skill workshops which included mapping 'mash-ups', cloud based collaborative techniques and parametric urban modelling.

A short workshop on GIS mapping and cloud based collaboration was expanded with a group site/context mapping exercise where students contributed to a 'Google Mash-up' which mapped all existing rail and smart bus connections as well as the newly proposed regional (western) rail link, the 'truck action plan' and Melbourne metro link between Footscray, Parkville Hospital precinct and University of Melbourne, through to Caulfield over the Google Map aerial photograph base. This exercise tested the potential of collaborative mash-ups where each student contributed to a map that became a common resource for the whole studio, accessible via the studio's Google account and website.

Interested students were shown collaborative cloud file sharing methods (using Sugarsync™) to simulate a kind 'virtual office' with a cloud based server to allow sharing of CAD drawings and readings as well as group 3D modelling.

Students were also given workshops on flexible digital urban modelling, and performative analysis/design techniques. These sessions allowed students to develop modelling and analysis skills that related directly to their weekly design exercises.

Critical reading (between the lines)

The studio also began with a critical reading of urban growth rhetoric against its implementation through analysis of the Victorian State Government's Melbourne 2030 / Melbourne at 5 Million's stated objectives and resulting built outcomes asking: have the objectives been met or have they been 'watered down' or compromised too much? The students were encouraged to look at the origins of these stated planning objectives alongside a variety of contemporary urban design theories and approaches including transit oriented development (TOD), pedestrian oriented development (POD), smart growth, parametric/ performative urbanism, and ecologically integrated urbanism.

Lectures and studio briefing

The studio included a series of formal and informal lectures and guest lectures covering and discussing council Structure Planning and Urban Design Framework documents; examples of 'extreme' car dominated cities from the 20th Century (Los Angeles versus Melbourne); examples of 'extreme' cities in history (Venice, Washington, Hong Kong); examples of unrealised extreme utopian city projects (Howard, Hilberseimer, Corbusier, Wright, Speers et.al); as well as 'built utopias' such as (Brasilia, Chandigarh, Canberra).

The brief for the Part A exercises and the main project in Part B was essentially the same but with additional time to develop the project. The project brief for Part A was to rework current planning documents to produce and test mini 3D Urban Design Frameworks that emphasised one particular aspect of urbanism in a *reductio ad absurdum* manner. I asked students to use an 'analogic approach' (Sancar 1996, p.137) with metaphor of the 'city as the full orchestra' and 'urban design as the

music recording studio mixing desk', where sliders are manipulated to control the intensity and quality of specific instruments (urban design objectives) (Figure 1: Mixing desk indicating levels for 'Sky-line up to 11' project).

I gave a briefing lecture describing to students how in a music recording studio, a mixing desk can be used to isolate one specific instrument or mix multiple instruments together in a controlled manner. Sound engineers use the technique of isolating one sound track /instrument (turning all other instruments down to background volume) as a kind of analytical tool, enabling them to hear the single instrument in a more detailed way, hearing all the nuances of tone, timbre, reverberation and any fumbles or missed notes by the individual musician.

I also described how in music history, turning up one 'instrument' that is normally backgrounded over others has yielded new and interesting musical possibilities, such as those that were afforded when the very lowvolume late medieval clavichord instrument evolved into Cristofori's *Gravicembalo col piano e forte* ca.1700, for the Medici court in Florence. This alteration to the volume of the instrument dramatically changed musical composition through the Renaissance and Baroque eras (Goodall 2000). I went on to describe the 20th Century example of how the guitar has evolved due to amplification. Prior to amplification and Alonzo Johnson's ground breaking 1927 Hot Five release '6/88 Glide', guitar was considered to be a parlour room backing instrument (Obrecht 2007; Mitchell 2011). I suggested that the electric (amplified) guitar has dominated 20th Century music in a similar way to the manner in which the motorised cars have dominated post World War city development.

The studio briefing drew upon the music theory of Nigel Tufnel – using the concept of pushing volume/ intensity up to an extreme level or 'up to eleven' (Reiner et al. 2000), to explore prioritising and exaggerating one key aspects of urban design rhetoric above all other design issues.

Project results

Each week, students pushed one volume control 'up to eleven', amplifying exploring one specific urban design issue in detail such as: cycle-ability; pedestrian connectivity; heritage preservation; transit oriented development; solar amenity; above all other design issues.

One group of students investigated how a suburb would need to be developed in order for it to maximise natural direct sunshine into public open spaces, which resulted in urban densification that was restricted to skewed pyramidal block volumes similar to studies conducted by Knowels (2003) or White (2008) (ref Figure 2: Subtractive solar modelling produced for the Venice Biennale project 'Implementing the Rhetoric' (2010)).

Other issues explored or 'turned up to 11' were: cycle-ability; pedestrian connectivity; heritage preservation; accessibility for mobility impaired; demographic make-up preservation; transit oriented development (TOD); civic form – compositional urban gesture; and city sky-lines.

A strong project outcome was the Askarimehr, Voon, and Ogawa team's 'River view Oriented Development – ROD' (real-estate views) (refer Figure 7: Ogawa, Voon and Askarimeh's team produced a developer-profit driven scheme 'River-View Oriented Development'. - Figure 11: Perspective rendering of 'optimised solution' of scheme 'River-View Oriented Development' from podium top level showing 'Docklands-esque' urban spaces at street level.). This project was highly successful in maximising views of the waterfront and suggested a completely new approach to designing and analysing developer-driven residential apartment forms and arrangements. This project drew from modelling and analysis skills developed in the class' urban modelling workshops, creating a digital model where the river and bay was turned into an artificial light source, casting light onto the sites proposed building envelopes and rendered with pseudo radians analysis. The render was then 'baked' onto the envelopes and unfolded, coloured areas vectorised and measured allowing a semi-automated process for comparing options and optimising the forms for maximum apartments with 'water views'. This investigation was also successful in revealing the major pitfalls in view-driven design, suffering from very poor street level with, as one guest critic put it, a 'remarkable resemblance to the Melbourne Docklands' (refer Figure 11: Perspective rendering of 'optimised solution' of scheme 'River-View Oriented Development' from podium top level showing 'Docklands-esque' urban spaces at street level.).

The Solanki, Burman, and Ashrafi Amineh team's 'Skyline' project reinvestigated the Maribyrnong council's Footscray Skyline Study document taking the actual skyline silhouette and Lynchian/ Cullen like way-finding rhetoric as primary performative

design drivers (ref Figure 3: Burman, Solanki and Amineh student team's quantitative skyline analysis method used to compare New York City current skyline with pre-9/11 skyline above, below image shows the analytical process applied as a design driver with their own scheme for 'Skyline up to 11' scheme for Footscray.). The students developed an empirical system for analysing the otherwise subjective 'good skyline' and developed a digital urban model that allowed parametric manipulation resulting in a project that was demonstrative of the intent, with design concept clearly legible in the urban form.

Other projects investigated connectivity using Spatial Syntax depthmapping linked to densification, urban campus planning, TOD and fauna distribution and connectivity using sophisticated generative game programming by Ed Blanch (refer Figure 6: Blanch, Le and Gomes' 'Community Up To 11 - Growing Footscray through community and ecological relationships' project. This project used focused on community accessibility (both human and fauna), modelled using agent based simulation using gaming software.). Each project providing its own specific contribution as a piece of design based research.

Discussion/Conclusion

Alternative studio models require more explanation.

By using a hybrid studio model with a non-deterministic brief, some students were pushed outside of their comfort zone, particularly urban design students with a planning background who were new to even the traditional design-studio learning model, let alone subversions of the model. The feedback from these students suggested they were initially confronted by the approach, whereas architecture students who had previously experienced other studio models were highly supportive of the studio method. Upon reflection, I believe that students would have benefited from greater explanation of the aims of the pedagogical approach.

Group work

By working in groups, the students were exposed to some the complexities of collaborative practice. Students had to negotiate between group members to agree upon design direction and methods of implementation. Some took advantage of

cloud based collaboration techniques and were able to work together as a team even though much work was done remotely from one another.

Students were also able to explore their chosen urban issues in far greater depth in their weekly exercises and final project than if working solo. Through weekly exercises presentations; sharing files on studio wiki; collective mapping mash-ups; and collaborative site analysis modelling, the studio learned together as a whole gaining a kind of collective intelligence. The studio covered a broad range of contextual and local environmental urban issues gaining many of the benefits one would expect from a Site Analysis Design studio, but used the 'up to 11' brief to limit their scope, so as not to suffer from the 'analysis paralysis' discussed earlier. Students were also able to test a multitude of design propositions gaining many of the pedagogical benefits of the 'concept-test' studio model.

With the skills learned in the digital urban modelling workshops, students were able to rapidly test design scenarios against quantifiable indicators and objectives or to use the objectives to directly inform their design approach. In most cases, students were able to fully integrate analysis with design synthesis process, in a sense, merging aspects of the digital design studio with the site analysis design studio models.

Conclusion

The resulting projects were diverse in their intent and execution and each were full of contradiction, strengths and weaknesses as was expected with such a brief. Students all gained an insight into the intrinsically interlinked nature of urban design as they discovered that by emphasising one design aspect over all others, they may 'solve' one urban problem only to have unintended impacts, positive or negative, on other aspects of urbanism.

By designing with one aspect prioritised over all others, undiluted, clearly legible extremes were produced, with unusual aspects of the city becoming dominant. The approach provided students freedom to follow through on experimental, speculative and provocative propositions gaining many of the benefits of the utopia studio model.

The studio projects in some cases resembled interesting extreme precedent cities. The Transit Oriented Development scheme resembled the real TOD city of Arlington, US; the 'Walkability' scheme resembled Venice, Italy – an example of extreme pedestrianisation (with canals); the 'Skylines' scheme had a relationship with Brasilia, Brazil (extreme civic composition) as well as Lynchian way-finding moments of medieval European cities; the 'cycling' scheme resembled Houten, Netherlands – an example of cycle domination; and the 'River (view) oriented development' scheme resembled Docklands, Melbourne – an example of extreme developer/profit driven urbanism.

Like these examples, each of the student propositions exposed weaknesses and strengths, for example, the walkability scheme, like Venice Italy, would likely have logistical problems where great difficulties would be encountered delivering services, food and goods. Though each project had weaknesses, and there is no doubt that more time spent testing different combinations of 'mixing slider' volumes would have produced more successful forms of urbanism, none of their shortfalls were anywhere near as great as the problems that have been caused by 'cars up to 11' (car dominated) planning approach that has dominated so many cities of the 20th Century.

Reflecting on the usefulness of the 'up to 11' approach, I suggest that the iterative method used to produce new urban schemes weekly provided students with a breadth of understanding of interrelated relationships of real urban issues whilst digging deeply into a specific issue. The analogy was also very useful in allowing students to engage in analysis minus the 'paralyses', exploring provocative design propositions whilst engaging with real current planning concerns.

To return to the original studio premise of the mixing desk analogy, by turning up one element that is normally backgrounded over others, new and interesting possibilities occur. As we move past the era of cheap oil and car dominated planning, there is a need to reprioritise the composition of cities. Though these student's urban reprioritisations may not have quite the profound impact of Cristofori's *piano e forte* and the projects were closer to Les Claypool's lead bass playing in Primus than the Moonlight Sonata 3rd Movement of Beethoven, they did show great potential in showing at least the beginning of a new way of conceptualising and learning about urban design and the complex 'wicked problem' of city.

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Reference images



Figure 1: Mixing desk indicating levels for 'Sky-line up to 11' project

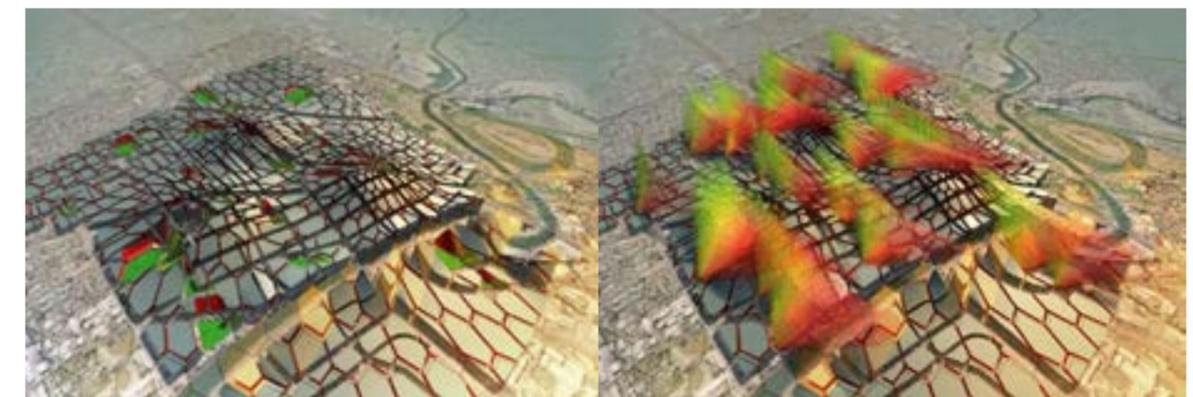


Figure 2: Subtractive solar modelling produced for the Venice Biennale project 'Implementing the Rhetoric' (2010).

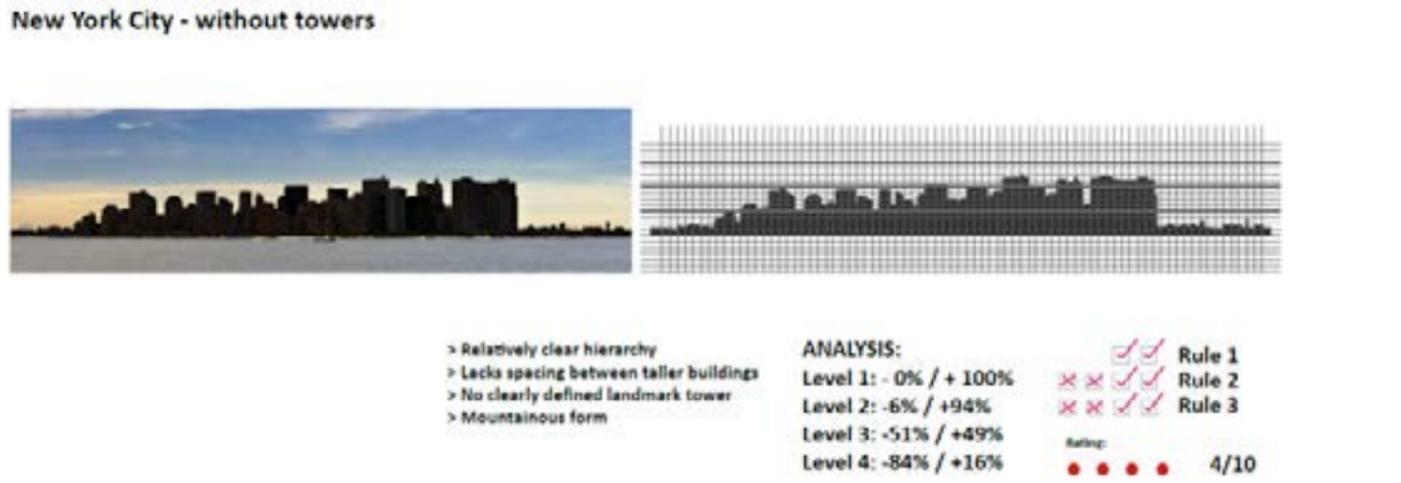
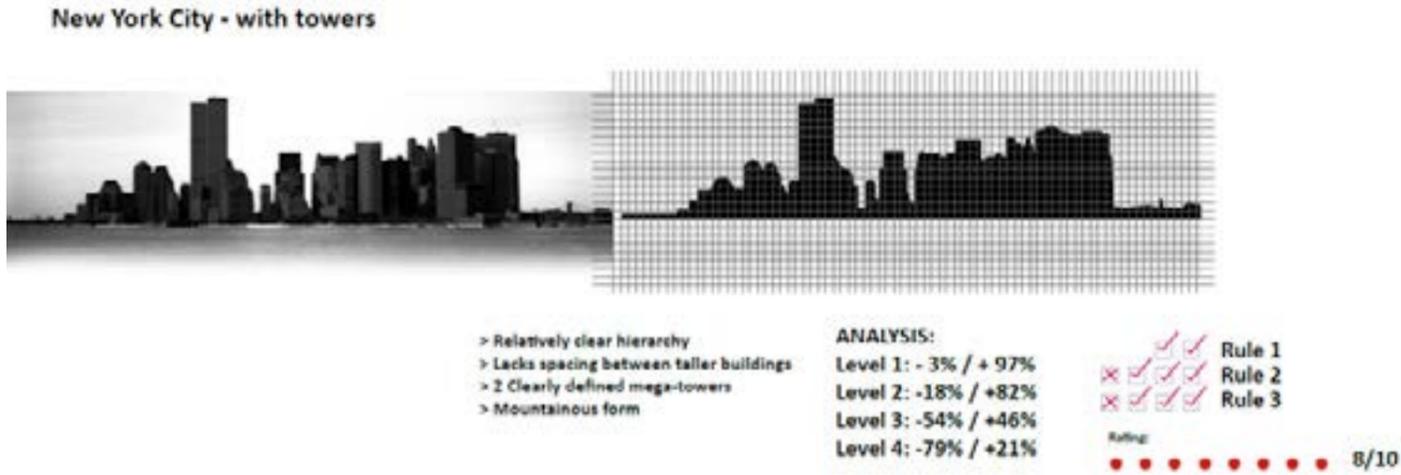


Figure 3: Burman, Solanki and Amineh student team’s quantitative skyline analysis method used to compare New York City current skyline with pre-9/11 skyline above, below image shows the analytical process applied as a design driver with their own scheme for ‘Skyline up to 11’ scheme for Footscray.



Figure 4: Photo montage of ‘Skyline up to 11’ scheme showing the street level way-finding implications of the urban design strategy.

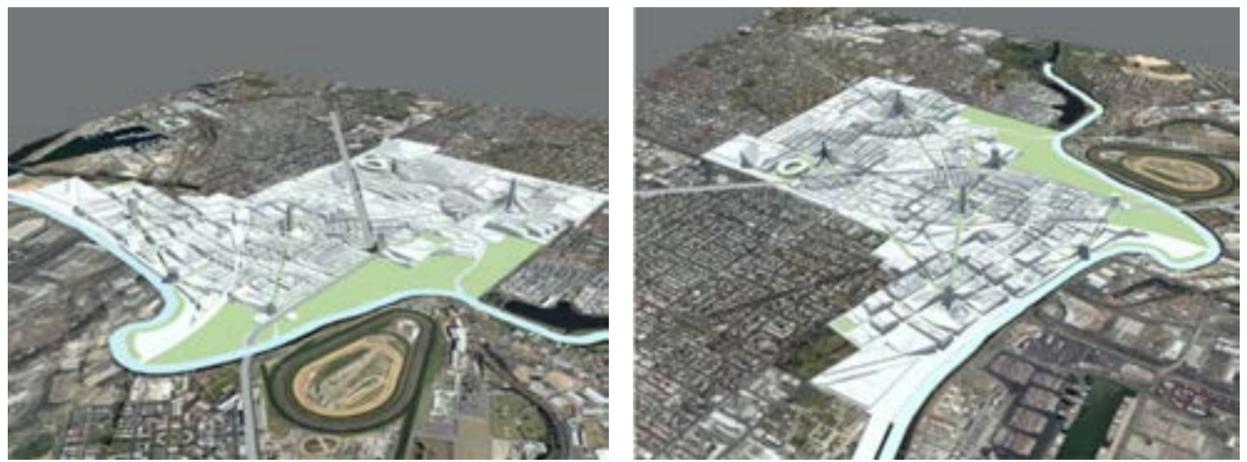


Figure 5: Aerial renderings of visualising the proposed height and density restrictions for the ‘Skyline up to 11’ project.

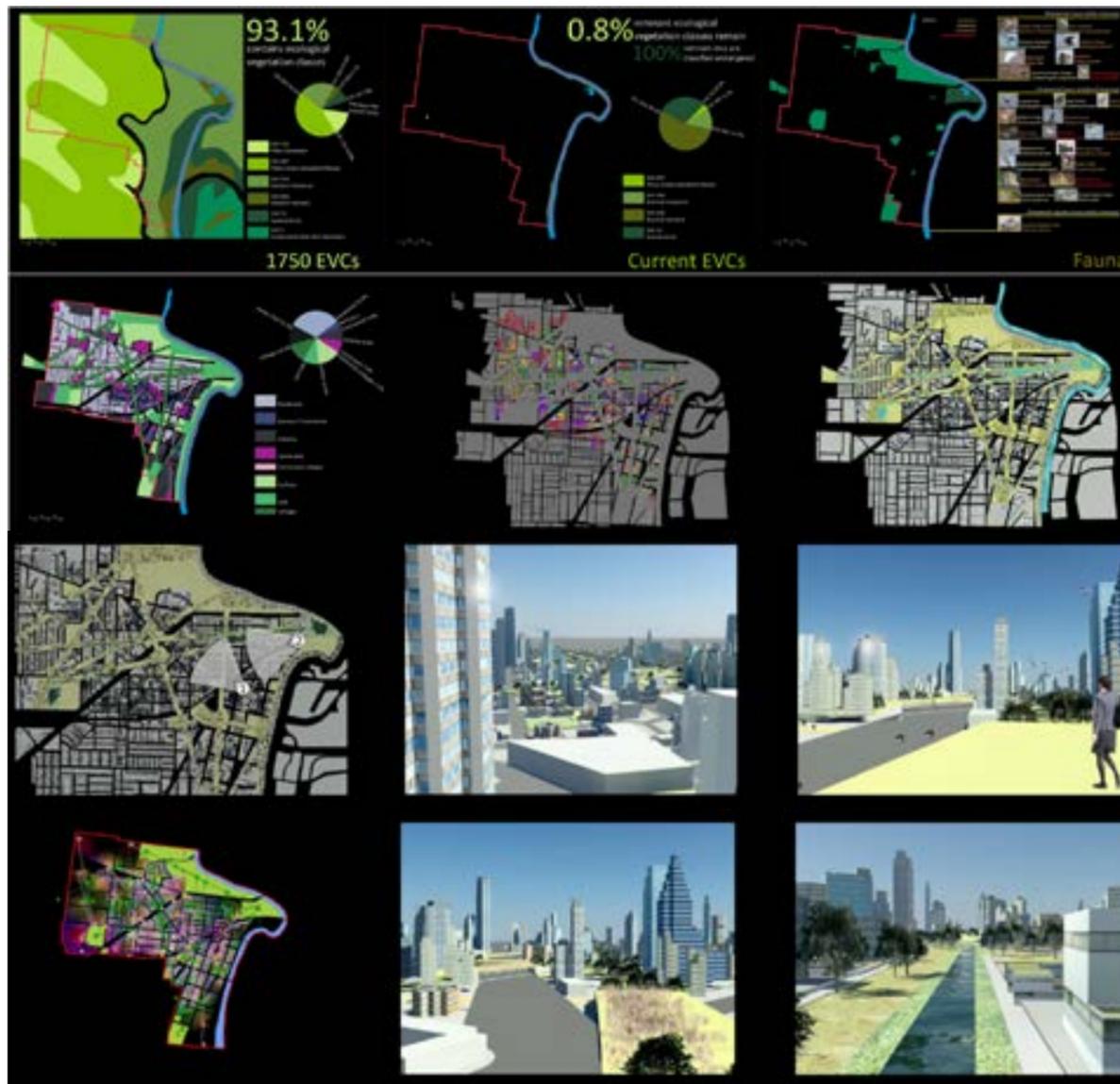
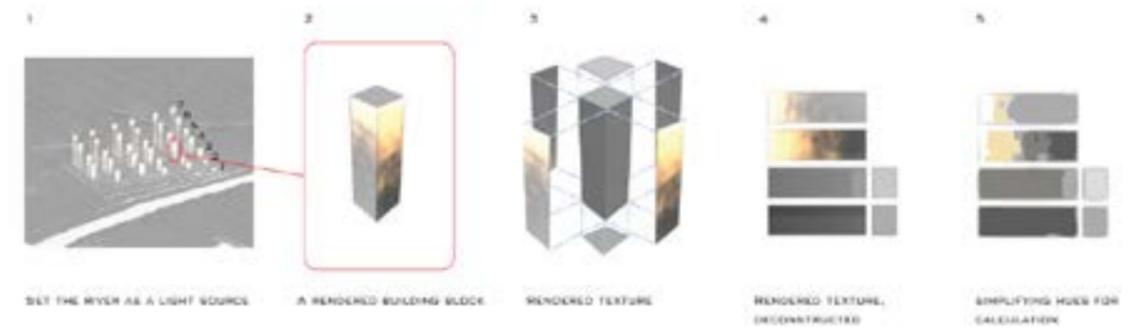


Figure 6: Blanch, Le and Gomes' 'Community Up To 11 - Growing Footscray through community and ecological relationships' project. This project used focused on community accessibility (both human and fauna), modelled using agent based simulation using gaming software.



Figure 7: Ogawa, Voon and Askarimeh's team produced a developer-profit driven scheme 'River-View Oriented Development'.

CALCULATING THE AREA WITH VIEW USING LIGHT CAST ONTO THE BLOCKS



Block	Total Area Usable Facades (m ²)	Area (Direct) View (m ²)	Percentage Direct	Area (Partial) View (m ²)	Percentage Indirect	Area (No) View (m ²)	No view Percentage	Total View Percentage
1	3387.8	3387.8	100	0	0	0	0	100.0
2	4248.0	3905.3	91.9	152.4	4.5	150.4	3.5	96.5
3	4199.1	1808.5	43.1	1121.7	26.7	1268.9	30.2	69.8
4	4561.4	1749.4	38.4	257.9	5.7	2554.0	56.0	44.0
5	4576.0	1131.2	24.7	257.6	5.6	3187.2	69.7	30.3
6	5296.7	894.8	17.2	580.8	11.2	3721.0	71.6	28.4
7	4155.1	296.9	7.1	293.7	7.1	3564.5	85.8	14.2
total	30324.0	13174.0	43.4	2704.1	8.9	14446.0	47.6	43.4

CALCULATION OF VIEW IN EACH ROW

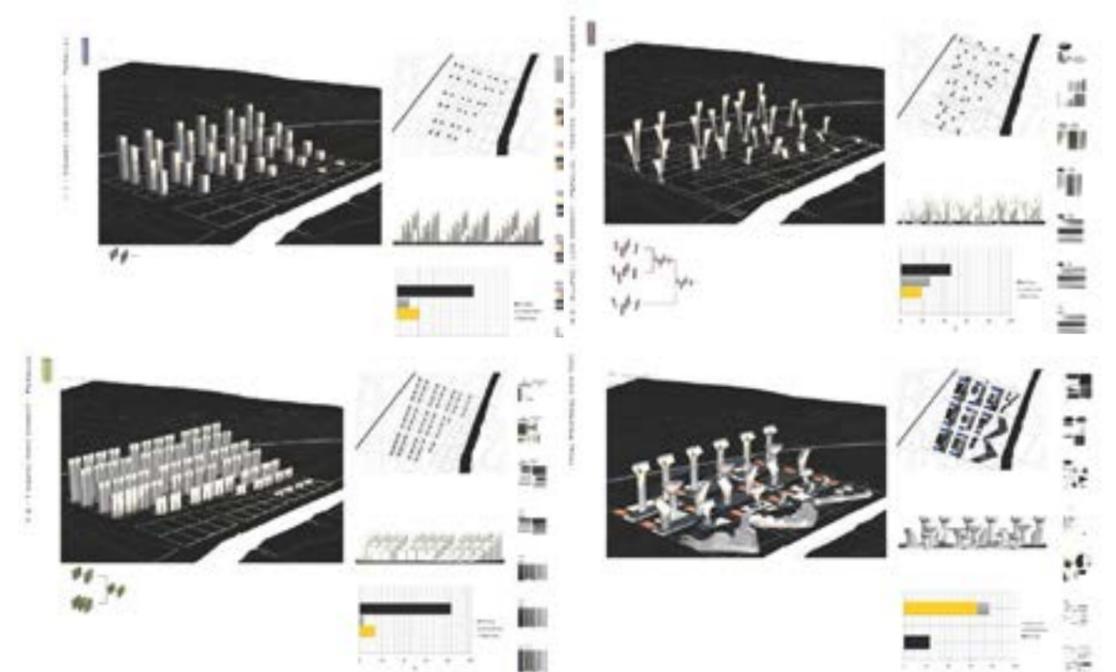


Figure 9: Stills from the semi-automated analysis-synthesis design process showing visual connectivity to river ranking system applied to multiple urban scenarios showing the 'optimised solution' in the bottom right hand corner.



Figure 10: Perspective rendering of 'optimised solution' of scheme 'River-View Oriented Development' showing increased massing towards the tops of towers with staggered building arrangements.



Figure 11: Perspective rendering of 'optimised solution' of scheme 'River-View Oriented Development' from podium top level showing 'Docklands-esque' urban spaces at street level.

Acknowledgments:

I would like to give thanks to academic and industry contributions by:

Justyna Karakiewicz (University of Melbourne)

Christine Phillips (Director OpenHAUS & Lecturer RMIT).

David Harrap from BKK,

Chris Reddaway, Associate Director NHA,

Mark Jacques (ex-Karres en Brands) Associate Director at Oculus Melbourne

Vicky Lam (ex-LAB) Daniel Libeskind's New York office.

Biography

Marcus is an award winning architect and urban designer; lecturer and researcher at the University of Melbourne; and co-director of Harrison and White Pty Ltd.

His design research into urban modelling and new design methods has been widely published and exhibited throughout Australia, North America, Asia and Europe

WORLD ARCHITECTURE WORKSHOP: MEMES AND SHORTCUTS

**GRAHAM CRIST, GRETCHEN
WILKINS & PAUL MINIFIE**
RMIT UNIVERSITY

**DESIGNING/
EDUCATION**
CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

Abstract

The World Architecture Workshop is a collaborative design studio project which has run annually for ten years, with three core schools, based in Melbourne, Montpellier and Sendai. Each year it has run in a new location, and that urban place provides the focus to the project and its design research. The workshop has therefore operated in six countries, and periodically involved other schools, including those from Spain, China and the USA. It is an excellent test case in an international collaborative design studio since it has experienced both diverse conditions and repeated formats.

The profoundly valuable learning experience to the students barely needs questioning. Its longevity has even meant that a participating student later joined as a supporting tutor. A reflection on this studio environment though, needs to examine the limitations of the experience pedagogically, and the limitations of what the work might discover about the particular urban questions of the project and its site locations.

If we accept that a design studio integrates learning and design research through a project, then we might ask: what are the limitations to what can be asked or what can be discovered through such a process? Or, what are the effects of the environment and the process on the discoveries?

Generally, students from Japan, France and Australia arrive in an unfamiliar place and work intensively for ten to fourteen days on an urban-scaled project. They are accompanied by tutors from their own school, with their own set of views about urbanism. They are pre-briefed prior to arriving, and develop or complete work after departing; nevertheless time is short and the task complex. We have observed a series of strategies for contending with such pressures; from limitations in language, to cultural differences in methodology. These might be called memes- and involve fast means of sharing knowledge and developing a common understanding. They are short-cuts and short-hand, ranging from reliance on web-based imagery, to default beaux-arts techniques of classical urbanism. The

longevity of the workshop has also been able to trace the explosion in availability of shared imagery and information, even over the last ten years. This experience has something to tell us about the nature of design learning, but also about how cities are understood, and made.

World Architecture Workshop: organisation

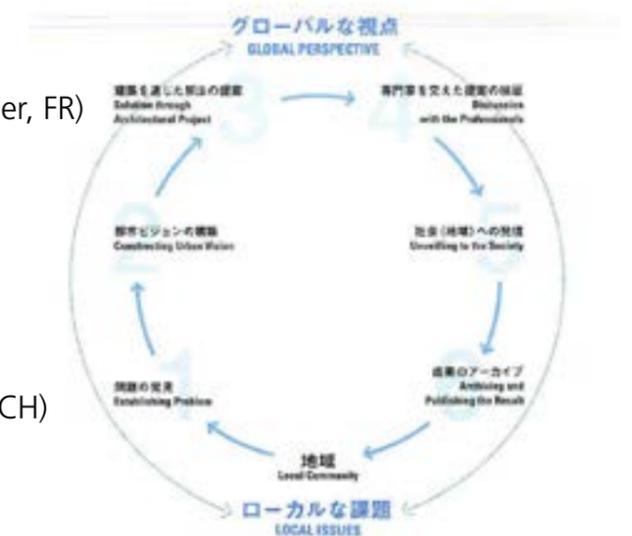


PARTICIPANTS:

- Ecole Nationale Supérieure d'Architecture de Montpellier, France
- Tohoku University, Sendai, Japan
- RMIT University, Australia
- Miyagi University, Sendai, Japan
- Tohoku Institute of Technology, Sendai, Japan
- Universtitat Internacional de Catalunya, Spain.
- University of Michigan, USA

HISTORY:

- 2002: Shrinking Japan (Miyagi, JP)
- 2003: Easily Flooded Architecture (Montpellier, FR)
- 2004: Leisurelands (Melbourne AU)
- 2005: City of Innocence (Sendai, JP)
- 2006: Nano-City (Montpellier, FR)
- 2007: Borderlands (Detroit, USA)
- 2008: Post-Oil City (Barcelona, SP)
- 2009: Post-Waterfront Cities (Lianyungang, CH)
- 2010: Population (Mildura, AU)
- 2011: Le Port (Reunion, FR)
- 2012: Unveiled Network (Sendai, JP)



World Architecture Workshop: Memes and Shortcuts

If we reflect on a design studio like the World Architecture Workshop, what can it tell us about the relationship between the pedagogy of design and the discoveries of design research in architecture, and in particular, architectural urbanism? This workshop has run for ten consecutive years in ten different locations; it is as such a rigorous trial and worthy of some reflective observation. It also ran as a collaboration between three core partners; RMIT in Melbourne, ENSAM in Montpellier and Tohoku University in Sendai. It engaged additional partners for particular workshops; namely the University of Michigan and Universitat Internacional de Catalunya in Barcelona, locating the workshops in six different countries over the decade. So, the repeated trials operated with multiple cultures in parallel, and new locations on every occasion.

The core of the method is an intensive workshop carried out on location over two weeks, designing a project framed by the urban place in which it is located. Each year, a school hosts the workshop and nominates its location; establishing the site for study, its thematic territory, and the briefing material. The semester program at RMIT would involve approximately six weeks design preparation before travel to the workshop, and a collation and presentation of the work upon return. At the workshop, students arrive, are placed in teams (a Japan/France/ Australia combination) and the intensive work kicks off. Much of the previous assumptions of the preparatory work is instantly undone, and the collaborators begin the task of negotiating shared language and joint creative work. They simultaneously observe the physical site and present the work they had done prior to visiting that site, to their peers. The two week esquisse is generally structured with the first half designing an urban proposition at large scale, usually referred to as the masterplan. In the second half, the team shifts scale to develop a series of projects at more detail and with more architectural focus. Student groups are co-supervised by the international staff group. The student participants then present the work in a public forum, often to invited architects and representatives of communities involved in the projects. After the final presentation, RMIT students return home to prepare a portfolio of the project outcomes.

This is a relatively familiar format. The value of the learning experience to an architectural student is difficult to doubt; a complex project in new and exotic

surroundings, collaboration with new colleagues and intense, daily interaction with a wide range of tutors. Many of the participating students will have had transformative experience. And several students from early workshops have later returned to join the workshop as tutors. A reflection on the workshop series though needs to examine the limitations of the learning experience, the architectural process and the discoveries in the work about the urban environment. What observations can be made of students working in this format over a number of cycles? Can this shed any light on the design process, practice or the environment for carrying out design, particularly design of the urban environment?

In a design studio such a number of things are happening simultaneously and in an integrated way. First: learning, through the acquisition and application of skills and knowledge. Second: the simulation of a professional design environment, with a project team, a brief and a hypothetically real project. Third: speculation through design which yields some discoveries in the field, or applies new knowledge to a unique context. We might think of these three activities in ascending order of aspiration. More importantly however: what is the relationship between the three, and what is the relationship with these methods of designing and researching in our discipline? What might this collaborative teaching experiment tell us about how cities are designed in other contexts?

THINKING FAST and SLOW

In the workshop, students from at least three language groups arrive in an unfamiliar place to work for ten to fourteen days on an urban scaled project. The difficult urban situations have ranged from post industrial urbanism of Detroit, Barcelona, OroshiMachi and Villeneuve, colonial cities of Le Port on Reunion island, a radically enlarged town of Mildura and post tsunami reconstruction in Sendai. The particular urban situation is invariably chosen for being subject to transformation by significant external forces; that is the current mode of the urban situation is inadequate to accommodate new pressures, be they demographic, economic or natural. The subject of the workshop is implicitly to effect a programmatic and formal transformation that can better realise the new potentials generated by these forces. Common with most design studios, these scenarios take as a given that this transformation can at least partly take place through proposing new organisation of program and form.

The students are pre-briefed prior to arriving on site, and have the opportunity to develop or complete their work after departing. Nevertheless time is short and the task is complex. Careful analysis of a situation, or the questioning of the initial assumptions is not feasible. Young designers learning their discipline are also contending with pressures exerted from the studio context; from limitations in language to cultural differences in design methodology and teaching style. The primary task is to quickly find enough shared language and ideas to proceed. We have observed strategies to contend with these pressures in the workshop. These might be called memes - i.e. fast tools for sharing knowledge and developing a common understanding. They are short-cuts and short-hand which foreground the known and the easily encapsulated, mimicked or easily reproducible.

In this context, an operative architectural meme could be seen as having some particular characteristics. The first might be that it is robust; having a persistent clarity both at the level of coherent figure, and also in its attendant justification. This quality enables a communication with a minimal of verbal sophistication. Further, replicability would refer to it being able to adapt to a variety of specific urban circumstances, with variable but foreseeable outcomes, while maintaining a forceful integrity. These qualities allow students to rapidly find a common ground, and begin to work quickly in an unfamiliar cultural context. That context includes uncertainties about the critical reception and favoured modes of justification held by the review panels (which in this case typically include community stakeholders). In the face of that uncertainty, students are likely to favour methods and figures that have strong levels of communicability and established implicit justification.

The kinds of memes deployed might include figurative diagramming techniques, families of projects, or particular infrastructural elements, or urban organisations which might privilege beaux-arts techniques axial and nodal diagrams, or otherwise prefigured responses borrowed from previous experience or local (individual) context. Other methods operate at the level of the image, with particularly vivid examples harvested and repurposed from the common space of the internet. Such tactics are simultaneously inadequate in capturing the specific complexity of a situation and highly effective in addressing the task at hand.

The DESIGN WEB; remote and shared information

In the ten years from 2002 to 2012 the workshop operated without any web presence and without any tools for online collaboration. It is hard to imagine the next series operating the same way, even if it continues to focus on face to face collaboration. When the workshop began, Facebook and twitter did not exist, and the content on the web was a small fraction of what it is now. At the end of 2011 for example, there were estimated to be 555 million websites live. 300 million of those were added in that year. The social media of architecture is the shared currency of imagery, and it visibly cuts through the cultural differences between the international participants. And in the context of a deadline, it is quicker to download from Archdaily than to visit a site 800 metre away for first hand photography.

MASTERPLANNING for masters and servants

Urban design limitations are built into a process where master planning precedes architectural interventions chronologically, and where that chronology is very compressed. Infrastructural diagrams are privileged over interaction between the built environment interacting with its urban structure. Architecture becomes a servant of the master plan, and urban design becomes conflated with town planning. The meme analogy in urban diagram terms throws up a few recurring favourites: ribbons; ropes; pixels; networks; or landscapes. These are primarily diagrams of circulation routes and informed by a strong preference for axial organisation, but each is an easily transmittable idea at high speed.

Again, this is not to discount the value of such processes, but to recognise they take precedence over close observation of the existing fabric, or the accretion of architectural fabric. Beginning with these tropes or diagrams is short-cut to more complex outcomes. It compresses the complexity of the context into something workable - be it post-disaster Japan or the post-industrial crisis of Detroit - into a quick, visual trigger.

The visual representation of the projects reinforces this through a tendency toward certain quick but potent techniques. The silhouette diagram, the pictogram, the figure/ground plan and various methods of collage recur. These carry communication tasks beyond that of diagramming; and beyond describing figure/ ground representations; and operate to tell the whole story. They representations; and

operate to tell the whole story. They substitute for other forms of representation, such as photography of the urban environment, as a new found condition. They do not to tell the whole story but relay key ideas or depict fleeting conditions, and are malleable forms of drawing - many hands can contribute simultaneously and messiness is not detrimental. Conspicuously absent are time-consuming and or very precise modes of design and communication such as photo-realistic rendering, video, animation or scripting.

If we consider also Kahneman's Thinking Fast and Slow in relation to design, then we might imagine two modes of thinking interacting; the fast, instinctive and emotional system and the slower, more deliberate, and more logical system (1). The benefit of thinking fast is that it makes the process feasible and generates productive momentum. It is coupled with the demonstrated limitations of this system; the logical errors and conceptual biases which are built into it. While setting aside the complexities of the cognitive or cultural process mentioned here, there are a few observations to be made in relation to them.

Instead of the real thing

At very least, the shortcut memes act as a technique to mimic the real thing, thus allowing a design process to unfold and the other useful experiences to be absorbed. That is, the entire process might stand in for a more detailed and nuanced one, in order to make other discoveries through collaboration and engagement with a context. Successful memes persist through variation, mutation and adaptability as they propagate, but they also hold a place in the queue which leads a different piece of knowledge acquired through the experience of the team project.

The quick, diagrammatic approaches endemic to workshop projects are indeed short cuts responding to intense pressures of time and complexity, but they are also inherently responding to knowledge accrued across much longer timespans and cultures. Tropes acknowledge experiments and experiences conducted over much time, previously, by others. In architecture they are effectively concentrated design processes, information compressed into a 'platform' for future work. Douglas Rushkoff describes this through Alfred Korzybski's notion of 'time binding': "A civilization makes progress by leveraging the achievements and observations of past generations. ... We create symbols, or what Korzybski calls abstractions, in order to

represent things to one another and our descendants more efficiently. They can be icons, brands, religious symbols, familiar tropes, or anything that compresses information bigger than itself."

The tropes, or memes both used and created by the workshop projects can be seen most productively in this light: observing, gathering and compressing architectural precedents and experiences in service of new design production, new observations. (2)

More like the real thing

Despite the limitations of the workshop format, it is a closer simulation to professional context than we may like to admit. Unreasonable deadlines, inadequate briefing and knowledge of the context, and imperfect collaborations; these define the environment that architects contend with frequently. Grappling with such situations, and being propositional within those situations, is increasingly typical to design tasks. The workshop model provides practice for this practice - cultivating skills for rapid design response in service of experimentation and debate over completeness and correctness. The kind of design which foregrounds effective application of design knowledge in unfamiliar and uncertain contexts is, for better or worse, an increasing part of the professional work of architects.

As Koolhaas and Mau once described the architect's adventures: "they are confronted with an arbitrary sequence of demands, with parameters they did not establish, in countries they hardly know, about issues they are only dimly aware of expected to deal with problems that have proved intractable to brains vastly superior to their own." (3)

It is possible to speculate too, on the unexpected benefits of working fast - of accidents. Thinking fast in design seems to bypass the restrictive thought processes for students that can debilitate or at least neutralise the potency of speculation. So while a designer might default to known and obvious patterns or models when under time pressure, it is equally possible that these compressions delivery a happy accident forced out of the author.

Two qualifying points should be noted with regard to the workshop intensive.

First; the shock tactics of the intensive need to be alternated with slower more deliberative design thinking, and complemented by repetition of the process. Working fast works if it is done several times; if it is coupled with a slower focus, and with reflection after the fact. Second, what is best gained from these experiences is provocation and speculation, rather than solving a real problem. Workshop processes such as this should be strictly delineated from a 'fly-in fly out' project which attempts to address a pressing problem, with social or economic implications, in a very short period.

CONTEXT AND CULTURE: home and away teams

It is obvious that students designing in these modes frequently misunderstand the urban context. It is also clear that the process favours bold, and possibly unreasonable infrastructural moves at the urban scale. It is not surprising that we have observed the designers working in their own local context to be more sensitive to that context than the visitors.

An acute example is the Reunion Island workshop where a local group from the school in Le Port was added to the French cohort from Montpellier. A trepidation, coupled with an orthodox view of urbanism was contrasted with the apparently reckless acts by the Japanese and Australian students. The term 'dangerous' became frequently used by the local tutors. Similar examples occur each year: American students protective of Detroit's legacy while others see only ruins, Japanese tutors amused at the whimsical if not audacious proposals for their local city centre. But if speculation and provocation is what is needed in this context, then local knowledge might be a disadvantage. Being too close to a subject limits one's ability to reimagine it, just as being too remote risks cavalier, or even colonial, urban gestures. The two-part structure of workshop (independent local work followed by on-site collaboration) endeavours to benefit from both 'problems', objective distance and local knowledge. This also allows the workshop over time to track changes in students' design approaches that occur between the far-out and close-in reading of the architectural-urban problem.

This affects the nature of teaching structures in the workshop as well. During the workshop tutors typically review the work on site daily, in teams which have at least one tutor from each university. As such each group gets feedback from the various

perspectives of each school, along with varied methods and approaches to instruction. Australian students are advised by Japanese, French, Spanish or American tutors, for example. Tutors experience the same negotiation of a position in an international team, instructing as a group. Clarify of language and direction is the primary concern, as is enabling productivity and negotiating conflicting ideas within the group. Full control of the direction of projects by one or more of the tutors is simply not possible in this context. At best case this provides an unobstructed path for accelerated design production; at worst it stalls work under the weight of negotiation, and ideas dissipate.

Conclusions

The discussions among the design teachers that lead to this paper, began with a critique of its limitations, and expanded to an appreciation of the process which can appear chaotic and superficial.

A fast design process at urban scale that deploys meme-like operations is open to criticism on grounds of being insufficiently grounded in close observation of local conditions and therefore unable to provide an authentic response to that particular circumstance, it could be admitted that such nuanced responses are not always possible or desirable. If we admit that a transformational practice - one that changes fundamental aspects of how a city operates or is understood - can be positive or even necessary, then the question becomes not one of how to make rapid urban practice more authentic, but rather how it might be made more effective, and show it to be such. The conceptual tools students work with might be criticised not for their pre-figurement but for their lack of invention and transformational effectiveness.

In this studio context an important part of pedagogy is to share the risk for unconventional and propositional strategies between students and staff. This has never been a heavily directed masterclass, nor an independent student competition. If staff establish the ground for a studio's methodology and the criteria for judging its success, students are freed to explore innovative design modes freed of some obligation to structure justifications to an uncertain audience. The rapid urban

workshop model described here might produce more transformative discoveries if staff had more involvement in a team's methodologies, and less replication of the students' negotiating tasks. One structure being considered for future workshops would be for several individual tutors to take a primary leading for a teams of students, with an understanding that varied modes and approaches would be expected from each team. In any case, the foregrounding of the speculation and provocation at a significant scale and complexity would remain central.

Endnotes

- 1 Kahneman, Daniel, *Thinking, Fast and Slow*, Farrar, Straus and Giroux, USA, 2011
- 2 Rushkoff, Douglas, *Present Shock: when everything happens now* (New York: Current: Penguin group, 2013) p138.
- 3 Koolhaas, Rem and Mau, Bruce; *SMLXL*, p.xix, the Monacelli Press, New York, 1995

Biography

Dr. Graham Crist is a senior lecturer in architecture at RMIT University where he is director of the masters of architecture program, and the director of that school's practice research symposium in Asia.

He is a founding director of the Melbourne architectural practice Antarctica. The design work of this practice pursues a contribution of design to social and environmental questions, in a wide range of peripheral urban contexts.

Gretchen Wilkins teaches architecture and directs the Master of Urban Design program at RMIT University. She is also a founding director of Studio Apparatus and editor of *Distributed Urbanism: Cities After Google Earth*. Her interests include the industrial and economic forces shaping cities and contemporary urbanism.

Paul Minifie is an Associate Professor at RMIT University, where he teaches into the architecture program and directs the Design Practice Research Centre. He is principal of MvS Architects, a practice who's built and theoretical projects have been awarded, published and exhibited in Australia and elsewhere. MvS is known for propositional works

that bring generative techniques to bear discursively on architecture's continuing thematics.

Reference Images

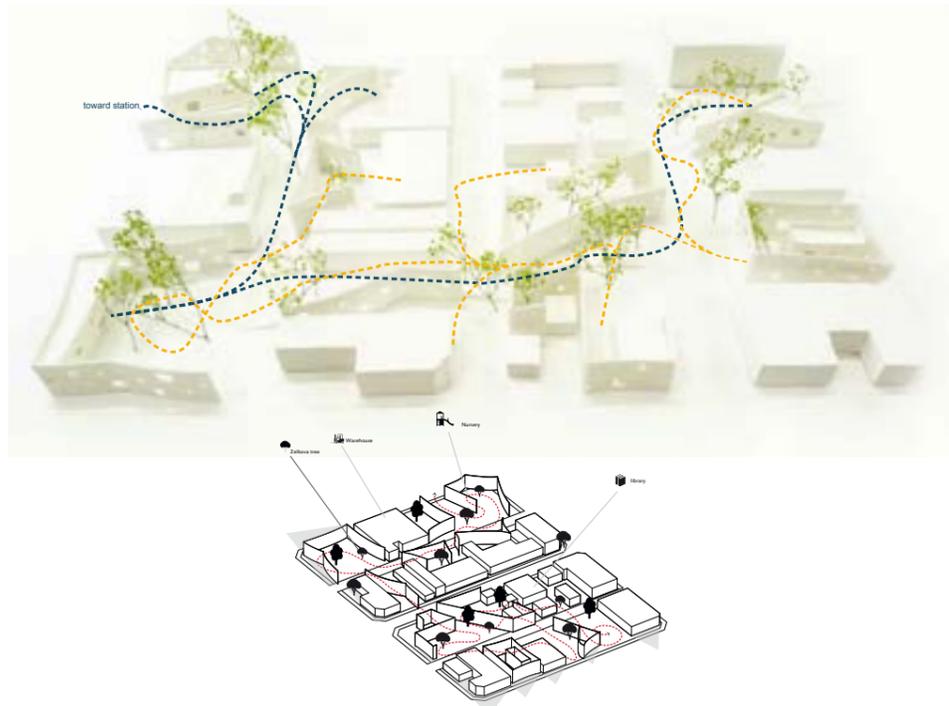


World Architecture Workshop: publications

Urban Strategies: Ribbons



"Detroit Borderlands" by C. Algie, T. Kawakami, J. Mercado, M. Brunel, G. Santoma (Borderlands, Detroit, USA 2007)

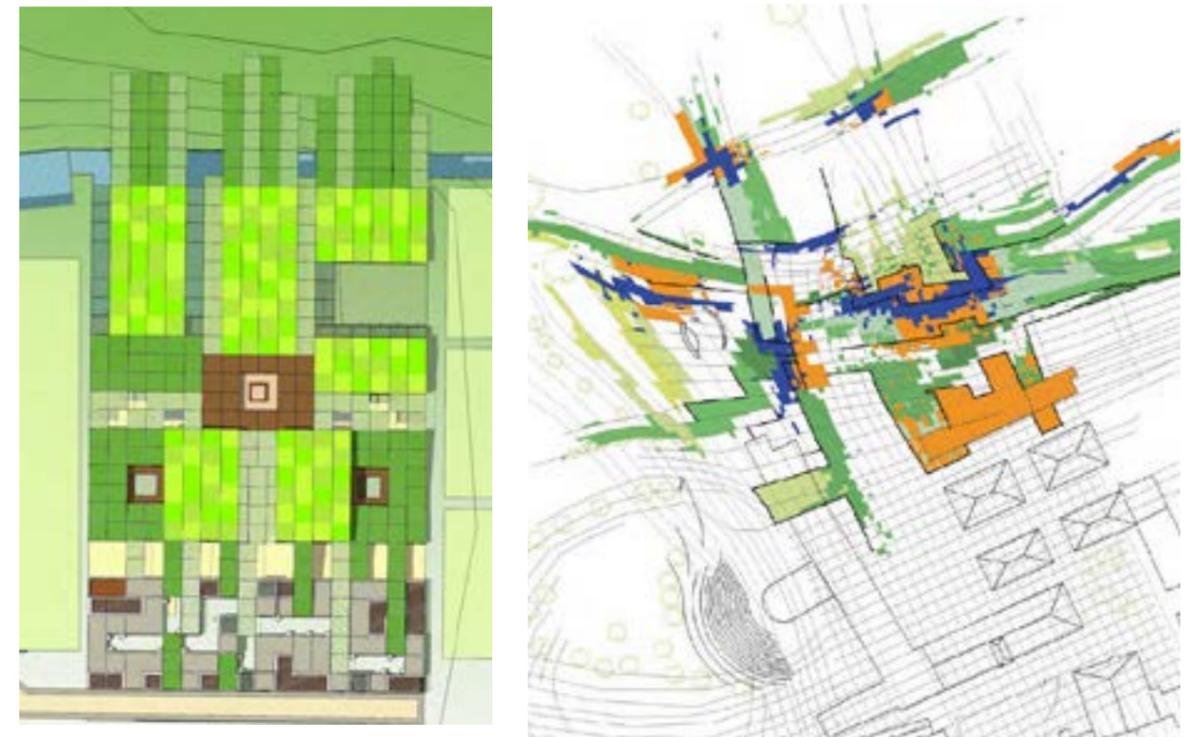


"Ecotone" by J. Laure, M. Lloyd, P. Malaquine, M. Shota, HH Ng (Unveiled Network, Sendai, JAPAN 2012)

Urban Strategies: Networks



"Pop Up Box" by C. Duchamp, J. Morel, M. McMahan, K. Tahara (Post-Oil City, Barcelona SPAIN 2008)



"Connecting People" by C. Cavalier, M. Palma, H. Uranami, M Chu (Post-Oil City, Barcelona SPAIN 2008)

Urban Strategies: Networks



"Future Past City" by C. Gilbert, T. Dalby, J. Dieu, E. Haneses, Z. Chuhan, L. Zheng (*Post-Waterfront City*, Lianyungang, CHINA, 2009)



"Gateway to the East" by G. Defer, L. Le Fevre, M. Moustey, D. Riddell, A. Sora (*Unveiled Network*, Sendai, JAPAN 2012)



"Dynamism" by E. Olstad, S. Wong, M. Chapuy, S. Yamada, Z. Xue (*Post-Waterfront City*, Lianyungang, CHINA, 2009)

Urban Strategies: Landscapes



"The 3rd Industrialisation" by M. Bensal, C. Dewanto (*Post-Oil City*, Barcelona SPAIN 2008)



"Urban Rope" by A. Bonnice, R. Ishainabe, S. El Ferchichi, H. Ju Seo, A. Kawamra (*Borderlands*, Detroit, USA 2007)



"Industrial Mountain" by C. Giardi, M. Lavit, H. Rowe, Y. Kodashima, Z. Cheng (*Post-Waterfront City*, Lianyungang, CHINA, 2009)

FACILITY..... LOCATING STUDIO TEACHING OUT OF PLACE/ PRACTICE

KATE TREGLOAN

MONASH UNIVERSITY

**DESIGNING/
EDUCATION**
CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

ABSTRACT

Where is studio teaching when the studio space is no longer permanently available or occupied? If the atelier model of disciplinary enculturation is dislocated from production, and if allocated contact hours limit the learning conversation, when will we engage in a studio experience? In the absence of these frames, how might studio teaching and learning usefully relate?

MADA's newly revised Bachelor of Interior Architecture program has drawn on recent research into "design expertise". Using this model, the teaching and learning of design is framed through three layers of studios, each aiming to elicit different student experiences and calling on contrasting teaching approaches to achieve these aims. Foundation studios, Practice Arenas, and Design Research studios offer a range of perspectives and design experiences, and also require shifts in the responsibilities and relationship of student and tutor.

Overall, the studio stream operates as an integrative focus for the collection and iteration of both general and discipline-specific design skills, scaffolded by other streams. For engagement this framework must bind itself to the design project, but for translation the studio must focus on praxis as well as outcome. For students to develop a personally relevant but productive and reflective balance, tailored provocation becomes a useful teaching skill.

This paper will present the new course framework through the lens of current research in design thinking and pedagogy. Two contrasting student design experiences, a first year Foundation studio and a final year Design Research project, offer examples of this translation. Together these inform a discussion of the challenges and subtleties of an activity that aims to provoke: studio teaching.

INTRODUCTION

The Bachelor of Interior Architecture (B.IA) has been delivered at Monash University since 1998, and was recently redeveloped following staffing, department and Faculty changes. The rollout of the new course has just commenced - both content and delivery will develop as new and subsequent enrolment cohorts progress. This paper offers an example of the application of design pedagogy research and a moment to review both new approaches and some familiar features of design programs through this lens.

A model of 'design expertise' is outlined in this paper. It is clear that in broad terms the development of skills can start with an outline of 'the basics' and progress to more complex tasks. Many teaching programs do this. What is less clear is the effect of a subtle shift in focus (from 'rule' to 'scenario' to 'strategy') suggested by the model. In the new B.IA this shift is highlighted by studios at various stages of the course. The paper suggests the agenda of studio teaching aims to provoke action on the part of the student, but that teaching provocations can be refined for greater impact on learning.

The new course framework weaves a focus on developing design skills with the engagement of content. It does not suggest or recommend a single set of techniques or processes. It steps away from a primary focus on design outcome, however, and from the assumption that exposure to variations in project, often through scale or complexity, will enable a student to extract enough useful experiences for future situations. In the B.IA both process and outcome are strategically engaged, with a view that both must contribute to learning when the Beaux Art(esque) atelier, and the Bauhaus(ish) workshop, are far from the current context of design education.

EXPERTISE + SKILL DEVELOPMENT

Although there have been numerous publications and discussions of the outcomes of good design, and increasing focus on the processes of creativity and 'innovation' in a number of disciplines, there is less discussion of the particular means by which students develop skills in design, and the contribution of studio to this end. Significant exceptions are recent OLT-funded investigations of creativity and studio

activities, and publications exploring 'design expertise' in terms of the cognitive skills associated with designing, and the role of drawing and modelmaking etc in support of this.

An important focus for the framework of the new MADA B.IA is the development of 'expertise'. "One of the key principles behind the development of high levels of skill seems to be the change from a conscious struggle to effortless even automatic, performance." To discuss Design Expertise in their recent book Lawson and Dorst draw on Dreyfus' model developed over several decades. This work suggests that beginners develop early understanding through the introduction of abstract rules into theoretical or semantic memory. With further practice, it is suggested that 'episodic memory' integrates social and cultural aspects to permit more 'automatic' performance (ie. development of expertise). This contrasts Piaget's proposal that comprehension increases with a move from concrete experience to abstraction, suggesting that abstract theory offers the beginning of skill development but that expertise is developed through practice. Read together these approaches suggest a cyclical relationship between abstraction and concrete experience, with more than a passing resemblance to Kolb's notions of experiential learning. This layered combination is consistent with notions of the studio as a 'social space' of 'learning by doing', with constructively aligned problems supporting declarative knowledge engagement.

The Dreyfus model of expertise sets out six 'levels' of expertise development. A summary definition of each is offered below, as interpreted by Lawson and Dorst for design skills:

- Novice: seek and follow strict 'objective' rules and 'expert' advice;
- Advanced Beginner: considering some situational aspects and exceptions, maxims;
- Competent: strategic selection of elements, opportunity-seeking, reflective exploration;

- Expert: intuitive response informed by previous experience, professional;
- Master: contingent view of professional behavior, acute awareness of context;
- Visionary: seeking opportunities to extend domain via marginal practices.

There is no suggestion that these 'levels' of expertise are independent, nor that any individual should fit neatly in one or another of these. Rather, each of us may attain different levels of expertise in various skills, and will construct a personal approach to designing on the basis of strengths, interests, experiences and opportunities.

Broadly, however, the model usefully highlights overall aims for course delivery and a means to consider students' experiences.

We may also note that the first three stages build on the integration of social and cultural ideas with problem perception – this initially proposed by Dreyfus to respond to the suggestion that artificial intelligence may offer a computer with design skills. MADA's B.IA aims to teach people (not computers) to design, calling on them to develop their preferences, understandings and values within and beyond the discipline. The development of reflective skills is key to this and discussed in a later section of this paper. The program focuses primarily on these first expertise levels to frame three general stages of the course: Core Skill Development; Skill Application; Personal Position.

DESIGN EXPERTISE in TRANSLATION

Students' travels through design programs are expected to include engagement with a version of 'real world' projects. Such project-based learning is now of great interest in other areas of education. It has been the mainstay of architectural and design education since the Ecole des Beaux Arts via the studio as both a space of activity (atelier, workshop, design lab); and as a model of engagement (project, praxis, workshop, travel, cross-disciplinary, blended learning). The tacit skills iteratively developed through multiple engagements have been discussed as 'designerly ways of knowing' and have been well-documented. These include: Engagement with novelty; Tolerance of uncertainty; Balancing of analysis, synthesis and evaluation; Drawing/modeling in problem-engagement; Adoption of solution-

focused strategies; Abductive reasoning for 'wicked' problems.

In addition to the development of these more general skills, particular design approaches that are relevant to the design of spaces and spatial experiences are highlighted. Some of these are introduced in the first semesters of the program through three Foundation Studios: Designing for Inhabitation; Designing in Context; Designing with Change. In all of these 'designing' (verb) signposts an early focus on skills and approaches. The first is 'for' inhabitation and implies a social agenda and a focus on the occupant's experience. The second suggests a responsive activity particular to place and circumstance, located within broader cultural constructions. The third intimates toward sustainable approaches, particularly relevant to projects of relatively short duration. These issues are not isolated, indeed they are necessarily linked, but Foundation Studios highlight key skills students will revisit and develop through later projects. These ambitions are implicit in the projects – and this is a key issue – as engagement is very much through project work and shared studio experience, rather than abstract description.

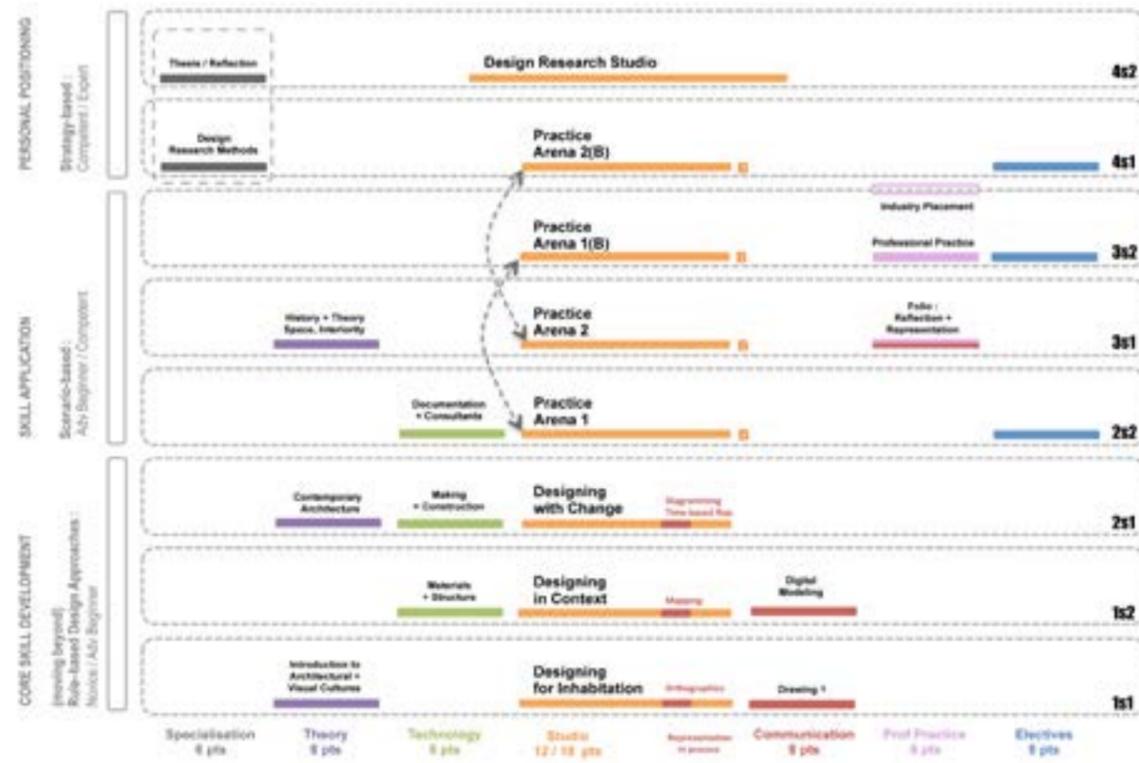


Figure 1: Course outline showing horizontal teaching / learning foci as expertise development, and vertical streaming of content from 1st year 1st semester ("1s1") at the base to 4th year 2nd semester (4s2) at the top

Core Skill Development : Foundation Studios

This first stage of the course aligns with the first phase of the model of expertise, indicating a time of collecting and then moving beyond rule-based approaches as Core Skill Development, or a move between approaches defined as 'novice' and 'advanced beginner'. Student work in this first stage is therefore fairly self-focused and introduces core design approaches and skills through the Foundation Studios as outlined above.



Figure 2: First section of the course including Foundation Studios scaffolded by other units to introduce key ideas and practices.

Skill Application : Practice Arena Studios

The middle stage (relating to 'advanced beginner' and 'competent' descriptions of expertise), brings a focus on the contextualization and application of approaches, and skills in selection and judgment for a given scenario. This stage is more outward-looking, with balloted, mixed year-level Practice Arena studios where disciplinary praxis and program research interests will be investigated. They allow space for both regular and 'once-off' studios, and more involvement by practitioners outside of the program. Scaffolding streams are similarly outward-looking, including electives in other parts of the Faculty and University, professional practice and documentation for consultants, and preparation for Industry Placement.

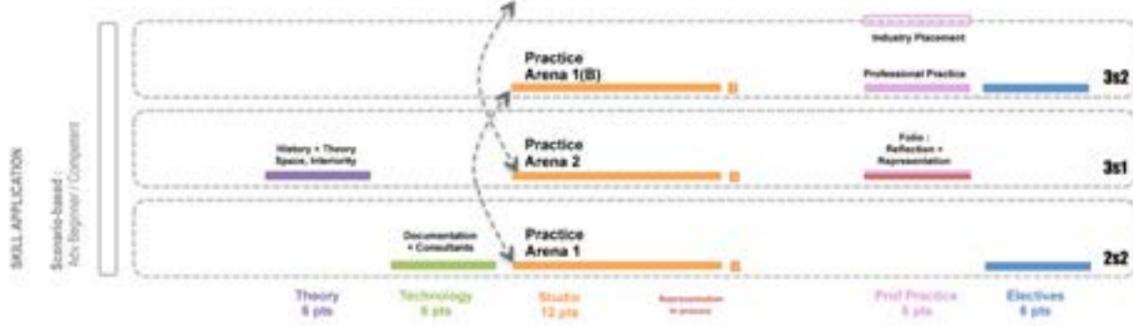


Figure 3: Middle section of the course focusing on an expanded awareness of discipline and scenario, and situated judgment.

Personal Positioning : Design Research Studio

The third and final stage of the degree calls for the establishment of a Personal Position - notionally between 'competent' and 'expert' designer. The student must become more independent, strategically applying professional knowledge and skills toward self-defined ends. This stage commences with a final practice arena studio in which final-year students are the senior cohort, alongside a final elective unit that may inform developing professional interests. A research methods unit introduces methodologies relevant to design, and assists students to identify research intentions for a final studio. The Design Research studio in the final semester is accompanied by a Thesis / Reflection unit as a full semester exploration.



Figure 4: Final section of the course aiming for personal positioning and a strategic exploratory approach to student-defined issues.

Further levels of expertise are described in the literature, but are not within the ambitions for this undergraduate course.

DESIGN EXPERTISE + STUDIO TEACHING APPROACHES

It is clear that teaching must adjust not only to the developing skills of students, as with any program, but also to the shifting relationship between student and rule vs scenario vs strategy focus implied by the model of expertise as set out. Moreover, it is clear that the overall aims of the teaching program are for increasing independence and personalization of response.

The role of the tutor in this overall agenda is significant, and relates particularly to the notion of 'provocation' ... for what is it that we seek from our studio teaching but the productive exploration of our students as they extend existing skills, find new forms, or propose novel approaches? In all of these, we provoke the travels (and travails) of another, and in the studio we design both the starting point for the adventure and the assessment of its progress.

Early Foundation Studios must have design briefs that balance boundaries useful to the novice with flexibility for students to start to define elements of the problem. Students must be both provoked and supported to move beyond the 'known' (including the currently published 'cool'). Simultaneously, tutors must identify and respond to the assumptions students arrive with. Understanding these challenges, particularly those around expectations for a 'designer', is an important element of early teaching.

In each Foundation Studio relevant conceptions of designing are identified with focus skills and challenges. The tutor has a particular role here linking projects and theme, setting a framework of "rules with spaces" that imitate the ill-defined design problem, and demonstrating designing and its practices (to be tested and expanded or rejected by each student). As an example, the Foundation 'Designing in Context' Studio asks students to design an installation within a context (students make a site model and test iterations of sketch model ideas); a proposal for a threshold / liminal space 'between contexts' (students map qualities across this threshold and storyboard a (re)designed experience); and the modification of an existing envelope and program (extending earlier approaches and early introductions to materials and structures). 'Generic' design skills are practiced throughout, as well as skills of observation, rich recording of experience, and responsive design approaches. While there is one tutor to a studio group of 17, the cohort for the semester is 70. Concurrent timetabling allows whole group activities and exposure to a wide range of approaches.

Practice Arena studios will draw on skills introduced through Foundation units. Teaching in this section of the course is a more familiar 'atelier-like' engagement of students and tutor with a focus design problem, using reflective conversations to review potential 'moves' and demonstrate their application to individual schemes. Students are challenged to justify the relevance of their approach. These balloted studios cover four semesters in total (overlapping with first semester final year), each with a single tutor and a cohort of 16-18.

The final Design Research studio aims for the strategic exploration of a personal agenda through a design project. As above, student investigations in the penultimate semester prepare for a final 'research through design' project and the

application of design practices to investigate the selected issue. The tutor in this case has become a 'supervisor' and the groups significantly smaller, around 6-7 per group. Students are expected to manage their own time, production and approach more independently. The teaching in this case most usefully provides a general framework for time-planning and delivery, a 'touchstone' with the expectations of the course and the discipline, and a critique of students' strategic approaches.

DESIGN EXPERTISE + LEARNING / REFLECTION

As above, design teaching over the program calls for an increasingly 'light' touch and the ability to perceive and respond to student concerns and development, as well as to relevant disciplinary issues, connections and practices. In this way teaching offers a form of professional enculturation via performed or suggested example, and by making relevant a rich store of precedent. Students must be encouraged to refine a personal mix of skills, knowledge and practices for future application. The intersection of these modes of learning and students' reflection both 'on' and 'in' designing offers another view of design expertise development in the program.

A first year design journal includes the following note :

"The first idea that came into my mind for this project was that 'secrets are meant to be shared' and I thought of designing a very open space but almost immediately retracted from that idea as I do not believe it fits the design brief. Then I thought about using the concept of being anonymous and censorship ..."

The student clearly perceives the brief as a set of 'rules' and attempts to come up with an idea that will provide an answer. This note is accompanied by a mind-mapping of 'secrets', and definitions from an on-line dictionary.

Another first year student extracts 'rules' for later application from a crit presentation:

"I think that I do need to focus more of my attention towards the layout, so my posters look like I present my extreme efforts. I also need to enlarge my titles, so they are easy to read from a distance. I need to further develop my design, as the model needs to be linked materiality. I need to also consider weather conditions ..."

While the rollout of the new course is yet to reach the final year, fourth year students are already engaged in a final studio with a focus on design research. These students produce a document accompanying a developed design proposal similar to the thesis document anticipated. It sets out aims and explorations of the project, relevance to identified issues, and reflections on the project approach and outcomes.

A completing student in 2012 included the following very strategic statement:

"This project investigates the relationship between design and opportunity in order to ask: How can design prevent spaces and objects from reaching a 'full stop'? This question has been addressed by examining the connection between the methods and attitudes of the designer in the provision of forward-looking opportunity as a 'design outcome'. Existing wasted opportunities, both spatial and object, were studied to provide insight into obsolescence and also considered as possibilities for recovery."

Project work included designing a system for re-locatable food production and education spaces aiming to engage youth at risk of homelessness. The student reflected on personal approaches and interests in design outcomes as well as engagements in design activities:

"Upon the completion of my final project and when looking over the past four years, continuous underpinning threads throughout my practice were consciously recognized. Similar to The Recoup Project, past works have concentrated on time based design outcomes, which assisted further unpacking of the systems design approach. My work continues to search for the opportunity of the event in architecture, and to design loose but structured frameworks for users to assist in the construction of space. Past design processes have been heavily theoretically grounded, placing important weight on strengthening concepts through precedent theories and practices. Although always a challenge to resolve equally, the layering of sub-concepts continues to appear within my work. Despite posing obstacles, this is what preserves my interest throughout the duration of the design process."



Figure 5: Images of material / conceptual experiments and a final layout panel for the 4th year project outlined.

CONCLUSION

The new B.IA at MADA focuses on both design outcomes and processes, using a model of expertise to link designerly skills and stages of learning. This focus responds to shifts in resourcing, in terms of the both the physical spaces and the teaching timetable, that are now commonplace across the Australian sector. Prompted by this, it identifies a view of studio not as a 'place' or a 'professional apprenticeship', but as a teaching and learning 'relationship' contributing to skill development over time. At a distance, the nature of these skills and support for their development does not fall far from some familiar activities in tertiary design education. Articulating particular design skills and discipline-specific foci in detail, and then framing a program to align (albeit loosely) with developing 'levels' of expertise, offers the ability to reconsider these activities and to use them strategically within a developing program. We have only recently commenced delivery of this new course and continue to refine its content and ambitions. We are looking forward to further experiments, and the opportunities that lie in developing a 'facility' that is not a location of action, but the ability of our students in design.

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Biography

Kate Tregloan is a registered architect and maker of buildings, interiors, furniture and jewellery with an abiding fascination for spatial ideas and experiences. Current research projects combine this with a passion for teaching to focus on the cognitive functions and exploratory activities that underpin learning, designing, and learning to design.

SOCIALIZED DESIGN EDUCATION: EXPLORING THE POTENTIAL OF SOCIAL MEDIA IN DESIGN STUDIO

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EDUCATION**
CONFERENCE

PROVOCATIVE STUDIO PEDAGOGIES

Abstract

Technology-enabled education is an extensive and active area of both research and current teaching. The use of Web 2.0 technologies, such as blogs and wikis, in the formal educational environment has utilized generational digital literacies and has facilitated more flexible modes of learning. Challenges still exist, however, in areas of student equity and interpersonal relations. With the emergence of social networking, there is an increased level of personal interaction, accessibility and information management. This shift in the social landscape places demands upon teaching methods and student engagement, calling for ways to integrate the new social behavior within the formal education setting.

This paper presents a qualitative case study of socialized blended learning, using a social network platform to investigate the level of literacies and interactions of students in a blended learning environment of traditional face-to-face studio and online participatory teaching. Using student and staff feedback, the paper examines the use of a web-assisted model of assessment, participation and publication as a mechanism for measuring the effectiveness of inclusive learning when supported by the constructs of social interaction. This paper describes the analysis of qualitative data to develop a preliminary theoretical framework of the social affordances of web-assisted teaching environments to support the changing demands of student literacies, cultural competencies and learning needs. The framework aims to support future models of online learning and facilitate further research into mediated design education.

Introduction

During the past few years, an increasing amount of Internet services are focusing on the practice of social behavior using software that are perceived as socially connective, such as blogs, wikis, trackback, podcasting, video blogs and social networks like MySpace and Facebook (Alexander, 2006). Today's students are entering higher education as digital natives (Prensky, 2001), having grown in a digital landscape for most of their lives. This generation of learners enter the university environment as multi-taskers, comfortable with performing multiple functions in various digital ways such as email, chat, text, and online posts (Roberts, 2005). Studies have shown that this level of online literacy places an increasing pressure on educators to integrate online tools to leverage this Internet-literate generation of learners.

One increasing global trend for Internet-based teaching delivery is the blended learning environment, which combines the online instructional system with face-to-face contact (Driscoll, 2002). Blended environments are often seen as a hybrid of two environments, one that employs conventional face-to-face interactions and one that utilizes the Internet for extended communication and collaboration. Thus, blended environments present a flexible approach to course delivery, offering more than one time and place for learning (Collis & Moonen, 2002). Blended learning environments offer opportunities for social interactions to occur through reflective activity, collaboration and individual expression. According to social constructivist theory, higher levels of learning occur within this social context (Jusoff & Khodabandelou, 2009; Yildiz, 2009), where interactions are promoted outside the face-to-face class time.

Methodology and Sample

A pilot study was conducted using a blended learning environment for first year students of an Interior Architecture design studio, combining the traditional face-to-face studio environment with an online studio environment using a social network platform. The aims of the study were to:

- investigate patterns of student re-presentation, levels of disclosure, communal behavior and social exchange in both the physical and virtual environments

- test whether a blended learning approach was able to facilitate a more effective and inclusive community of design inquiry

Course Design

Design studio

The face-to-face studio environment of First Year Design Studio is typical of most studio-based forms of design education. Tutorial groups are based around a maximum of fifteen students in a problem-solving setting led by individual tutors. Typically, studio activities begin with group pin-ups and discussions early in a project aimed at facilitating common understandings of design limits and possibilities and build to individual desk based consultations in the later stages of a project, aimed at refining design ideas.

Online social network

A social network site (SNS) is defined here as a web-based service that allow individuals to share content within a bounded system. Such systems can generally be constructed as either a public, semi-public or private profile, and aims to allow users to view and negotiate with their list of connections and those made by others within this system (Boyd & Ellison, 2008). A SNS was determined to be appropriate for the investigation of social behavior of students within the formal educational environment.

The following functionality was implemented in the on-line studio environment:

- Latest Activity: a central block of dynamic information, containing updates from blogs, events and comments. The latest activity was used as the first point of contact, to keep the student updated on what was occurring within the course.
- Blog: each member had a personal blog, in which individual content could be uploaded to. The blog was used to house developmental work from their studio projects.
- Photo Gallery: used to store student albums containing scanned drawings, graphic layouts and imagery. Design studios involve a large amount of graphic

communication, so the galleries allowed the students to upload a range of graphic content. This was a necessity, and a required component of the online environment.

- Comments: used to provide tutor feedback to specific posts, and an avenue for peer feedback. Comments were valued for their immediacy and connection to the relevant work.
- Events: simply used for announcements. However, the social terminology 'events' altered the way the announcements were received.
- Individual User Page: each member had a personal page that contained their blogs, photo galleries, friends, and comments. This was used primarily to provide a high level of personalization to the course.
- Chat: an opportunity for casual, unmonitored interaction between the students.

The on-line studio environment mimicked the face-to face environment through the establishment of 'Groups' representing the 7 tutorial groups led by specific tutors. Students were required to maintain a weekly Blog using drawings, photos of virtual or physical models and text summarizing and reflecting on their design development. Tutors were requested to comment on the Blogs at least once prior to the weekly face-to-face studio.

On joining the network, users were requested to maintain all communication as 'public' i.e., to allow all users to view their profile, photos and blogs.

Participants

92 first year students from the Interior Architecture program were invited to participate in the survey. A brief analysis of the students showed the following details:

- 92% of students were aged under 24 years
- 70% stated they were local students, 30% were international.
- 75% of the students were female

The Ning platform

Ning, an online platform for the creating and hosting of social networks, was selected to host the course's online component. Ning competes with social sites such as Facebook and MySpace by allowing people with specific interests to create their own social networks using their own visual design, choice of functionality and member data.

Dynamic interface

The interface of the Ning platform was designed to two primary criteria: visual appeal and social presence. Visual appeal included an easy to understand, simple layout that did not contain distracting or confusing imagery or color schemes. Social presence here is defined as the 'degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships' (Jusoff & Khodabandelou, 2009). It is also seen as the ability of learners to project themselves socially and affectively into a community of inquiry (Rourke, Anderson, Garrison, & Archer, 1999). Social presence is a complicated construct and involves privacy, social relationships, communication styles, the nature of the task, feedback, and immediacy (Tu, 2002), and can have a significant impact on student progression, improved learning, motivation and engagement (Jusoff & Khodabandelou, 2009; Richardson & Swan, 2003). It is therefore necessary that a social presence is able to be sensed in the front page of the SNS.

The front page of the Ning network (Figure 1) was deliberately left minimal to place focus on the central block of information: the latest activity. Similar to other SNS, the latest activity block constantly changes with updates of activity from the network, including student blogs, events and comments. Network members are continuously being featured in this block, generating a strong sense of social presence. Other front page items include personal settings, members, events, blogs and groups.

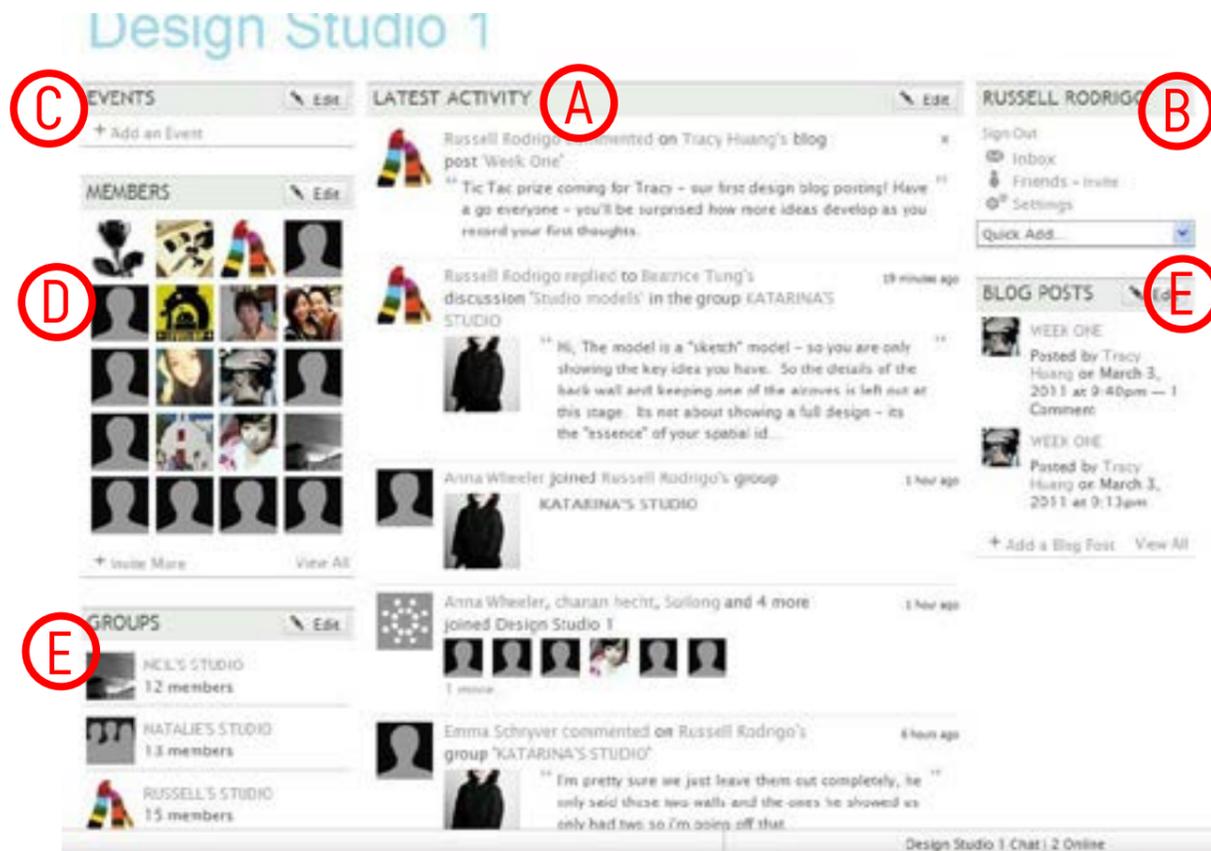


Figure 1: Components of the Ning front page. (A): Latest Activity feature block constantly updates with the activity of student blogs and comments (B): Personal settings for every member, including email and list of friends (C): Events feature block is used for announcements (D): List of course members (students and tutors) displayed as customized avatars (E): Features such as groups and blogs can be dragged onto the front page as condensed blocks

Avatars, profiles and friends

Like all social network sites, the Ning platform is built around the visible profile of members, including the listing of 'Friends' who are also part of the system. Like most social network sites, Ning allows members to upload a profile photo, an avatar, as a representation of themselves. This feature was used enthusiastically by students, with many regularly updating their avatars. Avatars emerged very quickly after the network was made active (Figure 2). Avatars for both students and staff ranged from full or partial portraits to more abstract images.

A critical component of all social network sites is the public display of socialization and the making of connections. While all computer-mediated communication allows

individuals to meet strangers, what makes social network sites different is that they 'enable users to articulate and make visible their social networks' (Boyd & Ellison, 2008, p 211). In the on-line studio environment, identity and connectedness is given visual and temporal form through the public displays of 'friending'. Donath and Boyd note that in social network sites, information is provided on an individual through the context of their connections, '...social status, political beliefs, musical taste, etc, may be inferred from the company one keeps' (Donath and Boyd, 2004).

Like all social network sites, after joining the course Ning network, users were prompted to welcome new members and identify others they wish to make 'Friends' with. The act of 'making friends' was quickly adopted by students early in the course (Figure 3). The list of Friends also allows users to cross the network by clicking through the Friends lists. Both the avatar and friend feature of Ning contributed to the very high level of personalisation.

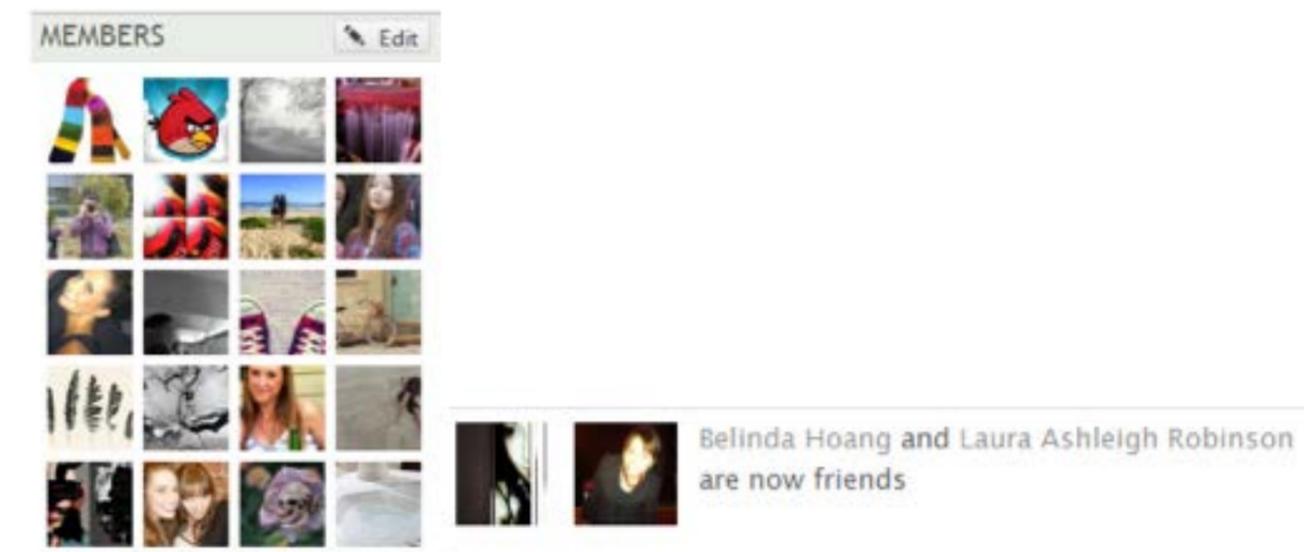


Figure 2, 3: Rapid emergence of personal avatars to represent members, and the process of "making friends"

Survey Questions

A survey was issued to the students and staff containing a combination of questions ranging from multiple choice and short answer questions, to psychometric scale items (Table 1).

Table 1: Survey Questions

Survey Question	Question Type
Have you used social media before? E.g., Facebook, Twitter, Blog, etc.	Multiple Choice
If yes, what social media have you used before?	Short Answer
Outside the educational environment, do you use social media	Multiple Choice
Prior to Ning, did you use any other online learning environment for educational purposes?	Multiple Choice
If yes, what did you use?	Short Answer
Do you chat/comment/email other students in Ning?	Multiple Choice
The Ning environment helped me build a sense of community (interaction) amongst the students	Psychometric Scale
The Ning environment helped build a closer relationship with tutors	Psychometric Scale
Using Ning improved the way I interacted with my peers/tutors in studio	Psychometric Scale
Using Ning helped me feel more connected with the course	Psychometric Scale
Using Ning helped me to develop my communication skills	Psychometric Scale
Using Ning helped me keep more informed about the course	Psychometric Scale
Using Ning helped me better prepare for studio	Psychometric Scale
Using Ning helped me progress my design work between face-to-face studios	Psychometric Scale
I prefer: (Face-to-Face Only, Online Only, A combination of the two)	Multiple Choice
The combination of online and face-to-face approach had a positive impact on my progress in this course	Psychometric Scale
The online component will help achieve a better grade in the course	Psychometric Scale
Using Ning helped me reflect on what I was learning	Psychometric Scale
Using Ning improved my design skills in general	Psychometric Scale
Compared to your previous experience with online learning, what was different this time using Ning?	Short Answer
The online environment developed my ability to express and share my ideas	Psychometric Scale
Using Ning helped me improve my ability to work with a group	Psychometric Scale
I log into Ning...(frequency)	Multiple Choice
I do the following in Ning (multiple options to measure activity)...	Multiple Choice
The online component allowed me the flexibility to study at times that suited me	Psychometric Scale
Having this flexibility had a significant impact on my ability to complete assessments	Psychometric Scale
Having this flexibility had a significant impact on my ability to manage my time effectively	Psychometric Scale
Do you upload ALL of your ideas & design development, or do you retain some aspects for one-to-one discussion with your tutor in studio?	Multiple Choice
If you do not upload all of your ideas & design development, what are your reasons for retaining them?	Short Answer
I am comfortable with publishing my work online	Psychometric Scale
I am able to seek and receive feedback efficiently using the Ning access to the tutors	Psychometric Scale
I am more likely to comment on a student's work online than face-to-face	Psychometric Scale
I am more comfortable presenting my work online than verbally	Psychometric Scale
I feel comfortable providing honest feedback on other students' work	Psychometric Scale
I prefer to receive feedback...(Face-to-Face Only, Online Only, A combination of the two)	Multiple Choice
If I am lost, I...(multiple options to measure reaction)	Multiple Choice
Overall, the online component (Ning) added value to my face-to-face interactions (lectures, studio, group projects, etc.)	Psychometric Scale
I would prefer to have this course...(Face-to-Face Only, Online Only, A combination of the two)	Psychometric Scale
I would like to see the following components online (multiple options to measure preferences)...	Multiple Choice

Establishing Existing Student Literacies

To assist in understanding the student level of digital literacy, a number of multiple choice questions were posed to establish the existing online behavior and experiences of the students. These results show a high level of contact with social media and a familiarity with the digital medium. However, it also reveals that this experience occurs primarily outside the educational context.

Results

Of the 92 students surveyed, the average question response rate was 99%. Student responses to the multiple choice questions were measured as a percentage of the response count. Multiple choice questions were made mandatory, so these questions had a 100% response count. Students' responses to the more open-ended short answer questions were analyzed to discover any patterns and common issues. These questions were optional, so response counts are provided for further clarification. Student's responses to the psychometric scale questions were measured with a rating average, calculated from allocated scores for each scale. Five scales were presented with these questions: SA=Strongly Agree (Score of 5), MA=Mildly Agree (Score of 4), NAD=Neither Agree or Disagree (Score of 3), MD=Mildly Disagree (Score of 2), SD=Strongly Disagree (Score of 1). These questions were not made mandatory, so the response counts are provided for further clarification.

Students' Evaluation of their Online Learning Experience

Students' overall satisfaction and experience with the Ning environment was analyzed using a series of psychometric scale questions (Table 2).

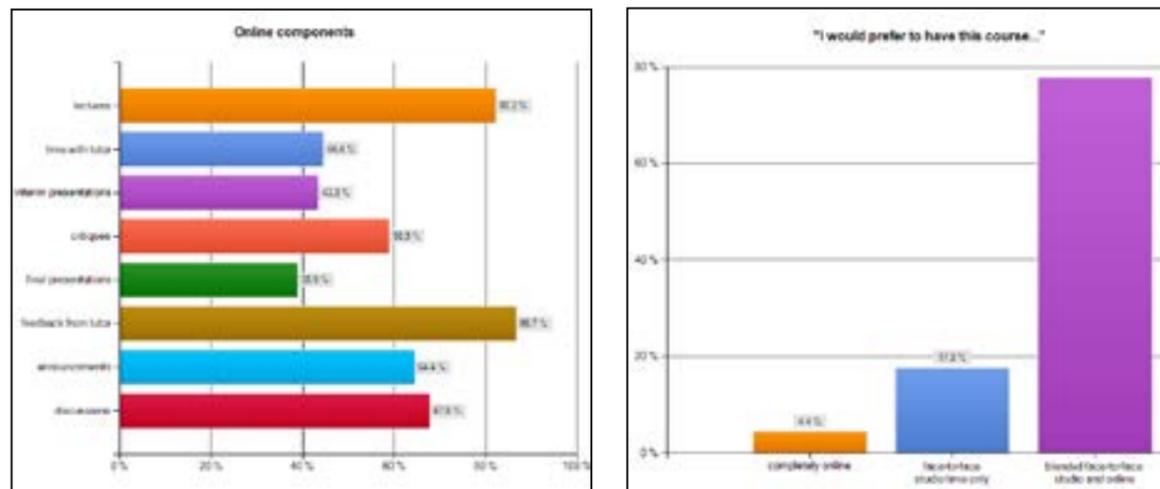
Table 2: Students' evaluation of their experience using the Ning network

<i>SA=Strongly Agree, MA=Mildly Agree, NAD=Neither Agree or Disagree, MD=Mildly Disagree, SD=Strongly Disagree, RA=Rating Average, RC=Response Count</i>							
Survey Question (Psychometric)	SA	MA	NAD	MD	SD	RA	RC
Using Ning helped me to develop my communication skills	18	37	25	9	2	3.7	91
Using Ning helped me keep more informed about the course	35	40	15	0	1	4.2	91
Using Ning helped me better prepare for studio	41	39	7	3	1	4.3	91
Using Ning helped me progress my design work between face-to-face studios	40	36	10	3	2	4.2	91
The combination of online and face-to-face approach had a positive impact on my progress in this course	39	40	9	2	1	4.3	91

The online component will help achieve a better grade in the course	27	32	24	6	2	3.8	91
Using Ning helped me reflect on what I was learning	34	37	14	5	1	4.1	91
Using Ning improved my design skills in general	22	33	22	9	5	3.6	91
Using Ning helped me improve my ability to work with a group	9	24	38	17	3	3.2	91
I am able to seek and receive feedback efficiently using the Ning access to the tutors	18	40	18	8	6	3.6	90
I am more likely to comment on a student's work online than face-to-face	2	15	33	24	16	2.6	90
Overall the online component (Ning) added value to my face-to-face interactions (lectures, studio, group projects, etc.)	27	45	13	4	1	4	90

Students' preferences

Two questions were used to measure the students' preference for online components, and the three learning environments. The first question was a multiple choice question with a list of components that commonly occur in a design studio: Lectures, time with tutor, interim presentations, critiques, final presentations, feedback from tutor, announcements and discussions (Figure 4). This was used to establish areas that could be utilized online. Components such as lectures, feedback from tutor and discussions yielded the highest preferences. The second question aimed to verify the students' preference for teaching mode. Three options were given: online, face-to-face and blended (combined face-to-face and online). An overwhelmingly 78% preferred the blended face-to-face and online environment. The results clearly show that, from a students' perspective, a blended learning environment is strongly favored (Figure 5).



Figures 4, 5: Charts that indicate student preferences for online components, and the blended face-to-face studio and online environment

Flexible modes and personal management

Time flexibility and convenience was reported by many students as an advantage of the online environment. In the psychometric scale questions about flexibility, most responded with either a MA or NAD. This suggests that the online component offers a degree of time flexibility and convenience, but is not a strong asset (Table 3).

Table 3: Students' evaluation of the impact on time flexibility

SA=Strongly Agree, MA=Mildly Agree, NAD=Neither Agree or Disagree, MD=Mildly Disagree, SD=Strongly Disagree, RA=Rating Average, RC=Response Count							
Survey Question (Psychometric)	SA	MA	NAD	MD	SD	RA	RC
The online component allowed me the flexibility to study at times that suited me	19	29	32	8	3	3.6	91
Having this flexibility had a significant impact on my ability to complete assessments	14	32	31	10	4	3.5	91
having this flexibility had a significant impact on my ability to manage my time effectively	13	33	29	13	3	3.4	91

A short answer expansion of these questions reveals feedback and staff contact as the primary benefit gained from outside class time:

"you are able to have contact with your tutor and receive advice and/or feedback twice a week instead of just once, which enables me to progress faster"

"having extra time outside of uni to get feedback with design studio"

"I can't imagine Design Studio without it - it is such a help to know midweek whether there is something to improve on, or just to ask simple questions that would not be answered until the next week otherwise. It's fantastic in my opinion. It also allows you to express your ideas more between classes in order to make sure you fully get your point across. You can forget things easily in studio itself."

Although some responses stated a different management of time:

"...it's starting to feel like Facebook- too addictive and makes me feel like I'm procrastinating"

"...I constantly log on too much as is starting to feel like "Facebook". I feel as if I'm procrastinating"

“...the private (social) chat is not popping out like Facebook, so sometimes we are not realizing there’s a message”

Students’ Online Interaction and Behavior

A multiple choice question, listing 9 options, was used to review the actions of students online. Options included: submit my work, look at other students’ work, look at other students’ profiles, change my own profile, read comments and feedback, post comments or suggestions, chat to other students, email students or tutors, check to see what is new (Figure 6). Over 90% of the students indicated they submitted their work, looked at other students’ work and read comments and feedback online. Over 70% of students indicated they logged into Ning to “check to see what is new”.

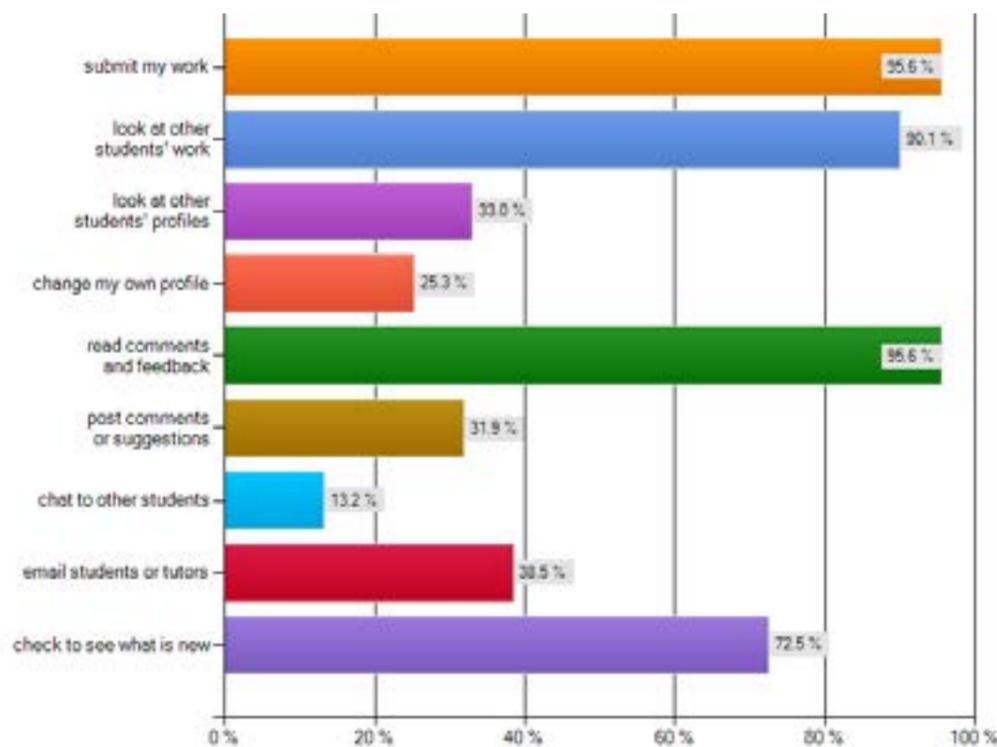


Figure 6: Actions of students online

Equity and inclusion

Students’ perceptions of community, inclusion and level of comfort with using the Ning environment were evaluated using a range of psychometric scale questions (Table 4).

Table 4: Students’ evaluation of the sense of community and inclusion

SA=Strongly Agree, MA=Mildly Agree, NAD=Neither Agree or Disagree, MD=Mildly Disagree, SD=Strongly Disagree, RA=Rating Average, RC=Response Count							
Survey Question (Psychometric)	SA	MA	NAD	MD	SD	RA	RC
The Ning environment helped me build a sense of community (interaction) amongst the students	15	43	23	8	2	3.7	91
The Ning environment helped build a closer relationship with tutors	21	41	19	7	3	3.8	91
Using Ning improved the way I interacted with my peers/tutors in studio	21	44	22	3	1	3.9	91
Using Ning helped me feel more connected with the course	32	38	16	3	2	4	91
The online environment developed my ability to express and share my ideas	30	46	14	0	1	4.1	91
I am comfortable with publishing my work online	24	38	18	9	2	3.8	91
I am more comfortable presenting my work online than verbally	21	20	26	14	9	3.3	90
I feel comfortable providing honest feedback on other students’ work	8	30	35	13	4	3.3	90

For students, the on-line studio environment assisted in developing a sense of connectedness, with over 77% of survey respondents agreeing that it helped them to feel more connected to the course overall. For students, connectedness was important not only in terms of connectedness to each other and the course, but also in terms of connectedness to their own design process:

“...the best thing about Ning was connecting with other students who are in the same position as you, learning from them as well as re-reading your thoughts”

“...being able to learn from your peers as well as receiving feedback and learning from other people’s feedback as well.”

“being able to get feedback more frequently and reading other students feedback was also beneficial e.g. reading another person’s feedback would help me to think about specific issues in my design I might need to improve upon”

Disclosure and privacy

Students’ conduct and judgment about the online publication of their creative ideas was analysed using three multiple choice questions, and associated short answer responses. Results reveal that the majority of students deliberately withhold creative work when publishing online, choosing to retain the work for face-to-face contact with their tutors (Figure 7). Although most students upload their work on completion, over 40% of students withheld their publication until the last day or

until they saw evidence of other students work first (Figure 8). This strongly suggests either a concern over intellectual theft, or a lack of confidence in the standard of work.

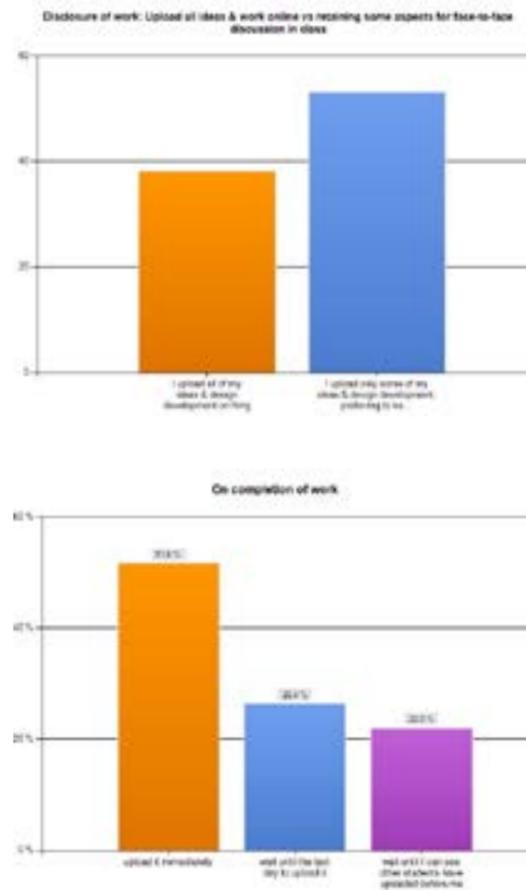


Figure 7, 8: Extent of disclosure – students preferring to retain creative work for face-to-face contact; withholding of work once complete

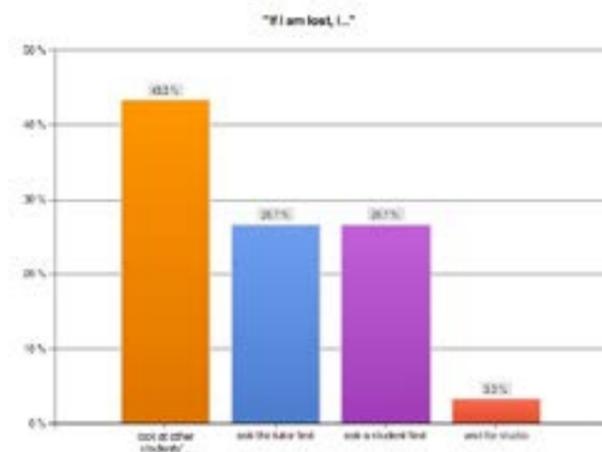


Figure 9: Students preferring to use other students' work as guidance

The third question aimed to evaluate student behavior when a lack of direction occurs. Over 40% stated they looked at other students work when they are lost, rather than seek staff advice. This may suggest a trend towards peer copying, and supports students' concerns of intellectual theft. An associated short answer question verifies this:

"(I don't upload all of my work because of) fear that other students will steal ideas - have seen my own concepts 'recycled' by other students word for word."

"(I don't upload all of my work because) I don't want others to 'borrow' it."

"(I don't upload all of my work because) at early stages, competition between students is a big factor."

Conclusion

This study clearly demonstrates that a social network does influence and change students' interactions and behavior. However, it has been made apparent that the interactions that occur within the network are more observational, with the majority of students using the network to observe each other's behavior and publications rather than to discuss and comment. Although peer support was expressed in some comments, most of the social participation was more passive rather than the active involvement seen in other social networks such as Facebook. However, this passive social behavior is clearly beneficial for students, with most of them stating they gain a deeper understanding of the course content and each other by observing. There is also evidence to support social networks as an effective environment for facilitating student familiarity and sense of inclusion. Students have stated they are better prepared, settled and informed about the course through the combined use of online and face-to-face contact. The large majority assert they are more connected and comfortable with the online environment, and clearly value the network as a component of their course.

It is clear that the integration of Web 2.0 technologies into conventional teaching approaches is able to effectively support the changing student online literacies and engagement. It is, however, important to note that there are implications that arise from using the online environment for assessment. Issues such as privacy, creative

disclosure and intellectual property become strong concerns that repress more active online social behavior. Using social networks in a blended structure does have clear advantages, where the benefits of both face-to-face and online contact provide a much more inclusive teaching environment than one only. Social interaction is shown to add value to a student's learning experience through participation and publication, although there is scope to re-think the use of social networks for assessment. In this complex and shifting area, the transparency and flexibility of the online environment seem to raise more challenges than solutions. To progress higher education in the 21st century, we need an understanding of the learners who will be occupying this landscape and their needs. Hybrid teaching environments that take advantage of their developed online literacy are much more able to connect to their diverse patterns of information and knowledge management, scholarly publishing and learning.

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Biography

Dr Russell Rodrigo is a Senior Lecture in the Interior Architecture program at the Faculty of Built Environment, University of New South Wales. Russell has taught in Design Studio across all four years of the degree and his research interests in design education focuses on the social affordances of web-assisted teaching environments.

Tam Nguyen is an Associate Lecturer in the Architectural Computing program of Faculty of the Built Environment, UNSW. Her research focusses on online learning and teaching strategies with an emphasis on social media applications.

WHY THE DESIGN STUDIO MODEL IS SO SUCCESSFUL, ITS VALUE AND POTENTIAL VALUE, HOW IT COULD BE IMPROVED AND A POSSIBLE ALTERNATIVE

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PROVOCATIVE STUDIO PEDAGOGIES

ABSTRACT

The purpose of this paper is to briefly discuss: why the design studio model is so successful; its potential pedagogical and commercial value; how the model could be improved; and, a possible alternative that could make the model more successful.

A reason I choose to run design studios and teach at architecture schools is because of my keen interest in, and support for, the design studio model. Its engagement with the philosophical, social, urban, artistic and communications aspects of architectural practice sets it apart from other forms of learning and makes it a very successful and thorough pedagogic model.

The purpose of this paper is to provide my thoughts on: why I believe the design studio model is so successful; to illustrate its current and potential value; to suggest a few aspects of the model that could be improved and, as a conclusion; to set out some of the outcomes of a recent intensive design studio I ran at the Robin Boyd Foundation – outcomes that suggest the intensive studio format as a strong and viable adjunct or alternative to the current semester long studio format.

1. WHY THE DESIGN STUDIO IS SUCH A SUCCESSFUL LEARNING MODEL.

My position is that three fundamental characteristics make the design studio successful:

1.1 A HIGH LEVEL OF STUDENT INTERACTION

The design studio is not a new concept. It has been the keystone of architectural education for a long time. Although it has been altered and adjusted over time, in essence it is based upon the same fundamentals now as it has been since the height of the École des Beaux-Arts and before: a group of students working on a common project supervised by an architect.

Not only is the model not new in architecture, it is also not new in general education. The one-class school, analogous in some ways to our design studio (albeit through necessity rather than design), illustrates how learning can occur horizontally between students as well as vertically from teacher to student.

There is a deal of pedagogic psychology and research available to support the importance of student-student learning and for us to develop on. From my reading, it is clear that the best learning opportunities occur when a diverse group of students and diverse learning and assessment modes come together. Importantly, the critical elements of the best modes of learning are: student engagement, student interaction, and student review through a diverse and focused student group.

Through my continuing involvement with the Fitzroy Community School, a leading Australian primary school, and my research into learning models, I have realised that the 'old school house' model of learning where classes are not necessarily determined by what year you are in or by a fixed number of students, is a lucrative model for future learning. Its value and potential is in the way in which it increases the opportunity for student interaction and learning.

What makes the design studio so special is the high level of direct and indirect student-student interaction and learning. Students learn by working together on specific tasks; students learn by working next to each other on individual tasks; students learn by assisting each other; and, students learn by collectively experiencing other students learning and interacting with a teacher. For example: when teachers help a student in a relatively small group and other students hear or see that, they learn by osmosis. Interaction can occur online but what differentiates the design studio from online models is the physical coming together of students and teacher in a space to discuss what they are working on - the informality, proximity, complexity and uninterrupted nature of this coming together makes it special and valuable.

This can't occur to such a successful degree in large lecture theatre or online based courses.

1.2 MULTIPLE SPONTANEOUS LEARNING OPPORTUNITIES

This physical coming together of students in a space allows another important thing

to occur – spontaneous learning. Informal learning that occurs in, around and outside the design studio as a result of the formation, form and content of the design studio.

When students work or 'hangout' in a common space they informally engage with each other via their bond formed through participating in a design studio. For example: students ask each other how they are approaching the project or dealing with a specific aspect of the project. More informally, they overhear others interacting or simply observe what others are drawing or making. As a collective they also informally assist each other to deal with stress and failure and to identify and celebrate successes.

Douglas Thomas and John Seely Brown in their excellent study of future learning modes: *A New Culture of Learning: Cultivating the Imagination for a World of Constant Change*¹, support this position and illustrate many examples of where interaction and student review can lead to improved education outcomes. Again, this is not new to architects.

This mode of learning is spontaneous. We can and should continue to provide the spaces and present the opportunities for spontaneous learning but we cannot control it – it is student controlled and guided and subject to circumstance. These particular forms of spontaneous learning occur in other models of learning but not to the high levels they do in a design studio.

1.3 FLEXIBILITY TO REACT AND ADAPT

The design studio is flexible and adaptive to the varied range of students and student groups. This is predominately because the design studio 'teacher' is more a *facilitator* and *moderator* rather than a teacher in the traditional sense.

Through my experience running design studios at R.M.I.T., the University of Melbourne and more recently, the Robin Boyd Foundation, I have realised that the facilitation-moderation role is the most critical role I play in the studio.

The specific degree of student facilitation is obviously dependent on the level of the student – first year students generally require more direct guidance than more senior students.

Steven Holl recently described the central skill of the architect as “Negative capability”:

“Negative capability is a positive capacity. Negative capability is to be able to take in all the problematic aspects of the surrounding world, to see and acknowledge, to entertain uncertainty and still be able to act: a modus operandi for the twenty-first century. As an architect you go to a site to study every angle available – to feel in your body what needs to be done; intuitively you create.”²

Given that architecture is a unique combination of rational problem solving and the employment of artistic principles as clearly illustrated by Holl, the primary role of architectural education is to facilitate the student to learn how to learn. Learning how to learn is more difficult than learning to do a specific task because it requires the conscious navigation of psychological, philosophical and practical opportunities and constraints. I believe, this mode of learning is ideally suited to the design studio model because of the small group size, high degree of dialogue and critical nature of student engagement.

Flexibility is crucial to learning models today. Further, Holl states:

“Today, working with doubt is unavoidable; the absolute is suspended by the relative and the interactive. Instead of stable systems we must work with dynamic systems. Instead of simple and clear programs we engage contingent and diverse programs. Instead of precision and perfection we work with intermittent, crossbred systems, and combined methods. Suspending disbelief and adopting a global understanding is today an a priori condition, a new fundamental for creative work in science, urbanism, and architecture. Working with doubt becomes an open position for concentrated intellectual work.”³

Another key finding by Thomas and Seely Brown, illustrated through a study of online gaming, is that flexibility is critical to making the most of student interaction and student learning. Student led learning is maximised when it has the opportunity to feedback live (or quickly) into the learning process. This is a central aspect to the architectural design studio model – flexibility and ability to adapt.

This acute flexibility and ability to adapt live, engage with diversity and deal with change and doubt are special characteristics of the design studio. The tutorial model

throughout universities is aimed at addressing these aspects of learning but, its ability to do so is limited and inferior to the design studio.

2. THE VALUE OF THE DESIGN STUDIO MODEL.

A corollary of the architectural design studio’s success is that it’s valuable.

I believe the characteristics I have set out above, among other things, are what make the design studio so successful and pedagogically valuable. Moreover, these very characteristics create its current and potential commercial value.

As architects, the way we educate ourselves through the design studio and the way we interact with each other could be better harnessed and applied outside the education of architects. Many other disciplines and departments through higher education and business look to our design studio model for guidance. From software engineering to MBA courses across the globe, our model of design education is looked to as a best practice model.

In many ways we are experts in education. Our education skills form part of our collective intellectual property and could be taken better advantage of. This point is not prosecuted often enough.

I don’t think it is arrogant or difficult to foresee architects assisting other disciplines to develop similar learning models. This is predominately because the complexity and uncertainty that have long been part of architectural practice are now common to many other commercial activities. Also, because design is a process and a means to an outcome, design education is open and easily adaptive to other disciplines.

The values and potential future values of the design studio model are reason enough for improving, marketing and selling what we do as educators as we do as designers.

3. ASPECTS THAT CAN BE IMPROVED.

I stated above that the design studio is successful and that it has a potential value outside of architecture. Not despite this success and value, but hopefully in support of it, the design studio model requires constant review and improvement.

I believe the best way to future proof the design studio model is to seek to further and enhance the very characteristics that make it successful. To tweak them at every instance, to conserve the positive aspects and, to ensure the model remains relevant. Relevance is gauged by our contemporary condition. As mentioned above, diversity, doubt and change are all pervasive today. Architecture design studios need to react to these conditions.

Another characteristic of our contemporary condition is student guided or directed learning is paramount to our market driven tertiary education system. Learning is, and is seen by students as, an *experience*. I believe the quality of the student learning experience is fundamental to a school's success.

The following aspects of the design studio are examples of how our current model insufficiently addresses these and other key contemporary conditions and, I believe, require review and change:

3.1. MONOTONY IN DESIGN STUDIO PROGRAMMING

The way most architecture courses (that I am aware of) are structured insufficiently engages with diversity in programming. Many courses are structured around 10, 13 week design studios – one per semester – ten per course. This even and repeated program leads to a certain form of evenness or monotony.

Many who have led such studios have seen energy levels of students and the degree of student engagement ebb and flow throughout the semester. In my experience, typically, a number of students start out with a high degree of energy and engagement in weeks 1-3, they fall away for a week or two then reengage prior to mid-semester presentations in about week 7, then fall away again in weeks 8-10, then reengage again in the final weeks to pull together their final presentations.

While there are many reasons for this, some of which are personal to particular students, a cause for student fatigue and instances of ineffective use of time is the monotonous nature of the design studio course program. This monotony in program unnecessarily disconnects it from the nature and diversity of design tasks as experienced in architectural practice.

Design is, at times, an inherently inefficient process but design education programming should not add to that inefficiency. A more varied and diverse series of design studios could improve its overall success of the model and increase the learning opportunities for students.

3.2 PREDOMINANCE OF STUDENT WORK DONE IN ISOLATION AND THE LACK OF TEAM WORK

The predominance of student work executed alone – not executed in teams or a collective environment. Teamwork is a very important aspect of learning to be a good professional and architect. Schools should engage more often with team based work.

As an undergraduate at R.M.I.T., I took Peter Corrigan's design studio and, as for many who did, it turned into one of my most influential educational experiences. There are many reasons for this. For current purposes, the key experiences resulted from having to work with others and an intensive turn around of design projects. Throughout the semester we were required to work in varying pairs or groups of three, present completed projects every Wednesday afternoon and Sunday morning for 13 weeks.

The half week project cycle, depth of analysis and breadth of production required pushed us to points where it became necessary and ultimately obvious to band together to get things done. Projects were assessed as team efforts. Individuals were necessarily assessed on their artistic and architectural ability but, in contrast to what I had experienced previously, students were also assessed on their ability to form, manage and work within the varying teams. It was quickly learnt that a poor team effort equalled a poor individual effort. From then on we focused on developing strong working teams.

There are aspects of Peter Corrigan's studio I couldn't and may not wish to replicate in the studios I run however, the intensive nature of his incredible studios and the acute importance placed on developing teamwork skills very strongly and clearly relate back to the practice of architecture and the education of architects.

This type of foundation learning provides the enduring skills and experiences students seek and that should therefore be fostered at architecture schools.

3.3 LACK OF OPPORTUNITIES FOR SPONTANEOUS LEARNING.

Interconnected with the need for more team work in design studio work, more opportunities for student-student focused and spontaneous learning could significantly improve learning outcomes.

There is a singularity to the way many architecture students learn. Their experience is dominated by a cycle of working alone at home, coming to school to present and then going home again to work. Of course a degree of interaction occurs in the computer labs, corridors and lifts, as well as in some of the newer hubs and education centres recently constructed but, at R.M.I.T. and most architecture schools I've seen in Australia, the scope for course work based student engagement outside of contact hours and the opportunities for spontaneous learning can be increased.

A key to improving the strength is to again provide permanent places for students to use and inhabit. The future of education is not necessarily as flexible, floating and impermanent as some may say. The best way to maximise the chance of quality and spontaneous student-student learning is to increase the time and proximity in which students spend physically together.

Evidence of the importance of and co-relation between a high degree of spontaneous learning and students working in the same physical space over time can be again taken from Peter Corrigan's studios run at R.M.I.T. Students undertaking his studio now 'occupy' and, to a degree, take ownership of a secure open plan space accessible 24/7 and equipped with large tables and a small number of fixed computers for the duration of the semester. Students use the space to draw, to work on computers, to make and store physical models, to rest interact between working - it is a clear example of students learning directly, indirectly and spontaneously. This coming together of students undertaking his studio and the impressive outcomes it produces proves to us that such an experience and type of learning is only possible through the provision of a shared work space. This example also illustrates that what is required for a successful student studio space is fundamentally simple and (real estate aside) relatively cost effective to provide.

While there would be some cost to implementing the changes suggested in this part, I believe none of the changes suggested here are difficult or overly time consuming for our institutions to implement. In fact, I believe that failure to address them and provide some of the necessary changes could cost more than it would to implement.

4. SHORT INTENSIVE DESIGN STUDIOS - A POSSIBLE ALTERNATIVE.

There are ways of tweaking and adjusting the way we run design studios and structure architecture courses that could make a very successful model more successful and help to keep it relevant. One example of this is to introduce short and intensive design studios into the curriculum. Following is a brief overview and summary of the benefits of such an intensive studio.

Recently, I ran a 6 day live-in intensive design studio for the Robin Boyd Foundation (RBF) held at the Boyd House II in Walsh Street, South Yarra.

The RBF intensive studios are open to students across a number of schools in Australia. Students submit a written application and portfolio and are required to pay a small amount for accommodation and food. The studio is accredited as an elective.

In summary, students arrived on Sunday evening for an introductory dinner and presentation, worked from and attended presentations at Walsh Street during the days, stayed at the University of Melbourne's Ormond College Sunday – Thursday night where dinner and breakfast as well as a space to work in the evenings was provided in the College Academic Centre recently and impressively renovated by McGlashan Everist. The studio concluded with final presentations on the Friday afternoon at Walsh Street.

The day time was typically split between morning presentations of the work they had done over night, presentations by guest architects and designers, round-table team design workshops and one-on-one discussions as required. This particular studio was informally based upon the Melbourne City Council's preliminary investigations for redevelopment of the Queen Victoria Market site. Students worked in three teams: one of five students and two teams of four students.

A number of the outcomes of this intensive studio suggested how such improvements could be, at least partially, achieved:

4.1 INTENSITY, LEVEL OF ENERGY AND STUDENT ENGAGEMENT

It was particularly impressive to see students apply themselves so ardently for the duration of the studio. The fact that students were required to apply for the studio and willing to work during semester break certainly added to the level of commitment they brought to the intensive, but the fact that it was a live-in studio and, only 6 days long, certainly allowed the students to more thoroughly and fully commit themselves to working hard and effectively.

Short and intensive studios produce greater, more consistent and intensive engagement and application compared to typical semester long studios. Therefore, I believe, intensive studios could provide an additional type of learning opportunity for architecture students.

4.2 SOPHISTICATED STUDENT ENGAGEMENT THROUGH TEAM WORK

It was first intended that students would work in teams for the first two days and then individually for the remainder of the week. However, as a result of the team dynamic developed through the intensive work environment and live-in nature of the studio and the sophistication of team discussions and interaction, I decided to continue with the team work for the entire studio.

Students worked in teams on concept presentations, master planning exercises and collectively drew 1:100 sections through their projects and the site which exceeded 5 metres in length. Tensions naturally arose and subsided between some team members however little guidance or counselling was required to maintain a successful team dynamic and structure.

When given the opportunity, students are incredibly good at falling into and assuming the various roles required in forming successful teams. I believe the intensive nature of the studio dramatically increased the success of the team structured work. Time constraints and the physical environment for the studio encouraged and fostered effective team work. Students quickly learned to balance their desire to fight for their position with compromising and assimilating when necessary to achieve a deadline.

Team work is fraught with compromises at times. While it is critical to professional and design development and success (few buildings can be achieved in isolation), it can be difficult to implement at school due to the lack of natural hierarchies.

Our current assessment systems are not ideally suited to team work. Some students dislike working in teams, but I find this is mostly due to a perceived or real concern about fairness in assessment. If we can develop a system for the accurate and helpful assessment of team derived work I believe our design studio system would be significantly improved. Team work does not, in the same amount of time, necessarily produce the same level of 'finished' presentation material as in more typical design studios. In this age of grant application focused funding and omnipresent school promotion through publishing and exhibiting eye catching outcomes, team work is perhaps less attractive. But, for someone at the beginning of a career in architectural education, team work and developing team work skills produces a deeper level of experience and possibly more enduring and beneficial learning outcomes.

A less predictable result of student-student focused learning and team work structure was an increased sense of enjoyment and fun in the design process. I found that the stress associated with intensive timelines and teamwork could, through careful cultivation and facilitation, be transformed into what we called a "low stakes" approach to learning and doing.

Through the team structure, students were able to transform the usual stress associated with working alone into positive and creative energy. Collective stress seems to be a lesser and more enjoyable stress. When one team member's energy or interest ebbs another team member's energy and interest flows. The individual asymmetry creates a collective learning force. Collective learning also provides that extra level of exchange that stems doubt and creates confidence in students through continual questioning and reasoning. Increased confidence created through collective and "low stakes" engagement often increases the level of fun and enjoyment in the design process and more often than not the quality of design ideas and outcomes.⁴

4.3 THE INTENSIVE NATURE OF, AND PHYSICAL LOCATIONS FOR, THE STUDIO CREATED A HIGH LEVEL OF SPONTANEOUS STUDENT-STUDENT LEARNING.

Spontaneous and serendipitous student-student learning – learning that occurs outside intended work times and locations – is a form of collective learning that can be underestimated.⁵ Universities have and continue to develop spaces that attempt to increase the chance of students bumping into each other and the opportunities of spontaneous learning. However, architecture schools have lost the one great space for this to occur – the studio space – a historically unique and important aspect of architectural education. I have experienced a small number of architecture school environments around the world and those that create the greatest opportunities for collective and spontaneous learning are those with permanent studio spaces for students. Despite the predominant use of computers to produce student work the studio space is still important. The Royal Danish Academy in Copenhagen is an excellent example of this.

Providing students with allocated desk and secure storage space increases the opportunities for and chance of spontaneous learning.

During the RBF intensive, the well scaled space at Walsh Street and the duration of contact time (all day) produced multiple opportunities for spontaneous learning. From simple exchanges between two students around the kettle or fridge, to more detailed conversations over long table lunch breaks, and to the more complex inhabitation of various spaces at Walsh Street; the degree of spontaneous learning and the degree in which that folded back into the more formal learning sessions was very impressive and at a level I have not noticed in typical semester long design studios.

I have noted some of the positive aspects of the intensive design studio model such as the one I ran for the RBF above. There are of course limitations to this model and it is not a panacea for all possible improvements. Most obviously, intensive courses do not provide the time required for detailed investigation and research – it would not for example be suitable for the drafting of a history or theory paper or to develop finished, publishable presentation material but, it clearly illustrates a possible alternative and series of solutions to some of the issues I have highlighted above and that restrict us making the most out of our successful design studio model.

At the very least, short intensive studios should be introduced more often throughout the five year architecture courses to break the evenness of ten semester

long studios and to increase and vary student engagement with team based design and the diversity of learning opportunities for students and future architects.

ENDNOTES

- 1 Douglas Thomas and John Seely Brown, *A New Learning of Learning: Cultivating the Imagination for a World of Constant Change* (Lexington, Kentucky: Self published, 2013).
- 2 Steven Holl, *Urbanisms: Working with Doubt* (New York, Princeton Architectural Press, 2009), p.34.
- 3 Above, p.13.
- 4 See: "John Cleese on Creativity," 12 August, 2013, <http://vimeo.com/18913413>.
- 5 Rufus Black, *Ideas About Learning* in 'New & Old' Magazine (Parkville, Ormond College, June 2011), pp. 6-7.

BIOGRAPHY

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THE SPECULATIVE CAMPUS PROJECT AND THE FORMFIELD SERIES

VIVIAN MITSOGIANNI
RMIT UNIVERSITY

**DESIGNING/
EDUCATION**
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ABSTRACT

The Speculative Campus Project is an emerging practice-based design research project which focusses on two interwoven investigations; experimenting with a 'process-based' architectural design approach and developing speculative design propositions for University learning environments.

The research was initiated through a series of design studios undertaken in the RMIT Master of Architecture program known as the FORMFIELD series. The studios demonstrate the possibility and necessity of undertaking multiple design research explorations – generative design processes in the first instance and speculative propositions for university environments in the second. The attitude is that the complexity of architectural design needs to be considered in educating architects. The model of design studio pedagogy which isolates one area for investigation (program, process, or site alone for example) is questioned suggesting that the design projects produced through such models hold a reductive and impoverished view of architecture is and can contain.

The aspect of the research in the FORMFIELD design studios which focusses on process-based design uses an understanding of the wider field which was facilitated in part by a reflection of previous series of design studios (white noise PANORAMA) and was captured in my PhD by project which provided an examination and critique of process-based architectural design. I have argued that contemporary process-based work is built on an inherited foundation of ideas that are often considered to be naturally linked to this way of working and that despite an evolving of these methods in contemporary practice, these fundamental assumptions continue to be maintained and constrain this practice. The reasons one might use these processes might be different away from these traditions and demonstrate an expanded series of concerns for process-based design work.

The speculations around future University Learning Environments spring from research that cites the importance and potential of social spaces as learning spaces on campus. Through the production of

architectural design propositions examples are provided through the design studio work that serve as prototypes of built and spatial possibilities.

This paper will speculate around the relationship of the overall research project and the design studios and reflect on the dissemination of the research propositions and speculations. It will provide a discussion of an integrated and speculative practice of ideas, propositions, researching, teaching, collaborating and designing.

The Speculative Campus Project and the FORMFIELD Series

How can design studios provide a productive nexus of teaching and research? A research project that I have been developing at RMIT University, Melbourne will be used as a case study and a means through which to speculate on wider questions around design studios and research. The Speculative Campus Project is an emerging practice-based design research project which focusses on two interwoven investigations; experimenting with a 'process-based' architectural design approach and developing speculative design propositions for University learning environments. The project was supported by the RMIT Design Research Institute¹ and the RMIT School of Architecture + Design. A series of design studios undertaken in the RMIT Master of Architecture program known as the FORMFIELD² series (2010 – 2012) were used to initiate and seed the research.

The model of research favoured here is research *through* design (contrasted with research *for* design and research *about* design)³. Design propositions were produced as research - as prototypes of particular propositions - which were subsequently disseminated (through exhibition and publication) with accompanying reflection and speculation. The studios themselves demonstrate the possibility and necessity of undertaking multiple design research explorations and the need to consider the complexity of architectural design in educating architects. The model of design studio pedagogy which isolates one area for investigation (program, process or site for example) is questioned suggesting that the design projects produced through such models hold a reductive and impoverished view of what architecture is and can contain.

The dilemma of being “academically correct”⁴ and the need for research “through” design.

It is possible that everything you say about what you have done in a design project is completely inaccurate and the building can still be interesting, still 'good'. Reading an architectural conference paper several years ago that discussed a design studio focussed on procedural design, which described the approach of the studio in a concise manner with appropriate references and clear description of the step-by-step procedural model used in the projects, there came a jarring moment at the end when the projects were revealed. An instant glance at the projects made the description that came before it somewhat irrelevant. The projects were poor, derivative and unchallenging.

As a designer and educator I have been interested in this dilemma of accuracy which is amplified in research focussed on designing. The generation of “good” design does not necessarily require accuracy or clarity in the process of its generation but the critique of design outcomes and its contextualisation probably does. Research “for” and “about” design does. Jeffrey Kipnis made a similar point when discussing the role of theory in the production of architectural projects in the 1990's (specifically external theories brought to the production of architecture).

Say, after reading Nietzsche's work on the revaluation of values, some architect designs an upside-down house to be constructed entirely in ice, contending that such constitutes a revaluation of architectural values. In terms of a theory of architectural design only three aspects of this situation are of interest: first, the fact that a particular choice, in this case a text by Nietzsche, motivated the design. Secondly, it is of interest how that motive was translated into a design process, which in this case was accomplished by illustrating the reversal of selected value pairs – up and down, permanent and impermanent – in an otherwise traditional design. Finally of interest are the terms by which the design is understood and evaluated. It is irrelevant whether or not it can be demonstrated that this design derives from a correct interpretation of Nietzsche's ideas. Such a demonstration can neither authorize nor indict the choice of motive, the process, nor the design⁵.

When it comes to architectural design the question of clarity is not as interesting as the question of judgement and what enables and assists rather than hinders

designing. In terms of process-based architectural design there are additional considerations such as the fact that choreographing a “good” process-based experiment does not guarantee a “good” building design, following a process-based experiment accurately does not guarantee a “good” building design and interesting propositions can be generated out of inadvertently misusing the process. Glossing over this with students and even alluding to the possibility of clarity and certainty (a pseudo rigour) ultimately doesn’t help.

So how do you structure a design studio to experiment with ideas and techniques and not ignore the complexity of architectural design? How do you facilitate a process-based design approach without making it seem linear, stripping away all the complexities or worse teaching one prescriptive “method”? How do you avoid the ‘it’s good in theory’ but produces banal work scenario? While research “through” design avoids some of the issues associated with design coming after “research”, how can design studios generate research; new knowledge through designing and what forms does this new knowledge come in?

Process-based Design Practice and the white noise PANORAMA studios.

The aspect of the research in the The Speculative Campus Project and the FORMFIELD design studios which focusses on process-based architectural design uses an understanding of the wider field which was facilitated in part by a reflection on an earlier series of design studios called white noise PANORAMA (RMIT 1998 – 2003) which was captured in my PhD by project (white noise PANORAMA: Process-based architectural design 2009 RMIT)⁶ which also provided an examination, critique of and repositioning of the potential and scope of process-based architectural design. In this instance reflection on the studios which specifically focussed on a process-based design approach became a chapter in the PhD. Reflecting on students working with this approach facilitated observations on the common considerations and problems of working in this way and (along with reflection on my own body of work) facilitated a particular understanding of the field which subsequently enabled the PhD content.

‘Process-based’ design refers to an approach whereby a process - consisting of a series of actions or operations - is choreographed in order to initiate and develop architectural designs (sometimes known as rule-based or generative design

processes). We can trace a lineage of this type of practice through the early projects of Peter Eisenman and Bernard Tschumi, then through Diagram Practice (as an attempt to break away from the restrictions of linear processes), Greg Lynn’s work through the 1990’s and various contemporary practices including – more recently - digital scripting processes. While there are broad variations in this practice that mean that it can’t be called one particular method, there are certain shared characteristics; involving designing the process as a starting point with a series of rules or actions being choreographed; there is often an adoption of techniques or systems from other disciplines and a translation of these to architectural technique.

I initially began working with process-based design methods because they offered the potential for the discovery of conditions, arrangements and effects that could not have been produced without them. As my practice developed I became increasingly critical of what I saw as the more problematic aspects of this type of design practice in the wider field, which I felt was becoming a confused terrain with questionable claims, sustained problems, and in some cases, had become what might be called a ‘process style’ or ‘process aesthetic’ and a discourse overwhelmed with the anxiety to claim that the processes were not “authored”. I ultimately argued that contemporary process-based practice is built on an inherited foundation of ideas that are often considered to be naturally linked to this way of working and that despite an evolving of these methods in contemporary practice, these fundamental assumptions continue to be maintained; are rarely specifically acknowledged and can be seen to constrain this type of practice⁷. There are other ways to use process-based design away from these traditions. The reflections on the field posited as new knowledge in the PhD were developed by reflecting on the differences in my own practice as well as reflection on the studios.

The Speculative Campus Project and the FORMFIELD studios.

The catalyst for the research on future University Learning Environments springs from research that cites the importance and potential of social spaces as learning spaces on campus. Starting from the premise that learning happens everywhere and anytime on Campus, we asked what might the possibilities be if we start to look at the social spaces on campus as active learning spaces and ways of facilitating people gathering. What are the different configurations through which this might occur – what do they look like, how are they organised and what might they lead to?

The aim was to consider the possibilities of design led by privileging the social spaces on campus through organisational strategies which facilitate interwoven formal systems. In my own work I have been interested in design potential of the formal condition I called FORMFIELD, a term coined to describe a condition (or organisational system) in which form and field gain variation, definition but also equivalence. The FORMFIELD idea aimed to capture these two conditions both as separate systems embedded within each other as well as forming a third polluted system. The hunch was that new types of architectural relationships would be developed for learning environments, planning, organisation, form, spatial qualities and so forth and these could be distributed on-mass (systematised as a flexible malleable system rather than designing one-off instances). The experiments with a process-based design approach were choreographed by each student (based on their own interests) towards facilitating these new relationships.

Importantly, in terms of research through the production of architectural design propositions, we sought to provide examples that might serve as prototypes of the built and spatial possibilities of these speculations. While it's one thing to have ambitions for social spaces being dispersed through more formal learning spaces - with the ambition to provide spill out spaces for students to continue working outside class time, to provide spaces for students to interact deliberately and by chance and so forth - what does this condition in fact look like, what are the specific arrangements and what possibilities do they lead to? In pursuing this research question, the aim was to do it in such a way as to still propose building designs that do not strip away the complex series of concerns and wide range of other performative criteria that buildings need to engage with.

Projects and Propositions.

The studios commenced with 5 weekly Experiments that focussed concurrently on future learning environments and choreographing process-based experiments in which techniques and systems external to architecture were appropriated and the behaviour of these systems co-opted to re-examine core architectural relationships. Experiment 01 focussed on choreographing process-based experiments, Experiment 02 focussed on choreographing process-based experiments in order to explore internal organisation, Experiment 03 focussed on choreographing process-based experiments in order to consider the building form and the organisation of the open

space component on the site. Experiment 04 focussed on how one might choreograph a process-based experiment to operate on existing building typologies in order to reappropriate and amplify their social qualities for learning environments and the final Experiment 05 considered choreographing a process-based experiment to consider the building's surface. Students were then asked to choose the direction for their final project after reflecting on the possibilities that had been developed through the experiments and the propositions that had been identified on a weekly basis. Students proceeded by selecting one or more of their process-based experiments/systems to work with. By this stage students have practiced choreographing a process-based experiment 5 times and have discussed over 50 examples with their peers. In the Experiments they have been working on the site with the correct proportion of program but did not receive the specific brief until the final ideas and vague propositions had been established.⁸

Speculations around learning environments included considering circulation spaces as active and part of learning; investigating the dispersal of social spaces (including food spaces, computer labs and study spaces) through dedicated learning spaces as well as looking at university spaces as flexible with multiple uses around a 24 hour cycle. In particular we considered using the strategic location of social spaces as integrated with other functions and akin to civic space on campus.

Georgina Karavasil's project for a Future University Building (FORMFIELD 4 2012) [FIGS 1-6] examined combination using a process-based experiment that was informed by the behaviour of the process of oil emulsification using a series of digital and material explorations. A variable field system was created comprised of 3 Dimensional solids and voids (internal and external) which provided variable densities across the length of the building, and produced a porous sponge like building. The system produced a series of spaces embedded within spaces internally and interspersed with embedded sectional voids as well as a series of external courtyards.

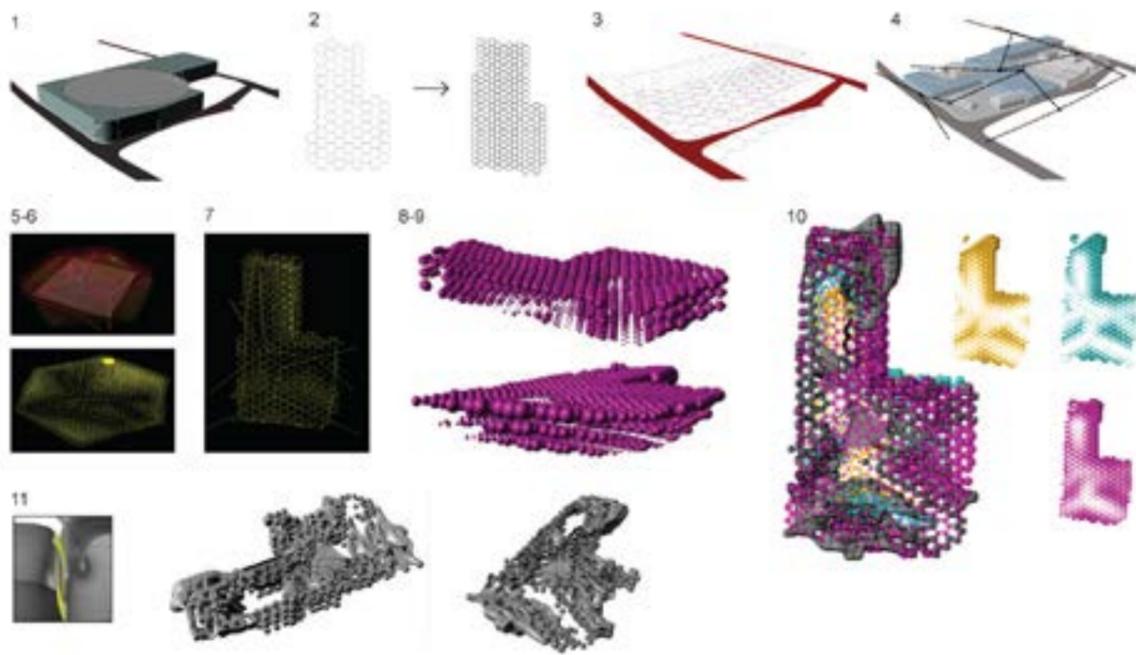


FIGURE 1: Process-based experiment by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012

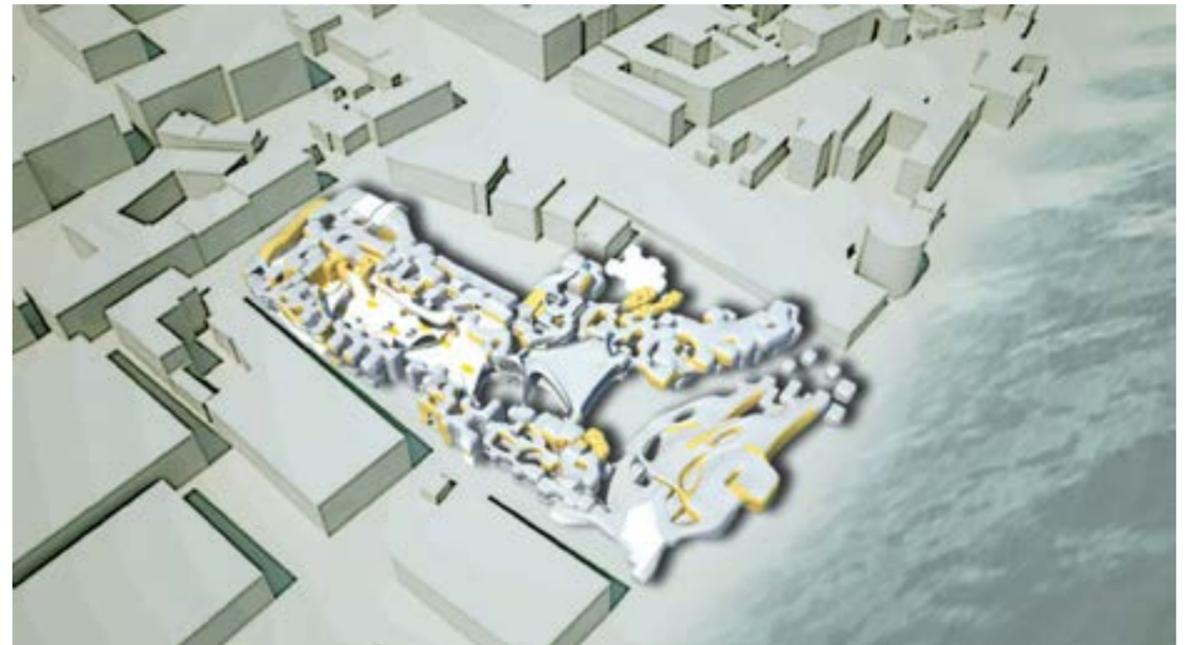


FIGURE 3: Aerial View for the developed design of the Future University Building by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012



FIGURE 2: Understanding oil behaviour by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012



FIGURE 4: External courtyard space, Future University Building by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012

The initial speculation in the project focussed on strategies for combining social space and learning space. How do we allow for a networked combination of these spaces and what are the combinations in which a student travelling across the building campus can be aware of the activities in the building? How do we create opportunities for social spaces, gathering and study outside the classroom and utilise external space as learning space?

The building proposal also tackles the problem of a large deep building and how to allow light through the building and visual connection across floors. It also provides a model where “classrooms” adjacent to the social voids can also double as be flexible social space as required and similarly the corridor can act as teaching space when required.



FIGURE 5: Interior view, Future University Building by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012



FIGURE 6: Aerial View showing courtyard spaces by Georgina Karavasil (First Year RMIT Master of Architecture Student) 2012

In the FORMFIELD studios the process-based experiments were reworked by students numerous times. The first time an experiment was choreographed, it was done so with the ambition of replicating the behaviour of the appropriated precedent based on a hunch about the reason for doing so in relation to ambitions for the qualities desired in the final outcome and in subsequent iterations the process was repeated with different parameters built in with more control desired over the system which is being developed.

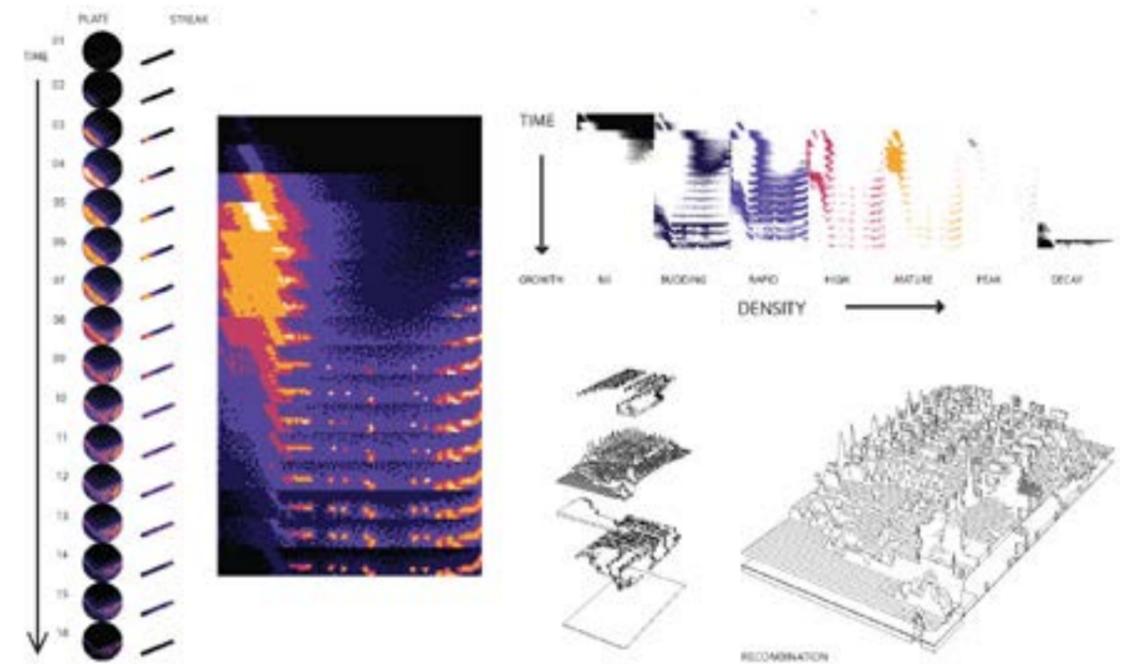


FIGURE 7: Final process-based experiments by David Wegman (First Year RMIT Master of Architecture Student) 2012

David Wegman's project (FORMFIELD 4 2012) [FIGS 7-11] investigated how to create a system for variable density across the building. The process was developed based on a hunch and desire to develop a system that would thread a variable density of social space – and possibly open space - through the building. The process-based experiment that was developed draws on the behaviour of bacterial growth systems over time. The project is developed to maximise a threading through of external open space through the building form which subsequently becomes porous at plaza level and is conceived of as a civic terrain accessible to the public. The process also assisted the development of an organisational system underneath the plaza which disperses and threads a series of learning and social functions in a terrain/mat allowing numerous opportunities for both discreet learning spaces and, immediately adjacent, spaces for social interaction.



FIGURE 8: External view of plaza level, Maribor Future University Building by David Wegman (First Year RMIT Master of Architecture Student) 2012

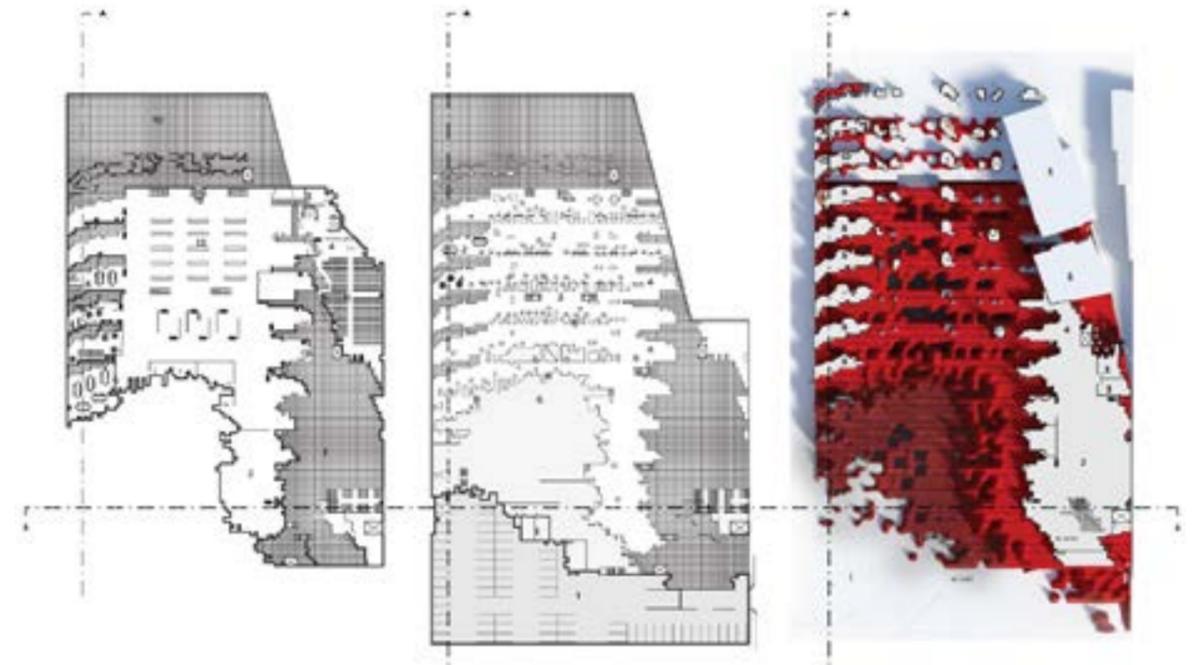


FIGURE 9: Floor Plans, Maribor Future University Building by David Wegman (First Year RMIT Master of Architecture Student) 2012

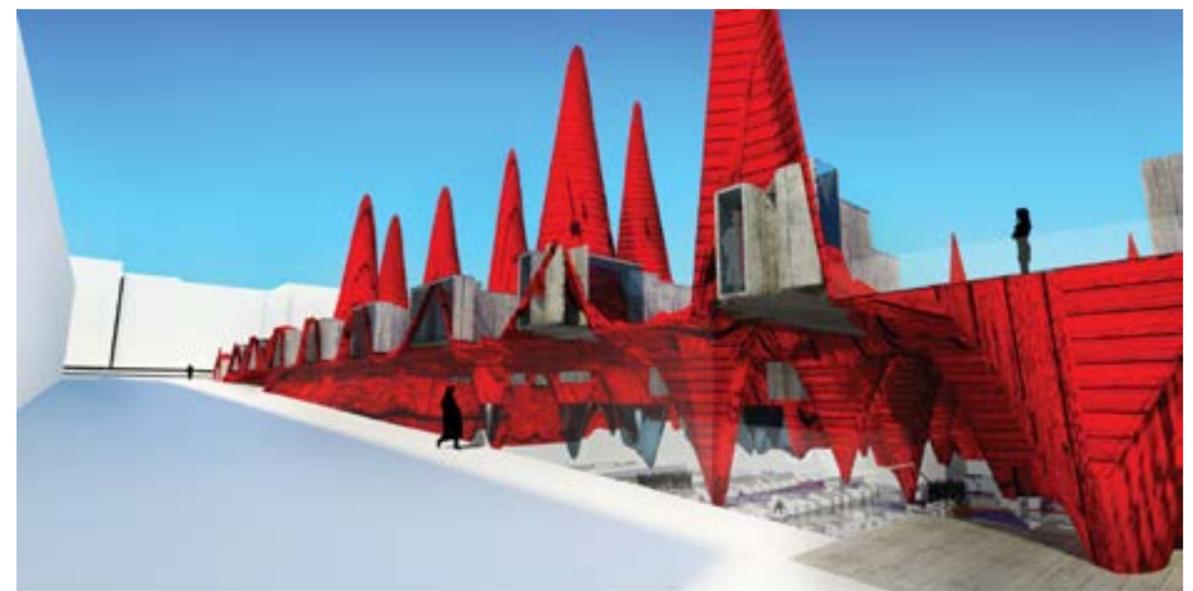


FIGURE 10: Maribor Future University Building by David Wegman (First Year RMIT Master of Architecture Student) 2012



FIGURE 11: Internal Corridor Spaces, Maribor Future University Building by David Wegman (First Year RMIT Master of Architecture Student) 2012

A further investigation in the studios involved ‘misappropriating’ various building typologies not traditionally associated with learning environments (train stations, stadia, shopping malls for example) and exploring the possibilities that they might bring (as part of a process-based approach) to the design project. In particular considering the configurations which facilitate public gathering and their relationships to the programs that surround them as well as to facilitate a breaking down of the vertical slab configuration that is usually associated with multi-level learning environments.

A series of projects appropriated the Stadium as a social precedent in order to explore the possibilities for gathering and public open space offered by the bleacher seating arrangement for University and public use. In Lip Hyeon Cheong’s project (FORMFIELD 4 2012) [FIG 12] a splitting process facilitates a porosity to the campus comprised of a series of inter-connected courtyards. The project attempts to develop an interwoven arrangement of both formal, informal and public spaces. Nur Safura Abdl Razak’s project (FORMFIELD³ 2011) for a new building for the RMIT School of Aerospace Mechanical and Manufacturing Engineering on the Bundoora campus [FIG 13] operates on the Stadium as a type using a series of scaling processes. It proposes a “building as campus” joined through a series of interlinked courtyards and aspires to a high level of visual and physical porosity.



FIGURE 12: Section through, Maribor Future University Building by Lip Hyeon Cheong (First Year RMIT Master of Architecture Student) 2012



FIGURE 13: View from proposed building for RMIT Bundoora Campus by Nur Safura Abdl Razak (First Year RMIT Master of Architecture Student) 2011



FIGURE 14: Diagrammatic massing model by Gabor Olah (First Year RMIT Master of Architecture Student) 2010

Gabor Olah's project (FORMFIELD 2010) [FIG 14] operates on the base type of the shopping mall as an initial organisational system and explores the potential for appropriating the public areas in the mall. As well as the central circulation and organisation of the mall (which progressively becomes more eroded on the higher levels) a series of internal courtyards are developed as internal and external amphitheatre and gathering spaces. James Loder's project (FORMFIELD³ 2011) [FIGS 15-16] for a new building for the RMIT School of Aerospace Mechanical and Manufacturing Engineering on the Bundoora Campus incorporates condensed laneway spaces between a series of buildings. The laneways contain cafes and classrooms accessible from and spilling out to the external open spaces. A series of ramps were developed to link the different levels which contained desks, study spaces, gathering and spill out space. The project incorporates a series of lecture theatres clustered around a central courtyard.

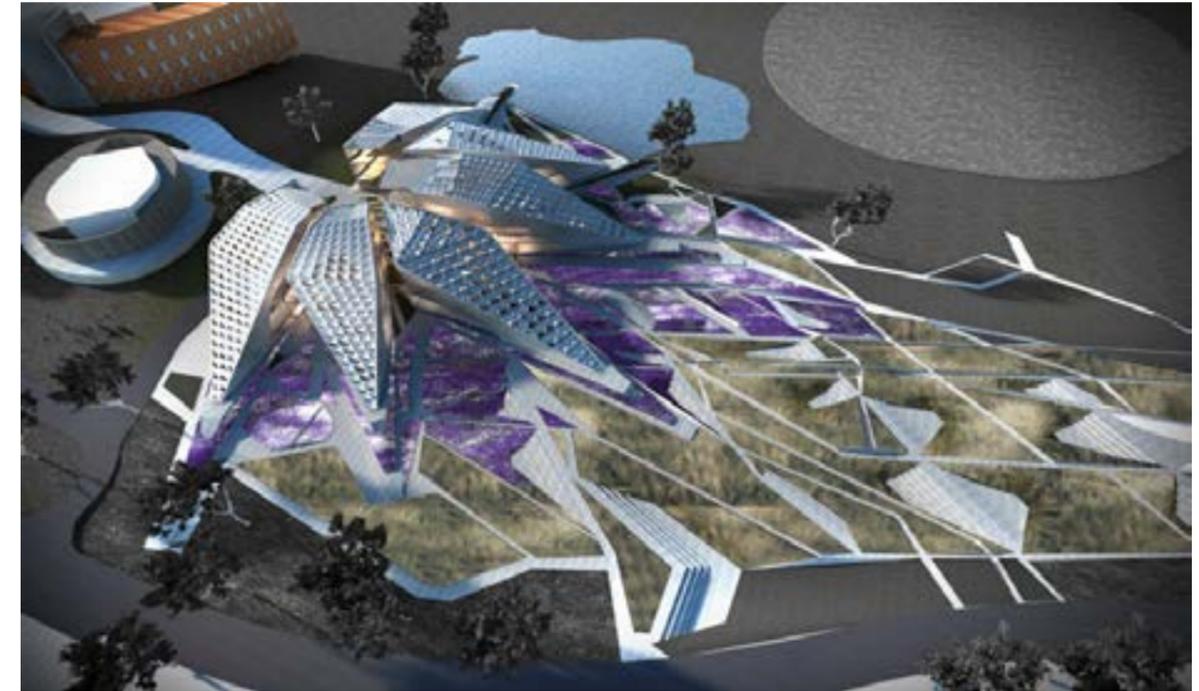


FIGURE 15: Aerial View of proposed building for RMIT Bundoora Campus by James Loder (First Year RMIT Master of Architecture Student) 2011

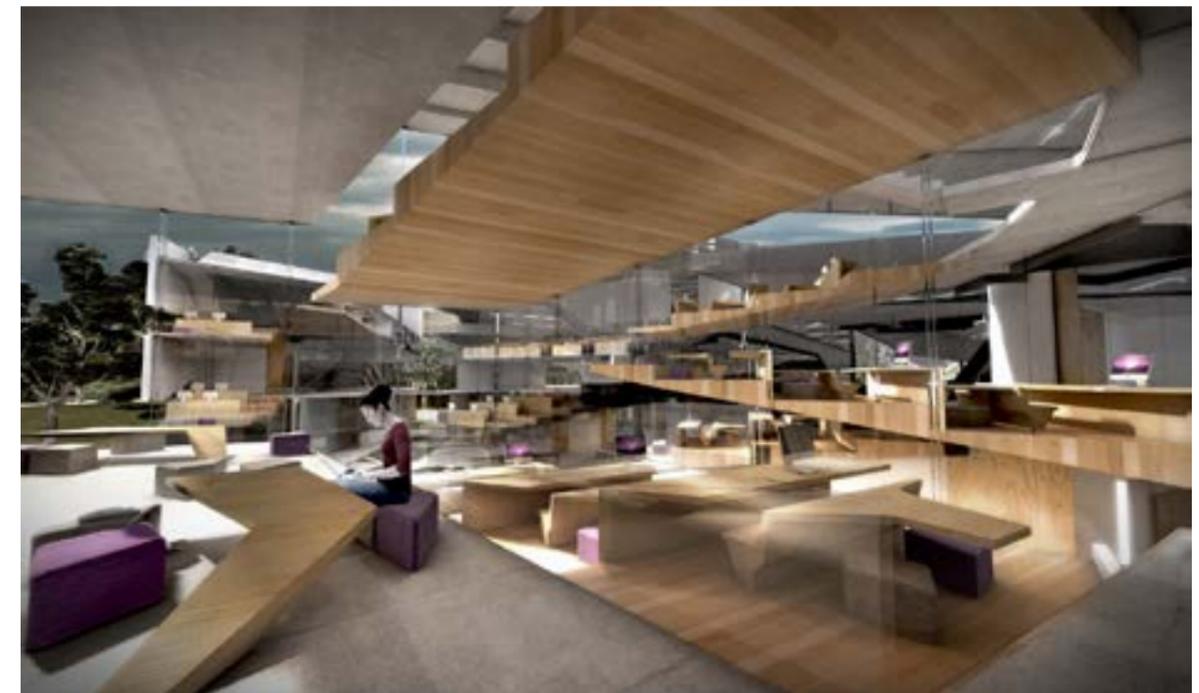


FIGURE 16: Internal View of proposed building for RMIT Bundoora Campus by James Loder (First Year RMIT Master of Architecture Student) 2011

Conclusion

The projects produced in the studio are not in their entirety perfect, there are flaws and that is of course to be expected where experimentation and venturous practice is required. The studios were peer reviewed through the invited juries of practitioners.⁹ The reflection on the wider questions associated with the studios using student work as an example prototype were presented in a number of public forums including the Work Where I Live Symposium¹⁰ (2011) and were exhibited in both the Architecture Pavilion and the Slovenian Pavilion of the Venice Architecture Biennale 2013 (where they were presented at the 100YC forum). The Speculative Campus Project and FORMFIELD studios were also exhibited as part of the RMIT Design Research Institute's Convergence Exhibition, RMIT Design Hub Melbourne, 2013¹¹.

My research interests include design process and this is a disciplinary concern. The means through which we uncover and explore design ideas are vital in any discipline. Research in the academy though, most often revolves around solving problems and this is how government funding models are structured. But there needs to be room for projective explorations that can be applied across a number of "problems"¹². The design explorations and approach in The Speculative Campus Project can be used across a range of building types. What the studios do not do is develop the "research project" in lieu of designing. They seek to juggle numerous questions and ambitions simultaneously, avoid being reductive and they have some faith that this approach is possible and productive for all parties involved.

Endnotes

- 1 Where I was the founding Research Leader of the Future Fabric of Cities Flagship Program (RMIT DRI 2009-2013) for more information refer to <http://www.designresearch.rmit.edu.au/programs/the-future-city/fabricated-city>
- 2 The FORMFIELD Design studios ran in the RMIT Master of Architecture program between 2010-2012 as follows: FORMFIELD and FORMFIELD² (2010) explored the design of a speculative university building and hybrid programs in Melbourne's Docklands Precinct. These were influenced by research on workplace models particularly questions around 'pay as you go' space. FORMFIELD³ was for the relocation of the RMIT School of Aerospace, Mechanical and Manufacturing Engineering from a series of dispersed

buildings on the Bundoora East campus to a single building on the Bundoora West Campus. FORMFIELD 4: 2112Ai Architectural Intelligence Edition (2012) was commissioned by the Maribor 100YC - 2112Ai [Architectural Intelligence] project which was a multidisciplinary project that invited visionary ideas for the city of Maribor in Slovenia and its 100 year future and focussed on experimental design techniques to consider a future Speculative University Campus precinct. The most recent studio WONDERSTUFF (prompted a change in name and direction) focussed more specifically on generative processes and the design of a new building for RMIT in Cardigan Street, Melbourne.

- 3 see Peter Downton, *Design Research* RMIT University Press, Melbourne, 2003
- 4 The term "academically correct" has been used a number of times and I attribute it to Neil Masterton (Design Director, Ashton Raggatt McDougall) who would sometimes start critique of student projects with "well that's very academically correct, but..." meaning that while the description sounded convincing in an academic sense the project was lacking when judged as an architectural proposition.
- 5 Kipnis, Jeffrey. "Forms of Irrationality" in *Strategies in Architectural Thinking*, Whiteman, John, Kipnis, Jeffrey, Burdett, Richard (Eds.)148-65. Cambridge: MIT Press, 1992.
- 6 see Vivian Mitsogianni, *white noise PANORAMA: Process-based architectural design* RMIT 2009 unpublished project-based PhD, supervised by Dr Shane Murray and Dr Sue-Anne Ware. For a discussion of the practice-based PhD model see Van Schaik, L. and Johnson, A. (ed): 2011, *By Practice, By Invitation: Design Practice Research in Architecture and Design at RMIT, 1986-02011*, onepointsixone, Melbourne Australia.
- 7 See Vivian Mitsogianni, *white noise PANORAMA: Process-based Architectural Design* RMIT 2009, unpublished project-based PhD.
- 8 This is a tactic to encourage the project being led through ideas and propositions as opposed to "resolving the building program".
- 9 The studios were assisted by a number of guest critics including: Neil Appleton (Lyons Architects), Dean Boothroyd (M@ STUDIO and NH Architects), Paul Morgan (Paul Morgan Architects), Donald Bates (LAB Architecture Studio and University of Melbourne), Mark Raggatt (Ashton Raggatt McDougall Architects), Gabor Olah (Ashton Raggatt McDougall Architects), Andrew Burrow (SIAL and RMIT Design Research Institute), Roland Snooks (Kokkugia and RMIT Architecture), Leanne Zilka (Zilka Architects and RMIT Architecture), John Doyle (Index Architects and RMIT Architecture) and

Professor Aleksandar Subic (Head of School, RMIT Aerospace, Mechanical and Manufacturing Engineering).

- 10 Work Where I Live Symposium: Collaborative Research on the Flexible and Dispersed Workplace, 5th September 2011, Chapter House Melbourne. Convened by Dr Graham Crist and Simon Whibley RMIT Design Research Institute.
- 11 Convergence: Transforming Our Future, May 2013, RMIT Design Hub Melbourne, curated by Fleur Watson and Ewan McEwan.
- 12 As research leader of the DRI Future Fabric of Cities Flagship I initiated the Speculative Architecture Laboratory research cluster in order to make room for the work of a number of colleagues who had strong research that did not specifically relate to one "problem".

Biography

Dr Vivian Mitsogianni is Deputy Dean and Head of the RMIT Architecture programs and a partner in M@ STUDIO Architects. Vivian was the founding research leader of the Future Fabric of Cities Flagship in the RMIT Design Research Institute (2009 – 2013) which undertakes transdisciplinary practice based design research; Masters of Architecture Design Studio coordinator (2001-2009) and the founding Architecture Community + Industry linkage projects coordinator (2001 – 2008). She undertakes practice-based design research and has extensive experience in the design of Architecture Design Studio curriculum to facilitate this mode of research.

F_RMLAB: PEER-TO-PEER LEARNING FOR EMERGING COMPUTATIONAL DESIGN

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DESIGNING/
EDUCATION
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

This process account shows how a new student-led, peer-to-peer learning initiative is rapidly developing within the University of Waterloo School of Architecture's design curriculum. The essay describes the organization of F_RMLab (Digital Research and Media), a research collective founded by a core group of graduate students at Waterloo's self-directed masters program, and describes how this group is rapidly acquiring agency and resources for advanced computational design within the student body. Emerging in response to paradigms of open-sourced data access, bottom-up custom fabrication, and the spirit of social entrepreneurship, this learning initiative offers a model of peer-based architectural design education. The paper details the educational context that preceded formation of the group, and describes the independent research clusters that form F_RMLab's collaborative framework. Two projects are described in detail, illustrating collaborative learning through activities in knowledge exchange and in project-based learning.

Actively seeking education prospects outside set institutional boundaries, F_RMLab is an innovative model of student-directed, project-based learning for a new generation of advanced computational design. Comprised of twelve students whose graduate theses coincide on smart materials research, dynamic responsive environments, and data manipulation for spatial analysis, F_RMLab engages in a lateral model of peer-to-peer learning through student-organized workshops and projects. Collaborative learning is fostered through Waterloo's cooperative education program, where undergraduates alternate between taught academic terms and paid professional internships. F_RMLab combines theoretical and practice-based knowledge by running student-led tutorials that disseminate specialized software skills and design methods that can be applied to independent thesis research. Research clusters share knowledge, resources, and engage in critical discourse related to complex systems. These exchanges are applied to collaborative built projects implemented within the neighbouring communities. The paper includes a detailed description of a recent commission for an interactive canopy at Toronto's Gladstone Hotel in which technologies of robotics and component fabrication were employed.

Introduction

“Professors still teach, but a university’s greatness is measured by the volume and quality of its research output. While the transmission of knowledge is necessary in higher education, it is insufficient for society’s greatest need: the advancement of learning.”¹

In this paper we discuss a student-led, peer-to-peer learning initiative and its role in advancing and disseminating research in design education through collaborative learning. F_RMlab, a research collective initiated by a core group of graduate students at the University of Waterloo School of Architecture’s self-directed masters program, couples independent thesis research with a lateral model of peer-to-peer learning to support the learning and application of advanced computational tools within the entire undergraduate and graduate student body. This paper details the educational context which F_RMlab emerged in response to, and F_RMlab’s collaborative framework as a collective of independent research clusters. It presents two primary vehicles for collaborative learning through activities in knowledge exchange and a case study in project-based learning.

F_RMlab is structured as three graduate research clusters that use collaborative learning to support peer knowledge exchange, skill-building through student organized workshops, and project-based learning through community collaboration. The initiative aims to make a bridge between a traditional guided learning environment dominant in the undergraduate design studios and the independent and speculative research done at the graduate level. This is achieved by drawing on the agency of students to direct the design curriculum and to attract resources for design research. F_RMlab is guided by the principle of educating by necessity and demand, and on the importance of collaboration both within the institution and with the wider community. This approach is particularly relevant when faced with new paradigms of architectural research on dynamic responsive environments that engage complex data, code and advanced material fabrication, all demanding increasingly fluid means of knowledge acquisition.

F_RMlab formed from within the student body upon recognizing specific opportunities in our current architectural education: Firstly, Waterloo’s innovative cooperative education program informally influences design studio and graduate

thesis work. Secondly, a paradigm shift towards computational design thinking, not only in architecture, but as a growing, ubiquitous influence in design progress, creates new pedagogical opportunities.

Educational Context

Both the undergraduate and graduate curriculum at the University of Waterloo School of Architecture are characterized by a high level of student agency. Graduate studies center upon a self-directed thesis based on the student’s individual research interests. Undergraduate studies feature a co-operative education program where students spend five years alternating between taught academic terms and paid professional internships. This fosters a dialogue between theoretical design studios and contemporary architectural practice for each student. The structure of the undergraduate program moreover allows the acquisition of a wide range of technical skills within a single class through their diverse work experiences. Through the independent pursuits of graduate research and undergraduate professional experience, a great deal of knowledge is amassed, yet the design curriculum does not formally emphasize or explicitly explore this collective knowledge base to its full potential. Traditional design studios evaluate students’ individual achievements while only facilitating peer-to-peer learning in select group projects. F_RMlab aims to provide an infrastructure for collaborative learning, extending student agency in transforming education.

Furthermore, the integration of computational methods in the design curriculum often seem insufficient compared to rapid advances in digital technologies within the design industry. Recent efforts to integrate advanced computation into a core design curriculum include final projects shared between courses in design studio, structures and digital design, yet are limited to the instructor’s expertise. Computational skills and workflows acquired on internships or through specialized graduate research play a unique role in creating an expanding knowledge base in the academic environment, opening opportunities for students to teach each other. F_RMlab has emerged out of this context.

Student-Directed Research Clusters: A Framework for Collaborative Learning

F_RMLab's strategies of collaboration and peer-to-peer learning in the form of research clusters aims to build on the strong emphasis on the self-driven thesis culture within the school. With the introduction of focused research clusters, F_RMLab introduces collaborative strategies that will allow for a more fluid workflow between students with various interests and expertise. The shift from a purely independent and abstract thesis structure to the project-based research-through-design investigations that F_RMLab promotes has been widely adopted in schools such as the Architectural Association and the University of Tokyo:

"Not insignificantly, design research programmes such as those at the AA replaced the independent thesis with an extended project pursued under the research umbrellas defined by the professors, a model adopted by many other programs" (Hight 2005: 29-35)²

In this process, the shift from independent research to collaboration also involves a change in the learning environment and process. In the case of the AA, a shift from discrete and segregated teaching environments with clear hierarchies to a horizontally structured mode of learning in the form of a laboratory was evident³. The laboratory framework adopted speaks of a scientific research environment in which outcomes are not predetermined and molded into a style of any sort, as traditional studio environments would be. Comparably, at the University of Tokyo, individual research "units" are defined within the graduate school which are supported by a main professor, researchers and graduate students (Ohno, Peeters 2012: 73)⁴. In this type of defined research platform, themes are developed and led mainly by faculty, and students collaborate through assigned sections or through partial participation within an overall research topic. Although in the examples mentioned, the shift from individual work to more collaborative work is made (Ohno, Peeters 2012), the strengths of lateral student led research and focus on particular interests seems to disappear into a more structured pursuit of a focused research project.

Responding to this widely adopted shift in architectural education, F_RMLab explores ways to adhere to the strengths of a self-driven research topic within a horizontal

learning environment. In contrast to operating within a defined "research umbrella" by the professors, the design problem, its platforms and facilities for the research are defined by the students themselves. F_RMLab's role is then to create a platform through which students with similar interests and expertise can gather resources and projects to work on collectively while still complying with their individual research interests. Research clusters thus operate both as a vehicle for academic growth and as a means of attracting collaborations with faculty research or potential partnerships within the industry and community. Unlike faculty-led design studios, students can bring in academic expertise or industry knowledge to their research.

F_RMLab members have defined three different research clusters: Interactive Architecture, which investigates the development and implementation of responsive technologies within the built environment, with a vision of integrating computational power to design buildings and spaces for better environmental performance and greater engagement with human occupants, Distributed Information Systems, developing design approaches where the digitalization, analysis and processing of environmental and social data can inform the design of intelligent urban spaces and landscapes, and Smart Materials Research considering architecture as a material system with structural, formal and behavioural properties, looking at methodologies of performative integration using current computation and digital fabrication tools.



Figure 1: Interactive Architecture Cluster (F_RMLab, 2012)

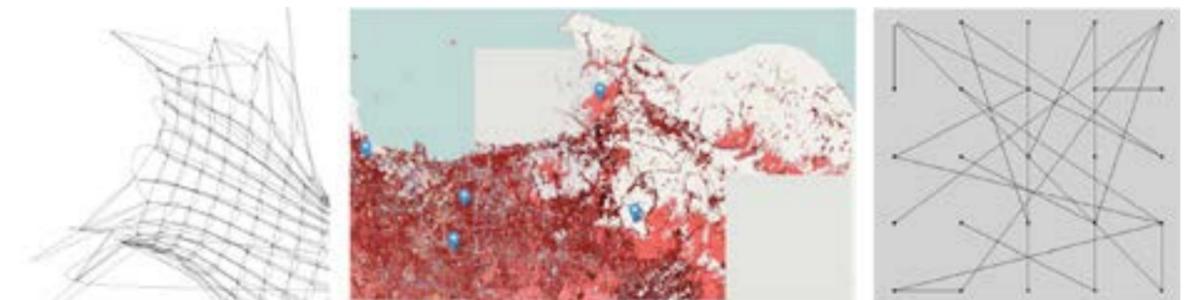


Figure 2: Distributed Information Systems Cluster (F_RMLab, 2012)



Figure 3: Smart Materials Research Cluster (F_RMLab, 2012)

Research Cluster Case Study: The Water Harvest

The Water Harvest is an example of a collaboration between F_RMLab and the community, where the focus of each research cluster contributes to a key aspect of project development. Working closely with the non-profit group Friends of Roxton Roads Park in Toronto, three F_RMLab members draw upon their specialized research focus to propose strategies for the revitalization of pocket parks in Toronto. The individual research of Rakshya Gauchan, May Wu and Miriam Ho comes together in an integrated water harvesting master plan for the park, incorporating community gardens and playgrounds that use water-sensitive materials, representing the research of each cluster. Gauchan, part of Distributed Information Systems, is designing an urban infrastructure for water harvesting strategies that can incorporate community programming. Wu, a member of Interactive Architectures, is engaged in documenting and developing interactive public playscapes, and Ho, a member of Smart Materials Research, is developing in material systems with a capacity for water harvesting and filtration. Gauchan, Wu and Ho benefit from the Friends group's large network, including water conservation agencies with expertise in urban stormwater management, and city councillors, local architects, schools and families that can provide invested critique to F_RMLab's proposals.

Computational Skill-Building: A Platform for Knowledge Exchange

Learning new software tools and workflows that evolve rapidly within research and praxis rely upon knowledge exchange. F_RMLab aims to facilitate the cross-pollination of skills, methods, experiences and ideas through student-run workshops and collaborations with institutions. In doing so, F_RMLab emphasizes the importance of student leadership in teaching and disseminating knowledge, establishing a lateral model of peer-to-peer learning that extends beyond the limits of a single streamed

design studio. This is part of an effort to promote ongoing dialogue in advanced computational design within the student body. By drawing on knowledge gleaned outside of the academic curriculum, F_RMLab encourages student agency in integrating computational design workflow into any specific architectural design course, and acts as an incubator for innovation and exploration in the school.

Skilling-Up

F_RMLab introduces alternative computational design possibilities with a series of student-run seminars, in order to address the crucial role skill acquisition can play when developed in tandem with design problems introduced in the academic curriculum. F_RMLab tutorials and workshops typically run as regular weekend sessions, led by graduate and undergraduate students who possess pre-existing technical knowledge of the material. Tutorials in foundational skills such as Rhino modelling, digital fabrication and video editing are held early in the term to provide tools that can facilitate academic work. More specialized workshops share applied computational methods developed in independent research. For example, F_RMLab member Saeran Vasanthakumar led a GIS tutorial in using OpenStreetMaps to extract crowdsourced urban data for architectural site drawings. Vasanthakumar recognized that his own research in city data mapping offered an efficient method of obtaining site information that could be used in other architectural projects undertaken by the student body.



Figure 4: Arduino Workshop with Brandon DeHart

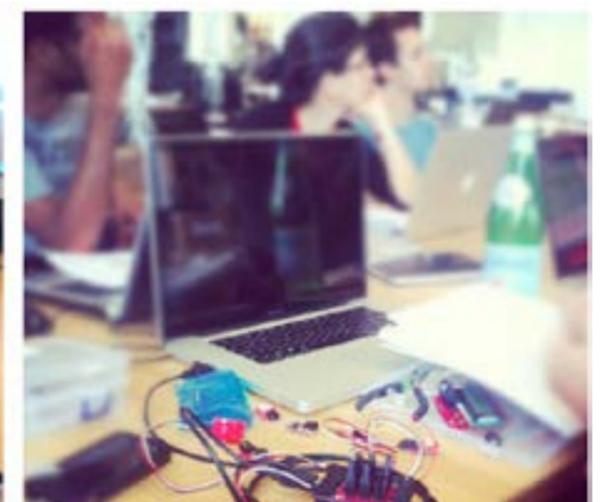


Figure 5: Arduino Workshop with Brandon DeHart at University of Waterloo (Shahi, 2012) at Philip Beesley Architects Inc, Toronto (Bogias, 2012)

Attracting Community Resources

While F_RMLab's core members have varying skill sets, venturing into hardware and software applications with interactive robotic systems involved seeking out external expertise. F_RMLab drew upon the research practice of faculty member Philip Beesley, and Brandon DeHart (Phd candidate, University of Waterloo), and recent alumni with experience in electronic circuitry to guide us through the learning process. Through hands on exploration of an array of sensors, motors, and responsive materials F_RMLab members were able to gain rudimentary knowledge of interactive component design. Through in-kind facilitation of knowledge expansion, this bolsters the growth of the computational knowledge pool for peer-peer learning and allows for the foundational skills that prepare a team for project based integration. F_RMLab has begun to establish a network of experts and collaborators to expand group knowledge. By engaging professionals and specialists, we are able to engage the particularities of the problems at hand, and to continue to build on the framework that allows certain students to participate in the skills and methodologies that apply to their cluster.

Collaborative Exploration Case Studies: Future Public Environments

An accessible approach to student skillbuilding is by participating in workshops that allow the transfer of knowledge between institutions. In Fall 2012, F_RMLab and Waterloo Architecture hosted the Future Public Environments Workshop in collaboration with University of Buffalo(SUNY) Centre for Architecture and Situated Technologies. This two day investigative workshop speculated on tangible urban applications for interactive systems. Arduino interactive systems were launched in conjunction with basic material prototypes.

This workshop allowed Waterloo participants to connect with University of Buffalo students who had previous knowledge of hacking techniques with the Xbox Kinect. We were able to test basic inflatable structures that were connected to the infrared vision system of the Kinect in order to explore soft built forms that began to embody 'living' emotional sensitivities such as fear and excitement. This workshop allowed for increased knowledge in design methodology in conjunction with the advancement of arduino skills, basic hardware hacking, and material exploration for the fabrication of lightweight, low-cost structures.



Figure 6: Future Public Environments Workshop with SUNY Buffalo (F_RMLab 2012)

Learning Through Making: Applying Research and Prototyping

F_RMLab as a platform encourages the processing of research ideas and theories being investigated in different clusters to be experimented with through collective exploratory projects and installations undertaken by the larger group. In this process, learning through making becomes an important component of the learning process through which individual theories investigated can be followed through with skills gained, and shared amongst the group. In this manner, F_RMLab aims to develop a framework through which learning by necessity and demand can be enriched. This framework was followed through successfully in *Field Guide*, an installation created by F_RMLab in April 2013 for the Toronto Gladstone Hotel's Inaugural Grow-Up exhibition in April 2013, of which a second iteration will appear as part of the Visiting Research Team Installations at ACADIA 2013.

A Case Study in Community Collaboration and Learning-through-Making: Field Guide

A recent interactive installation undertaken by F_RMLab exemplifies the approach of project-based learning for research development via community collaboration. *Field Guide* is an interactive canopy composed of an intricate modular surface manipulated by a digital infrastructure programmed to respond to the motion of passer bys. The installation provokes our participation and dynamic engagement with everyday spaces, advancing F_RMLab members' ongoing research to uncover new dynamic relationships between people and their surroundings through detailed material investigations that extend our perceptual participation of the built environment.

F_RMLab worked closely with the Toronto Gladstone community, receiving support and feedback from designers and makers from across a broad range of creative practices. The process facilitated the acquisition of new skills in robotics, component fabrication and material design to advance F_RMLab research, by drawing on student

leadership to attract resources for learning and engaging in the tangible experiences of learning-through-making.

Field Guide was developed through three parallel focuses on 1) the design of a flexible material system, 2) sensor and receiver components that enabled the material system to respond, and 3) code to control the behaviour of the components. *Field Guide* features a modular interactive system coded for a single sensor input and output via two parallel motors attached to six mylar clouds, comprised of designed interlocking modules. F_RMLab's core graduate students undertook research on different aspects of the system, based on existing skills and moreover based on a desire to learn and acquire specialized knowledge of advanced computational design. The wide range of research through design required to make this project happen included the main focuses of the three clusters and therefore served as a rewarding collaborative project.



Figure 7: Field Guide at GROW OP, Gladstone Hotel, Toronto (F_RMLab, 2013)

Prior to undertaking Field Guide, F_RMLab had only basic knowledge of the skillset required for executing interactive design, and designing material systems. F_RMLab relied the gained knowledge of code through the Arduino workshops conducted and the collaborative workshop with University of Buffalo (SUNY), and interdisciplinary

courses in computer science. This knowledge was applied to new technologies in robotics using arduino boards, motor shields and multiplexers. In this manner, F_RMLab conceived of the code for the behaviour of a system that responded intuitively to human activation, and gained assistance from collaborators in the faculty and industry as was required to complete the knowledge base that led to the completion of a successful responsive installation. Finally, F_RMLab received highly supportive feedback from local community of Toronto during the exhibition, leading to a commission for Field Guide at the Toronto Civic Action Group's charity event, as well as subsequent presentation in the School of Architecture's Uncovered Lecture Series, exhibition in the Musagetes Architecture library, and a faculty-recommended exhibition at Interactive Shanghai in August 2013.



Figure 8: Field Guide - Interactive System (F_RMLab, 2013)



Figure 9: Field Guide at GROW OP, Gladstone Hotel, Toronto (F_RMLab, 2013)

Conclusion

Establishing research clusters, offering computational workshops, and working on hands-on projects outside of Waterloo Architecture's pedagogy has created profound change within the school community less than a year after F_RMLab's inception. Both undergraduate and graduate students are increasingly able to engage computational tools within their individual design and research work. Student-initiated projects provide not only an alternate learning opportunity for new technologies, but begin to promote new computational design paradigms that influence the core curriculum. Graduate research increasingly benefits from closely aligned relationships with faculty research, community groups and interdisciplinary networks.

As F_RMLab continues to grow, new participants pool existing skills to strengthen the group's collective knowledge and peer learning curriculum. F_RMLab as a creative platform encourages new student-led collaborative projects to emerge borne out of the individual interests and educational needs of the group. This encourages undergraduate students to further drive their own development through various stages of knowledge acquisition, design and production, and graduate students to attract opportunities and resources for their self-directed thesis research. By emphasizing student leadership in the design curriculum, both in teaching and in seeking out design projects, F_RMLab acts as an incubator for innovation and change within the school that can grow and evolve with student interests and the demands of the industry.

Endnotes

- 1 Leatherbarrow, David. 2012. 'The Project of Design Research.' In *Design Innovation For The Built Environment Research By Design and The Renovation of Practice*, edited by Michael U. Hensel, New York: Routledge: 6.
- 2 Hight, C. 2005. 'Oxymoronic Methods: The Incomplete Project of Design Research', Corporate Fields, London: Architectural Association: 198-203.
- 3 Higgott, A. 2007. 'The Subject of Architecture: Alvin Boyarsky and the Architectural Association School', *Mediating Modernism: Architectural Cultures in Britain*, London/ New York: Routledge: 153-188.
- 4 Ohno, Hidetoshi and Bruno, Peeters, 2012. 'Beyond Kenkyushitsu and atelier—towards a new professional education and practice.' In *Design Innovation For The Built Environment Research By Design and The Renovation of Practice*, edited by Michael U. Hensel, New York: Routledge: 70-75.

Biography

Miriam, Sheida and Connor are graduate students and co-founders of F_RMLab. Miriam's research focuses on the design and fabrication of water-harvesting wall assemblies. Sheida's research focuses on a socially and environmentally responsive and adaptive system as a retrofitting strategy for dated residential towers in Toronto. Connor's research lies in explorations of responsive urban public spaces as a means to enrich relationships between people and their built environments.

CURATING SCHOOL CULTURES: STUDIOS IN THE CONTEXT OF SCHOOL AGENDAS

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**DESIGNING/
EDUCATION**
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

Studios are consistently assumed to be the focus of Architectural education. This paper proposes alternatively, that the success of any studio is fundamentally determined by the explicit design of the context in which it sits. What remains little examined within studio pedagogic discussion is the design of the culture of studios at individual schools and the role, positive and negative of larger school agendas within that shape meaningful studio outcomes. Rather than ask how does one design a studio, a better question might be how does one design the research environment in which they thrive?

This paper interrogates the assumptions of studio independence and posits the positive relationship between designed and curated school cultures and studios as a means of repositioning the debate around studio education.

This raises many issues for currently accepted studio practice which include; assessing the value of individual intellectual property structurally embedded within current studio models, the role of heads of programs as skilled curators, the coherency of a school of architecture and the subsequent capacity for commitment to common research goals, the scale of the current studio model against research potentials, the positioning of schools within a competitive education market place, and the role of specific school agendas and positioning in the context of notions of generalized architectural education.

Within the context of the contemporary education system, there are many reasons why the typical studio model has been so resilient, however, larger agendas requiring change in educational structures and focus is one action with the potential to drive the evolution of studios in a design research context beyond the limits of current boutique project development.

What then is the relationship between a school agenda and the success of studio projects? By examining two contemporary school models (Columbia University's studio X, and the UTS "all school"

Metropolis project) as a starting point, and drawing on conversations developed initially at the international conference “20/20 The Evolving Architectural Education; Innovation in Teaching and learning in Asia” conference hosted in 2012 at CUHK around the importance of cultural activation within Architecture Schools, this paper draws out the relationship between an overall explicit school positioning or agenda, and the success of studio culture within those schools where this is clear.

Curating School Cultures; Studios in the context of School Agendas

Studios are consistently assumed to be the focus of Architectural education. This paper proposes alternatively, that the success of any studio is fundamentally determined by the explicit design of the context in which it sits. What remains little examined within studio pedagogic discussion is the design of the culture of studios at individual schools and the role, positive and negative of larger school agendas within that shape meaningful studio outcomes. Rather than ask how does one design a studio, a better question might be how does one design the research environment in which they thrive?

Studios have formed the center of architecture education since the formalization of architecture as distinct from building. As Aureli reminds us, Architecture schools were initially if anything, a political instrument formed as a means of creating consensus on what architectural style was. At the core of this political project of conformity to an accepted disciplinary mode, studios or drawing ateliers were the means of instructing, education or indoctrinating classes of students into a state sanctioned version of architecture as it emerged in 1671 in the Academie Royale d'Architecture, established by Louise the XIV's minister of finance, Jean-Baptiste Colbert, articulating architecture as a discipline distinct from building.¹

Today, the studio is still, by far, the dominant core of architectural education, and perhaps the one area that is equally supported by stringent accreditation demands on courses, and supported universally by the academics and practitioners that teach. So universal is the studio as an agreed education model for architecture, it is the one meeting place where professionals, academics and legislation agree to agree about architecture.

However the studio model has from its origins also maintained its role as a means of conforming students to an agreed notion of architecture, perhaps no longer based in a state sanctioned style, but certainly as a means of celebrating individuality, both to the advantage of academics who benefit from being popular elective studio choices, to students who wish to align themselves with individual instructors whether they are academics or practitioners. The typical context of studio cultures in schools of architecture remains competitive, boutique and focused on individuality.

Current advanced studio models rely on the twin modes of boutique “uniqueness” and difference as a selling point within schools and also between schools. Yet this model that promotes the distinguished designer has little or no relation to a school culture and the context in which studios sit are typically ad hoc arrangements of guest and full time academics that have good individual teaching records and availability, and more or less satisfy the needs of a generalized notion of the graduate architect. Whether they are in a selective /options studio context or not, students are still typically expected to develop through increasing complexity of projects, still based around typological programs.

In the context of the contemporary expectations of research within AQF level 9 Masters degrees, not to mention the pressures of research for staff, the limitations of this version of individual studio cells of around 12 students working on a project set by the instructor and usually changing from year to year are clear, and reinforce a type of graduate architect that is arguably completely ill equipped to work in a research or professional context after graduation.

The contexts of schools of architecture has also changed dramatically in the last two decades creating what might be described as, a sense of disciplinary anxiety, “only exacerbated by the much discussed realization that if the problems of last century were able to be addressed through architecture, by and large the problems of this century are not, at least in the terms of a 20th Century understanding of the figure of the architect.”²

Pressures from funding, changing expectations of graduate skills, and much talked about disciplinary and practice changes are all pressures on the traditional studio model. However the anxiety is only exacerbated by the notion that a studio is an independent academic unit, with a unique method, social/cultural environment, and

project form. In this sense, the context of schools of architecture in which studios sit, are rarely explicitly curated, and are typically only administratively balanced as a result ultimately of offering an appropriate spread of skills to satisfy school accreditation demands.

What alternative types of context can be created for studios? What if the studio was not an island in a school, but if the school itself was considered the project? Quite separately from the question of school marketing and identity which are beyond the scope of this paper, the scale of the studio to tackle the complexity of problems and environments that architecture must currently face seems totally inadequate, and the scale of the school, mobilizing a whole context within which a studio might operate as a part of an agreed agenda offers much potential while challenging accepted wisdom of the boutique studio model.

Approaching the role of studios as part of a curated and explicit school agenda over a period of time challenges the concept of a broad graduate skill base in favor of a narrow focus on topics. It puts the agenda of the school ahead of the agenda of individual research or teaching positions, and allows one studio to leverage off others, as well as off other subjects in a coordinated way such that a robust school conversation can be engaged at many levels within the school and across typically distinct discipline areas such as construction, theory and design. The value of this approach is in assuming that the outcomes of the studios can be effectively put into the service of a larger school project and literally projected into other more public spaces of debate.

This idea however also raises many issues for currently accepted studio practice. These include; assessing the value of individual intellectual property structurally embedded within current studio models, the development of the role of heads of programs as skilled curators rather than administrators, the coherency of a school of architecture and the subsequent capacity for commitment to common research goals, the logistics of scale of the current studio model against research potentials, the positioning of schools within a competitive education market place, and the role of specific school agendas and positioning in the context of notions of generalized architectural education.

The Columbia University Graduate School of Architecture, Planning and Preservation launched their StudioX program in 2008, as an experimental strategy to increase the capacity of a school to address substantial research contexts through a structural reorganization and networked strategy. Trading on the brand name of Columbia's GSAPP, the school has tested a pilot StudioX venue in NY in 2008 lead by the high profile Geoff Manaugh of BldBlog before franchising that model to other international destinations. While there is much skepticism of the strategy as a marketing initiative and a kind of brand colonialisation, (like the AA summer school program), the ambitions of the StudioX project towards creating a unique and broad context for a series of parallel studio, event and exhibition situations does offer both a potential scaling effect beyond individual studios while embedding a curatorial program, that of the question of cities, primarily within a broad and enduring collection of spaces for multiple events, including studios. The StudioX model is labeled as a series of "advanced laboratories for exploring the future of cities"³ at once claiming the scale of the project, its projective nature and the focus of the networks research.

Interestingly a core component of the Studio X model is the tempering of individual studio works not as the center of attention for this project, but as one of a series of elements being drawn together that aim to engage a broadly understood audience for the work on an ongoing basis, through talks, visits, exhibitions, libraries, provision of resources and a stated ambition to invite in other institutions and instructors to join the project. Within the GSAPP's stated ambition to "establish the most decisive global network of teaching, research and communication about the build environment."⁴ Tempering this marketing hubris, is the recognition that the issue at hand, the future of cities, is beyond traditional studio contexts to manage, and that schools need to change in order to address these larger architectural contexts. Also embedded in the project is the recognition that the centers of the North American and European academies, are no longer well placed to engage with these large scale problems directly. In a world of global ambitions, the virtue of being local is evident, and in this sense the project of the StudioX is to learn from the locals, summed up in the words of Dean Mark Wigley, "Schools need to become students."⁵

The studio in this model is no longer central. Rather the offering extends to a book gallery, global interface, gallery, lecture space, work space, meeting room, offices, coffee bar which all amount to a studio-X model. In this regard the StudioX model is similar to the creative spaces offering of the City of Sydney Oxford Street and William street creative hubs program which launched in 2011.⁶

The other aspect of the studio network model that is unique to the GSAPP offering is the scale of their global footprint. This is a clever tie in to their alumni networks, and a way to leverage their brand well beyond New York, where it has been historically synonymous. The strategy is not available to all schools as the set up costs and management of the network are resource intensive however, the ambition to collectivise the project of research in cities through a network of spaces rather than traditional studios per se, offers a glimpse of the potential of this new school context within which large scale research can occur.

At the University of Technology, Sydney, after much discussion on the changing role of practice in architecture after the 2012 Venice Architecture Biennale, *Formations*, exhibition, a decision was made to soft launch and *all school* project, the "Sydney Metropolis" project. The aims of the project are three fold, to develop a strongly articulated local expertise in Sydney as a case study for contemporary issues in metropolitan development in Australia, to engage within the current Sydney metropolitan and development debates not as an objective institution, but as a biased protagonist, and to explore the potentials of rallying a small core faculty and adjunct staff around a common project.

The continuous question for the school remains, what are the possibilities of a contemporary school of architecture? Certainly this is another means of addressing the role of research, but also includes issues of advocacy, the possibility of institutional generosity, and acknowledging and taking responsibility for a role as a cultural creator within any metropolitan context. These aims for a school also require a context of curatorial leadership and willingness for political engagement with the context of the school, as much as the formulation and development of political skills within the school itself. This political context of a project then serves to direct the studio offerings along with offerings from all subject areas to participate in something larger.

There are some immediate virtues to this model. The relationship of subject to subject falls not within a heterogeneous model of architectural education, but are instrumentalised within a contiguous thematic project, thus foregrounding the integration of architectural skills that are within but also beyond design studio as a central aspect of architectural intelligence and indeed one's education. Another virtue is the capacity to develop a critical foundation for discussion across studio contexts. This allows for the development of positions within the school to be tested external to individual studio contexts, while activating other forums within the school that benefit from a common ground of knowledge.

The negatives to this approach are more related to the typical cultures of architectural education and the challenges for developing buy in from the academic staff typically used to running their own show. In reorienting an academic studio to address or at least respond to an overarching agenda, requires some level of re-crafting a studio that may already be seen to be running well which in turn requires a change in the leadership role from one of colleague/administrator, to one of overt curatorial leadership.

The school of Architecture at UTS is trialing this technique in 2013. By engaging with this question, positions around the argument may be made, and staff and students are able to speak across common theoretical, practice and design territories. Perhaps of most value, in the context of developing research, the value of the school is made explicit to external entities, such as the City of Sydney, or the State Government Architects office for example that allow the students and staff to make meaningful contributions to debates of a larger order. Additionally, subjects usually held apart from one another are all seen to contribute to a common cause, which pedagogically seams the discipline areas of the school into common and complex project understanding. Ultimately the school of architecture must then not only be a place where a conversation can take place, but must articulate a position within that debate. A school can no longer be understood as neutral territory.

Endnotes

- 1 Pier Vittorio Aureli, *The Possibility of an Absolute Architecture*, (The MIT Press, Boston Mass) 2011, p150
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- 3 GSAPP course information package, "initiatives" brochure, 2012, p6
- 4 GSAPP course information package, "initiatives" brochure, 2012, p5
- 5 GSAPP course information package, "initiatives" brochure, 2012, p3
- 6 www.cityofsydney.nsw.gov.au/business/city-spaces/creative-hubs, accessed 14.08.13

Biography

Head of the School of Architecture at UTS, and Professor of Architecture, Anthony Burke is a leading figure in Australian architecture, specialising in contemporary design and theory in relation to technology and its implications for the built environment. A graduate from Columbia University (MS AAD, 2000) and a Bachelor of Architecture from UNSW (B.Arch, Hons 1, 1996), Anthony has lectured extensively in Australia, North America and Asia, including institutions such as University of California, Berkeley, the Harvard Graduate School of Design, Princeton University, Carnegie Mellon University and The California College of the Arts (CCA), Shenzhen University, Tongji University, Hong Kong University and Chinese University of Hong Kong and the Poznan Academy of Fine Arts.

Anthony is an internationally recognised designer, curator and architectural theorist, and sits on a number of urban and architectural advisory panels, and recently was elected to chair the board of the Object: Australian Design Centre. Anthony was selected as co-creative director for the 2012 Australian Pavilion at the Venice Architecture Biennale, and spoke as one of the 2012 TEDx Sydney presenters. His designs have been exhibited internationally and he has published books on Architecture and media, networks and practice.

ADVANCED DESIGN RESEARCH: EXPLORING THE TEACHING RESEARCH NEXUS

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**DESIGNING/
EDUCATION**
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

The relatively recent shift from Bachelor to Master degrees has seen a foregrounding of research within architecture programs. Within the new regulated environment under the Australian Qualifications Framework, which mandates research skills as a core component of the 'level 9' degree, there is an increasing imperative to articulate both the nature and scope of research within the Master of Architecture. Coupled with the pressures on academics to publish or perish and to find innovative ways of doing more with less, the Master of Architecture presents a world of opportunities in relation to the 'teaching-research nexus'.

Although the 'nexus' between teaching and research is widely promoted as universally desirable – benefitting both academics and students, there is very little critical interrogation of what this means in relation to either teaching pedagogy or research practice. While both have been the subject of widespread research in recent years, there is very little that targets the interface between these two areas.

The aim of this paper is to unpack the meaning of the 'teaching-research nexus' in design through the framework of the Advanced Design Research (ADR) studios within the Master of Architecture program at the University of Tasmania. While traditional architectural design studios allow the students to develop specific solutions for projects, the ADR programme offers the opportunity to explore design problems through a range of different processes, which follow Christopher Frayling's typology of research for/into/through design, resulting in a diverse range of outputs. These outputs extend from traditional academic publications (co-authored by students and supervisors), to the dissemination of research findings to appropriate audiences through reports, exhibitions and digital media.

Introduction

For the majority of academics, juggling research and teaching is a necessary condition of operating in the current university system. Research remains a firm institutional priority, heightened by the introduction of mechanisms for assessing research quality in institutions, under such frameworks as the Excellence for Research in Australia (ERA). This has led to a competitive ranking environment at the institutional level and a 'publish or perish' mentality at the individual academic level. At the same time there are increasing efforts to recognise and address the disparity in relative value attached to teaching and the position of undergraduate programs as "sideshowes to the main event."¹ Given the pressure to perform in both spaces, and with an increasingly contracting resource-base, the 'teaching-research' nexus emerges as an attractive site of opportunity for both individual academics and institutions.

From a university perspective, the acquisition of research skills is seen to be vital to prepare graduates for the workplace. The increasingly dynamic nature of career paths and the rapidly transforming work environment fuel the requirement for students to develop competitive and life-long learning skills that can carry them into an uncertain future. In Australia, research skills are now mandated as part of the Australian Qualifications Framework (AQF), which provides a nationally consistent set of learning outcomes for each AQF level and qualification type from Certificate 1 (Level 1) to doctoral degrees (Level 10). As a Level 9 qualification, the Master of Architecture (by coursework) requires that graduates demonstrate knowledge of research principles and methods and technical research skills and their application in a substantial research-based project, capstone experience and/or piece of scholarship.²

The coursework format of the Master of Architecture offers opportunities for exploring the 'teaching-research' nexus for both staff and students. One of the key recommendations in the highly influential Boyer Commission report is to emphasise 'inquiry-based learning' in a framework of reciprocal exchange "where faculty, graduate students, and undergraduates share an adventure of discovery."³ Yet what does this 'adventure of discovery' really mean in relation to teaching pedagogy and research practice?

In this paper we unpack the meaning of the 'teaching-research nexus' and the implications for the architectural academy. Following a brief discussion of the literature in this area, we turn to an analysis of opportunities and limitations through the framework of the Advanced Design Research (ADR) studios within the Master of Architecture program at the University of Tasmania.

Teaching-research nexus

The teaching-research nexus is a 'contested space', underpinned by transforming understandings of research in relation to more pluralistic views of knowledge production, and a shifting of pedagogy towards student-centred learning.⁴ Griffiths distinguishes research within built environment disciplines as primarily a form of 'applied inquiry' with an emphasis on improving practice in given contexts.⁵ This contrasts with empirical inquiry in the sciences and interpretive inquiry in the humanities, which both emphasise the production of generalised knowledge. While applied inquiry may be a distinguishing feature of much of design-based research, particularly in relation to Frayling's conceptualisation of Research *through* Design, it is not an encompassing definition. Empirical, interpretive and other emerging forms of spatial and visual-based inquiry are also part of the broad field of design research. These forms of research may be generated through particular contexts but can be directed to more open-ended and generalised forms of knowledge-making.

Another key issue in design disciplines is distinguishing research from practice. This remains a key point of contention within the field.⁶ Distinctions can be made in relation to broad characteristics of research as a systematic process of investigation, advancing knowledge for the broader field and dissemination of findings.⁷ For design research this requires the pursuit of a deliberate line of inquiry developed through an iterative process, generalisable (rather than generalised) knowledge and a mechanism by which the research is communicated to appropriate audiences, whether academic, professional or the broader public. However, complexities still exist in the detail, particularly in relation to the robustness of the methodology and the perennial quest to legitimise alternate forms of qualitative research within positivist frameworks, notably in terms of the rigour of the process and validity of the findings.

Within architectural education there are particular challenges of aligning teaching and research. As a vocational education, architecture must negotiate the competing demands from the academy to develop research skills and core graduate attributes, and from the professional accreditation bodies to develop core competencies in relation to practice. This leaves little room for flexibility and can result in a proliferation of content, which in turn can foster shallow rather than deep learning experiences. However, we contend that the problem-based learning approach within architecture and design disciplines presents opportunities to bring research and teaching into closer alignment.

Griffiths identifies 4 models of teaching-research nexus, which can be used to highlight the opportunities for architecture and design education⁸:

1. Research-oriented teaching – understanding of research processes
2. Research-led teaching – content of curriculum based on specialist knowledge
3. Research-based teaching – curriculum based around research inquiry
4. Research-informed teaching – teaching based on inquiry into teaching and learning process/pedagogy

Underpinning these models are differences in curriculum design, pedagogical practice and the perceived relationship between academic and student, which Griffiths positions along a spectrum from weak to strong. At the 'weak' end of the spectrum, the research experience is 'diffuse', research knowledge is located at the periphery of the learning experience and the flow of knowledge from academic to student is uni-directional. At the 'strong' end of the spectrum students engage in research projects led by academic staff, the research shapes the learning task and there is a perceived 'two-way' relationship between academic and student. From this perspective, research not only serves to enrich the content of the curriculum and learning experience for students, but also provides academics with the opportunity to place their work in a wider intellectual context, to gain feedback from students and to provide a testing ground for research ideas.⁹ In this way, as Brew contends, "Take away research, and teaching can become routine. Take away teaching and research can become remote and stodgy."¹⁰

While the models outlined by Griffiths are not necessarily discrete and they pervade the curriculum and teaching practices in different ways at the University of Tasmania, this paper focuses on the model of research-based teaching and the opportunities and limitations of the 'two-way' relationship between academic and student. This research studio examines the potential Christopher Frayling's tripartite model of *for, into, and through* design as a way of conceptualising design research.¹¹ Research *for* Design involves investigations conducted with a design application in mind, encompassing studies driven by the perceived needs of the sector, including the development of new materials and technologies. Research *into* Design focuses on the advancement of new scholarship in design through historical and theoretical interpretations. Research *through* Design takes design processes to constitute the research methodology itself, a form of practice-led research that may focus on product or process.

Advanced Design Research at UTAS

The integration of research into the Master of Architecture programme in the School of Architecture & Design is provided through the Advanced Design Research (ADR) stream, and the companion preparatory subject Design Research Methods (DRM). The latter is delivered in the first year of the Masters programme, and focuses on research-oriented teaching, introducing students to research processes, skills and ethos. In contrast, the ADR stream in the final year of Masters allows students to undertake research projects that engage with both empirical and applied process, as well as speculative and theoretical investigations. Students and supervisors work together to develop specific research questions in relation to a particular field of enquiry. This allows different connections between teaching and research, and promotes a two-way relationship between staff and students, where research processes are iteratively developed as findings are critically examined, questioned and refined.

Generically, three different types of research tasks are embodied in the current programme, each testing the limits of differing processes of Research *for/into/through* Design. While some projects are almost exclusively Research *into* Design, examining historical and theoretical issues, others involve the overlapping and intertwining of different research methods. For example, an ongoing research project in the School has involved the development of prefabricated building systems. The

ADR projects that are related to this involve: Research *into* Design, investigating precedents for exemplar building systems and technologies; and Research *through* Design, resulting in actual built prototypes. These projects also involve Research *for* Design, examining the materials and technologies that can be employed in the service of the architectural design of built structures. Other studios include processes of mapping, auditing and speculation, which can be understood as an amalgam of Research *for/into/through* Design.¹²

Although each project employs differing research methods and processes, each references a broader field of enquiry, employs critical thinking, uses iterative process to systematically develop and expand knowledge, and communicates findings to particular audiences. Various processes of visual mapping are employed to assist students to understand the research process. Firstly, bubble diagrams are used to assist students in understanding the context of their research enquiry in relation to other student projects, and to identify key fields of research. Examples of these diagrams are illustrated in Figures 1-3, below.

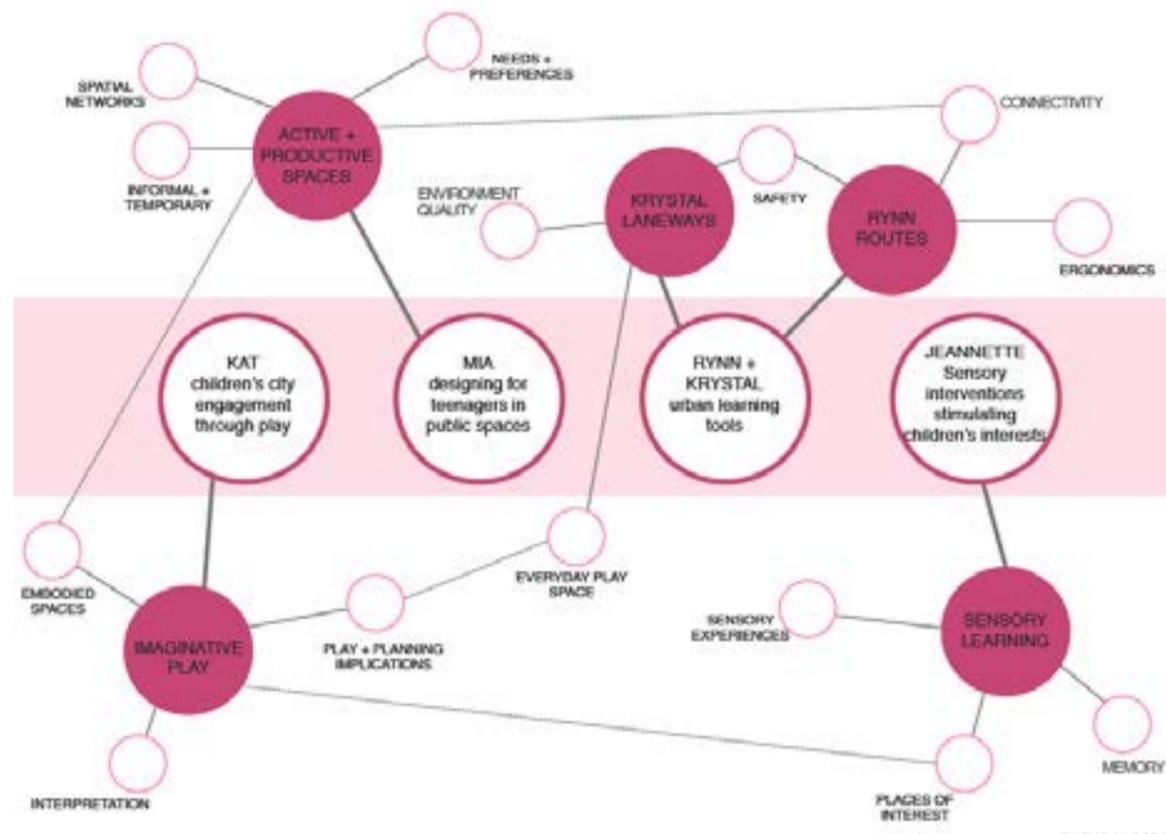


Figure 1: Mapping research context: City as an Urban Playground project ADR1, 2013.

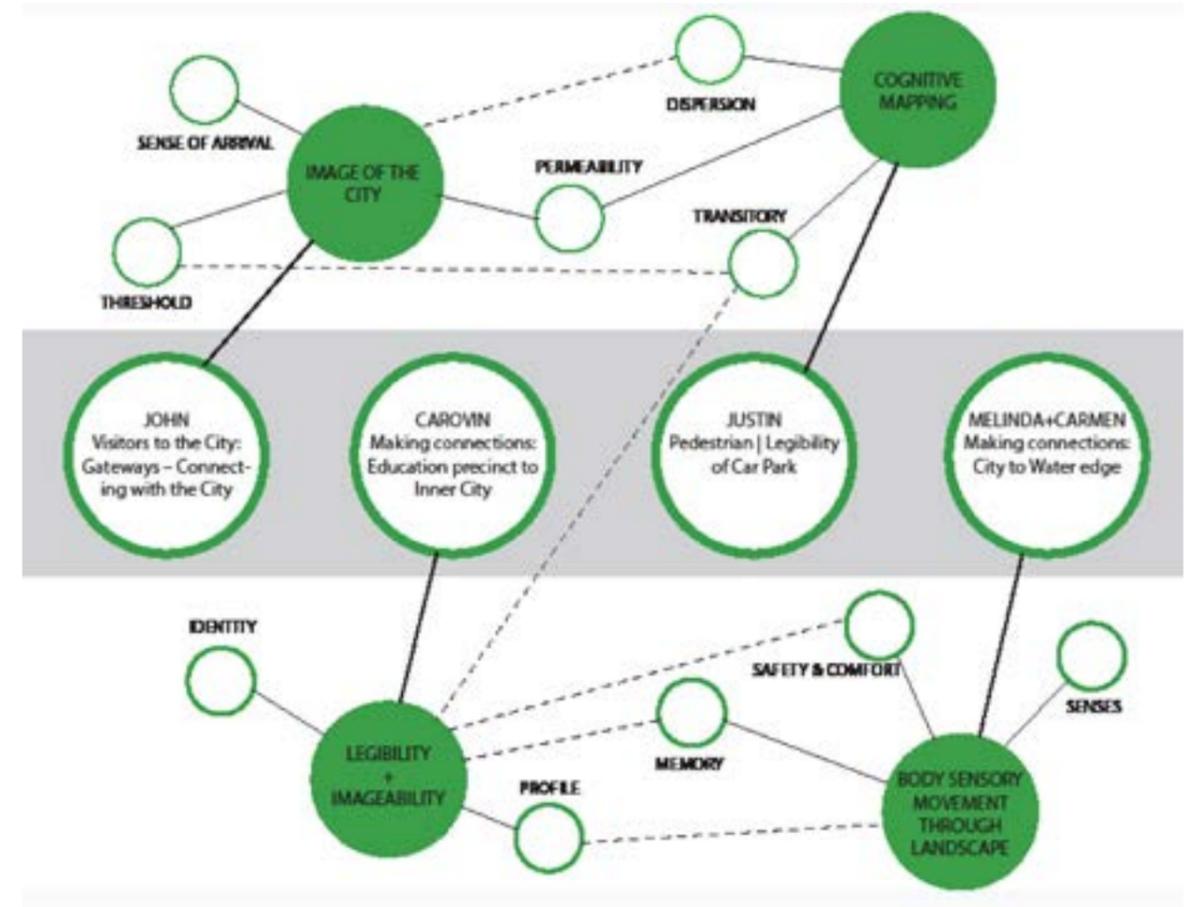


Figure 2: Mapping research context: Navigate: urban legibility, ADR1, 2013

A second visual mapping tool is used to examine the research processes of each project, and to explore Frayling's definitions of Research *for/into/through* Design. As Friedman points out, although Frayling is widely quoted, his tripartite definition is speculative rather than rigorously constituted.¹³ The ADR studios provide an opportunity to test Frayling's definitions of research, with students visually mapping their research process in relation to these categories. Many of the projects begin with either Research *for* Design - gathering reference materials to inform an understanding of the design issues at the core of the project - or Research *into* Design - exploring historical or theoretical ideas. Generally these two processes constitute the majority of the research task, however many projects also involve some component of design speculation or artefact production, and this shifts the process towards Research *through* Design. Figures 4-8 below illustrate the mapping of a range of projects, showing the shift in processes throughout the duration of the research. These diagrams are to some extent contestable, as Frayling's definitions are

by no means definitive; however they offer a comparative analysis of the different processes, which can be used to demonstrate research methods. This allows staff to understand the comparative similarities and differences between projects, which both assists in developing inclusive assessment rubrics, and highlights the student's understanding of their own research processes.

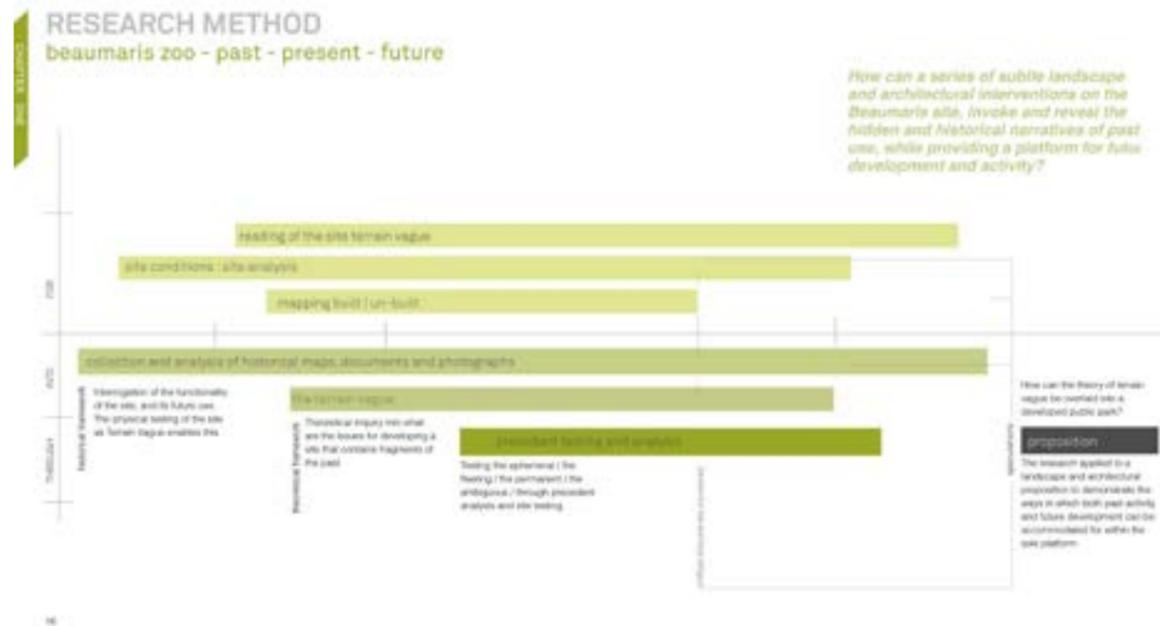


Figure 3: Research Method: Beaumaris Zoo, ADR, 2012.

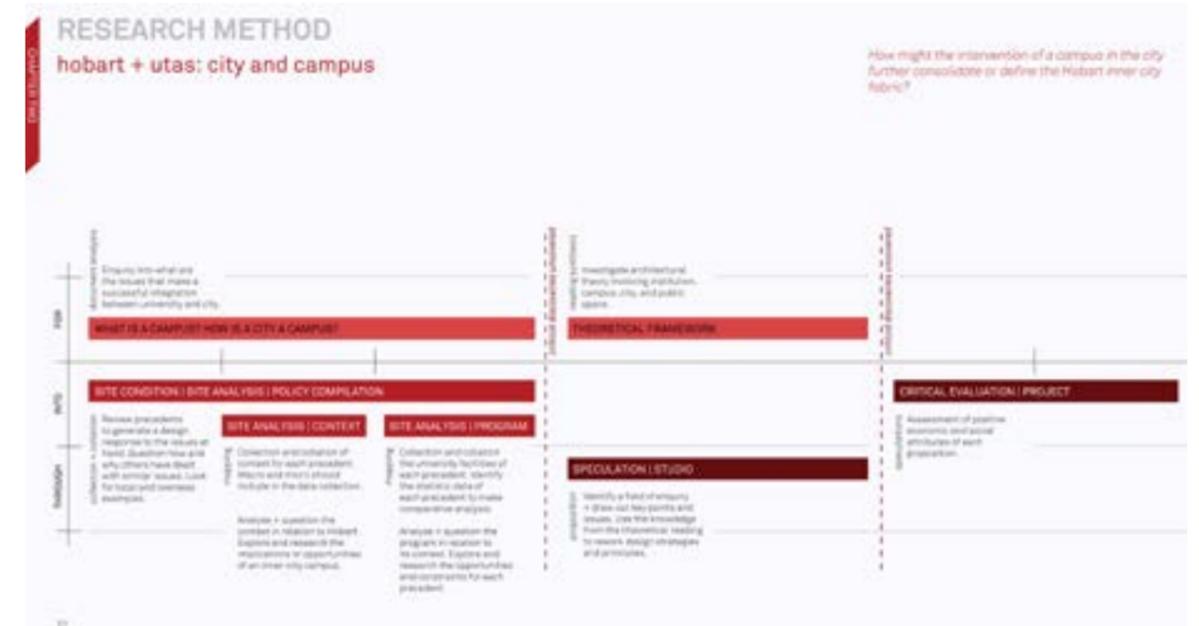


Figure 5: Research Method: City as Campus, ADR, 2012.

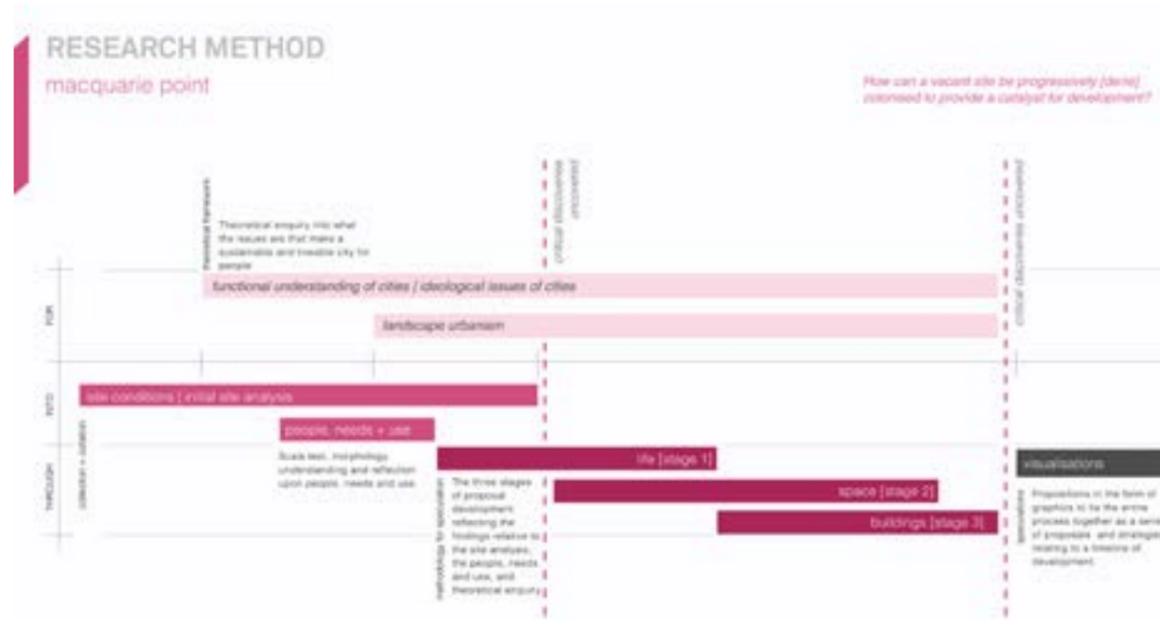


Figure 4: Research Method: Macquarie Point, ADR, 2011.



Figure 6: Research Method: Sullivan's Cove, ADR, 2011.

Discussion

The research-based teaching model of the ADR units provides a framework for engaging a productive two-way relationship in the nexus between teaching and research. The model has developed over a number of years and continues to transform in response to perceived challenges and opportunities. A recent development is the expansion of the course over two semesters, with an additional subject that provides an opportunity to consider how the findings of the ADR research can be communicated to specific audiences beyond the academic context. Dividing the research into two subjects has strengthened the focus of ADR1 on process and ADR2 on product. In ADR2, students are required to define key audiences for the dissemination of their research beyond the academy and to re-present the findings in an appropriate form, which may include websites, exhibitions, cultural artefacts, brochures or technical reports. For example, recent projects that explore the city as a site of social inclusion are ideal for communication to both members of the general public and to professional and government bodies that have agency to address the issues explored in the research project.

Although the units are essentially research-based, they offer opportunities for research-oriented and research-informed teaching. The ADR units provide opportunities to co-author academic papers with students, and this results in research-oriented teaching, as students are mentored through the process of writing academic papers. Several of the ADR selectives are now in their third or fourth iteration, and critical reflection on pedagogical processes has provided opportunities for additional research outputs. These findings are in turn used to shape subsequent studios. Research outputs from previous years are also used to demonstrate research methods to students in subsequent years, and both of these processes facilitate research-informed teaching. However, there are several complexities of operating in this loosely defined space, which need to be highlighted, addressing Trowler and Wareham's contention that "potential negative features of research-teaching interactions tend to be underplayed."¹⁴

First is the complexity of negotiating the open ended and uncertain terrain of the research task. By its very nature research requires that you never know quite what you are doing until you are doing it. As a consequence, it can be difficult to communicate in advance the scope of work required within the framework of

assessment tasks that are not limited by a simple measure of word count. For students, where the emphasis lies in identifying required outputs rather than desired inputs, this can lead to confusion. A certain amount of trust must be invested in the supervisor to successfully guide students through this messy process. The increasing expectations of providing clear frameworks for assessment also risks closing down opportunities if the research leads to unexpected but productive directions that are not reflected in the 'contract' of the assignment outline and assessment rubric. It is only through several iterations of ADR that we are now beginning to successfully craft our outlines and rubrics to accommodate both the diversity in content and approach and the certainty of assessment practices. Key to this is the emphasis on process rather than product, which is further enabled by the separation of these two components in ADR1 and ADR2. It is for this reason that we have also found Frayling's models of research useful as a loose framework for communicating the structure and possible outcomes of the various selective streams.

Second is the complexity of negotiating roles in the blurred territory of teacher/supervisor and student/researcher. The erosion of hierarchies between teacher and student and the opportunity to enter into more collaborative partnerships in knowledge creation is commonly promoted as one of the key opportunities of the teaching-research nexus.¹⁵ While there are undoubtedly benefits, aspects of this relationship also require careful negotiation. One key issue is the destabilisation of the collaborative relationship in the context of assessment. Brew argues that this may require substantive transformations to assessment practices emphasising formative rather than summative assessment.¹⁶ A related issue for academics is the ability to shift between immersive collaborator and objective assessor. This two-way dilemma has no easy resolution. One possibility is to adopt the model of 'external' examination by other staff members. However, this has implications for workload for both students and staff in collating and reviewing the comprehensive documentation required to enable effective assessment of the processes (rather than only the products) of the research. For students the risk is that emphasis will shift to documenting rather than doing and in this context it may be preferable to accept the inevitability of entrenched hierarchies, albeit with transparent processes of moderation.

Third is the complexity of negotiating the diverse capabilities of the student cohort and the numbers of students relative to research-active staff. The objective of research-based teaching is to immerse the student fully as a collaborator in the research task. This requires that students are not merely research assistants working on clearly defined tasks, but that they participate in framing research questions and developing appropriate methods. For some students this is a challenging, if not impossible task, which frequently requires the intervention of the supervisor to more deliberately structure the research task. This requirement to create open-ended scaffolds for research collaboration at the start of semester and then retrospectively construct detailed (and varied) frameworks for research in response to individual student interests and abilities can be an arduous task. Further, with up to twelve students in each selective stream, the logistics of coordination for both supervisor and student can be challenging and time-consuming.

Although the ADR model offers opportunities for co-authoring recognised research outputs (commonly papers), this also presents challenges. While many students demonstrate clear competencies in self-directed learning, they are generally less well prepared for the practice of scholarly writing, as this is not a key feature of the current national competency standards, or central to the vocationally based curriculum. Although students are mentored in developing these skills, in most cases the ability to generate a paper suitable for publication requires a substantive amount of co-authoring. Again, this raises the problematic issue of assessment in unpicking the relative contributions of supervisor and student. While the initial intention in ADR2 was that selected students may produce an (almost) publication ready output, in the future this detailed crafting of the final product may need to be located outside of the formal unit structure.

Finally, in relation to the vocational nature of architectural education, what of the perceived value of research and its relevance to future careers? It is certainly the case that some students view ADR with a degree of scepticism, and the primary motivation for selective preferences is based on the potential overlaps with design studio projects. Nevertheless, given the uncertainty of career trajectories, particularly in the current economic climate, the value of this unit may only be realised retrospectively.

Endnotes

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- 16 Brew, *The Nature of Research*, 153.

Biography

Helen Norrie is an academic in the School of Architecture & Design at the University of Tasmania, coordinator of the Advanced Design Research stream of the Masters of Architecture programme, and head of the Regional Urban Studies Laboratory (RUSL), a collaborative urban design research initiative exploring future sustainable urban development of regional cities

Dr Ceridwen Owen is Senior Lecturer and Program Director (Architecture) in the School of Architecture & Design at the University of Tasmania. Ceridwen's research focuses on inclusive design and experiences of home within the context of mental health employing visual-based methodologies of self-directed photography and alternative mapping practices. Ceridwen is also a registered practising architect in Victoria and a partner with Core Collective Architects. With Core Collective, she recently completed a pro bono project for a children's hostel in north India for the charity Tong-len.

DESIGNING TRANSIT FOR ALL: POSITIONING THE STUDIO WITHIN AN INDUSTRY RESEARCH PARTNERSHIP

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**DESIGNING/
EDUCATION**
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

Research-led design studio teaching is becoming a familiar catchphrase associated with architecture schools. While there is a range of interpretations, one implication is that teaching involves research methods and agendas driven by academic research projects, with students developing designs relevant to research questions and outcomes derived from clearly articulated research processes. While the benefits for students are clear, how can the outcomes generate research findings with wider applicability? In this paper, we discuss the shift in dynamics and the role of a masters-level design studio as a research activity in itself within a collaborative research project whose partners are a mix of state and local government agencies and private sector design firms specializing in transport facilities.

That better public transport is central to making Australian cities more sustainable is widely held within academia, the profession and the wider community and is a mainstay of urban-focused design studios. However, detailed questions of how the design of stations in suburban contexts can support greatly increased mode share is a complex and very real inter-disciplinary and multi-dimensional problem. The studio investigated models for interchanges that work as both functional transport hubs and key civic nodes in urban public space; rather than privileging engineering, safety standards and vandal-proofing as is standard real-world practice, the studio re-framed station design quality to also address public space design, urbanity, identity and place.

The strength of this research approach is in modelling new modes of practice. Rather than master/apprentice or client/practitioner, as project collaborators all participants in the studio (students, researchers and partners) develop new knowledge through engagement with the design process. The paper discusses the roles of the various participants and the kinds of knowledge produced through this productive engagement between practice, research and design teaching.

Research and design teaching

'Research-led' design studio teaching is becoming a familiar catch-phrase associated with architecture schools. While there is a range of interpretations, one implication is that teaching can be informed by research methods and agendas driven by academic research projects, with students developing designs relevant to research questions and producing outcomes derived from clearly articulated research processes. 'Research-informed design' has become one of the key parameters by which students' work is assessed. Rather than simply breaking down the long-held distinction between research as an academic activity and design as an essentially practical one, an emphasis on academic research methods that inform both the choice of design problem and the processes by which design proceeds also changes the way design itself is conceived as an activity. While the benefits for students are clear in terms of studios linked to more clearly articulated intellectual agendas, beyond the shifts in design process and assessment, how can the outcomes generate research findings with wider applicability? In this paper, we discuss the shift in dynamics and the role of a masters-level design studio as research activity in itself within a collaborative research project whose partners are a mix of state and local government agencies and private sector design firms specializing in transport facilities.

Collaborative design research: Transit for All

That better public transport is central to making Australian cities more sustainable is widely held within academia, the profession and the wider community and is a mainstay of urban-focused design studios. However, most of these architecture and urban design studios tend to focus on the design of higher density commercial, mixed-use, community and cultural projects that take improvements to public transport as a given rather than place focus on the design of transit facilities to facilitate increased patronage and thus contribute to the advantages of higher density living. The logic of transit-oriented development is assumed to be simple and tends not to acknowledge the conundrum of which should come first – the intensification or the improved transit? Assumptions about the likelihood of a market or otherwise for intensification are primarily based on the land-values in the catchment. However, the design quality of the transit facilities that serve a place may be more of a catalyst for transformation rather than a by-product or an assumption.

Detailed questions of how the design of stations in suburban contexts can support greatly increased mode share is a complex and very real inter-disciplinary and multi-dimensional problem. To engage with these 'wicked problems' the Transit for All: better station design and access infrastructure project (TFA) was conceived as a collaboration between two departments at The University of Melbourne – architecture and engineering – that engages with key stakeholders: public transport agencies, local governments and private sector design firms. The project has two primary aims. Firstly, to investigate how station design in suburban contexts could be improved, and secondly, to develop the basis for an ongoing research collaboration between the parties. Between them, transport agencies manage the land resources (VicTrack, Department of Transport, VicRoads), the public transport system (Public Transport Victoria) and operate the trains (Metro Trains Melbourne). Local government is charged with the responsibility for ensuring better urban design and planning (including for transport) at the local precinct scale, within the constraints of state policy. Yet it is State Government agencies that are charged with the task of implementing and running upgrade projects for public transport. While project teams are often adept at navigating this complex set of interests it is inevitable that the focus within an individual project will be constrained due to very short timeframes.

Most suburban stations in Australia prioritise transport functionality above all else, meaning that they tend to be stand-alone facilities for controlling the flow of passengers on and off trains, frequently difficult to find and to get into, often without basic amenities such as public toilets, and largely disconnected from their contexts in terms of modal transfer or as places of social encounter and exchange within their locale. Stations have become this way through a very long tradition of treating them as engineering and safety problems rather than urban design and placemaking opportunities. The idea that stations can fulfil these needs is the driving force behind the TFA research project and the briefing for the design research studio articulated within it.

These observations about what stations lack illustrate the complexity of the research task, in terms of the range of factors in play, but moreover, the problematic of research that makes a difference to practice. Rail infrastructure is extremely expensive and expenditures on upgrades are highly politicised. The procurement

process itself works against integrative design thinking at the early strategic stages, when transformative approaches might lead to wider benefits for the entire locality associated with each station. Consultants' time and energy is spent on bidding for and conducting work framed largely by the very constraints the research is seeking to address, no matter how well-intentioned. However, an advantage of academic research is its independence, and the potential this opens up for all engaged with it to think more freely than otherwise. Architectural design studios are premised on the freedom to think creatively and critically, to explore scenarios un-constrained by the limitations of having to get things built within bureaucracies, budgets, planning schemes and timeframes that in the case of transit, may be largely politically or bureaucratically determined. Another key element, common to industry-university research partnerships is the coming together of actors essential to an integrated design approach who would not necessarily have worked together or even met previously, due to the divisions in and between local and state bureaucracies and the professional 'silo-ism' that exists between architects, engineers and academics to name a few.

Thus, the methodology of the project is structured to bring stakeholders together around a series of Masters design studios as the heart of the research endeavour rather than as adjunct to it. In addition to the usual project meetings between researchers and partners, the key forum for engagement is the studio. Local and state government partners present background material on case study sites to students; design partners present their own work for international and local contexts to an audience of other partners, researchers and students; researchers give presentations on current research related to the project to audiences of partners and students, including international best-practice references¹. Formative and summative design reviews are attended by this large and varied cohort of engaged stakeholders. While involvement in the studio process with key actors from practice may not necessarily be new, the range of stakeholders and their level of engagement is much higher than is usually the case. And while the involvement of most, if not all of the industry partners with station design projects may not be a new experience, the engagement with a design process that is framed beyond the bureaucratic constraints of everyday practice provides the space to explore the potential of new ideas in sufficient depth to assess their applicability in real, local contexts where they would otherwise be unimaginable.

Previous work for such case studies may vary from almost nothing to structure planning proposals, feasibility studies, engineering studies for limited upgrades, land acquisitions for projected transport capacity increase scenarios and yield studies for development. However, what none of the sites have yet had is an integrative approach to stations as place-making exercises focused on their ability to create, shape and connect public space, or to incorporate a wide range of complementary programs to activate that space. Some of the partner presentations into the studio have indicated that when speculative precinct planning has been undertaken by an architect, it has been conducted outside the scope of the project as an exercise undertaken to inform the architect's design approach, though still limited by the standards and constraints of current station design practice rather than any vision of what stations could become if key parameters were opened up. However, a key reason for making the studio central to the research project is that any design consideration of a site either by students or professionals helps position it as a potentially real design project, which has the potential to shift a given location up in the priorities of Government. The production of imagery helps make the issues more tangible and literally give visibility to a problem and a range of potential solutions.

Current Practice

The redevelopment of Melbourne's second-most important central city station, Spencer Street, into Southern Cross in 2002 was a complete transformation that saw passenger circulation completely re-organised accompanied by significant retailing, food and beverage outlets added beneath an iconic singular wave-form roof that provided complete weather protection for almost every platform. Southern Cross was significant as a political gesture in terms of re-establishing the status of public transport. However, the limited number of redevelopments of suburban stations since have been much more modest in scope, often driven by the need for grade separations to relieve traffic congestion, with station briefs concomitantly focused on facilitating passenger access (lifts, stairs and ramps that meet current disability access standards), the very minor addition of a single small kiosk at one entry and limited weather protection for individual platforms². Staff accommodation areas, waiting rooms and secure bicycle parking have also been included in new buildings that together with circulation infrastructure have allowed some contemporary architectural expressions to emerge – notable examples of this type include

Nunawading, North Melbourne and the three stations on the South Morang Line extension and upgrade. However, such work has been constrained by a focus on a set of narrow minimum standards and concerns for vandal-proofing rather than exploring the potential of stations to play a much larger integrative role as catalysts for place-shaping, urban integration and re-vitalisation. This is not to deny the architectural merit of much recent work that has been creatively wrought within these constraints, and indeed, some of the best examples have been recognised by Australian Institute of Architects' awards for both architecture and urban design. However, under the current Victorian standards, a 22 square metre kiosk is the only non-transport related program considered worthy of inclusion, weather protection requirements remain limited and the scope of projects is constrained to the 'station footprint' within VicTrack land. As such, there is very limited potential for even recent stations to be genuinely vibrant nodes in the network of urban public space³.

Public Use Zone: Stations as 'community connectors'

In response to the agenda set by the Transit For All research project, the studio, titled 'Public Use Zone', investigated models for interchanges that work as both functional transport hubs and key civic nodes in urban public space; rather than privileging engineering, safety standards and vandal-proofing as is standard real-world practice, the studio re-framed station design quality to also address public space design, urbanity, identity and place, from the perspective that places emerge from their connectivity more than anything else⁴. To achieve this, the hierarchy of priorities was revised, placing the question of 'what makes space public?' at the top of the agenda, with an open-ended brief that in addition to dramatically up-graded transit capacities included significant complementary programs such as retail, hospitality, commercial, community, recreational and cultural facilities within the station but not necessarily within the standard 'footprint' on VicTrack land⁵.

Case studies: Reservoir and Burnley

After proposals were made by partners for a range of case studies across all five partner local government areas and some additional ones beyond, the first two case studies were selected from the list by the authors. The key selection criteria were typological difference from each other in as many ways possible, with sufficient generic properties to be potentially replicable and to have been nominated by local

government partners to ensure relevance and buy-in. Reservoir station in the City of Darebin and Burnley Station in the City of Yarra were the first two case studies of 8 or 9 planned.

Reservoir is a large socio-economically disadvantaged suburb in Melbourne's northern region, with its rail station at its centre, but not at its heart – the rail line and the complex intersection of a pair of parallel arterial roads divide the activity centre into two quite separate halves (Figures 1 and 2). Structure planning has been ongoing for the last four years, much of it premised on the potential for transit-oriented development within the station catchment, a combination of intensification of the existing low-rise retail strips and the redevelopment of a large parcel of VicTrack land that the station sits within and that, aside from parking for 495 cars and a bus terminus, is largely vacant land.

Having tested a number of scenarios, Darebin had settled on undergrounding the station for two reasons - to maximise potential air-rights development (limited to 4-storeys) and to allow a proposed extension of the tram from West Preston to be extended through Reservoir and ultimately to La Trobe University's Bundoora Campus 3.5km to the east. Senior council staff envisage a 15-year process to achieve the grade separation, having agreed on the above arrangement. At the start of the studio, VicTrack, who were initially unfamiliar with Darebin's planning work, provided some outline air-rights development scenarios comprising a big box retail development and a community facility, with an indicative underground station.



Figure 1: Reservoir station in streetscape context



Figure 2: Reservoir station – the only pedestrian crossing place for several hundred metres

Burnley station is located in the inner-eastern suburbs just before the bifurcation of busy lines serving Melbourne’s east and south east. The local area is gentrified and well-serviced, the Swan Street tram corridor strip running parallel to the railway 80 metres to the north. Immediately to the south is a largely heritage protected Victorian residential precinct with a transitional industrial area on its western edge along the main north-south vehicle-only Burnley Street (Figures 3 and 4).



Figure 3: Burnley Station from beneath Burnley Street overpass



Figure 4: Burnley Station from Burnley Street overpass

Pedestrian access from the residential area to Swan Street is via two narrow underpasses, only one of which leads to the station. The City of Yarra’s Swan Street Activity Centre structure plan envisages intensification of up to 10-storeys along the Swan Street corridor north of the station, but has little to say about the role of Burnley station or other transport issues. As part of the briefing given to students, a new north-south medium capacity bus route was added along Burnley St. to fill a gap in the transit network; VicTrack provided an outline proposal for a 8-10 storey air-rights commercial or residential development adjacent to the Burnley St. overpass over the western end of the station.

Studio design outcomes

Nine students completed the studio, with five schemes for Reservoir and four schemes for Burnley. Two Reservoir designs were underground stations, three elevated schemes. Two of the Burnley projects left the tracks at grade, one elevated the station, and another lowered it by a few metres. All incorporated a mixed-use program of retail, commercial, community, recreational and cultural uses tailored to their locations.



RESERVOIR Station, Melbourne

Kat Christie

Reservoir Station proposal (Image: Kat Christie)

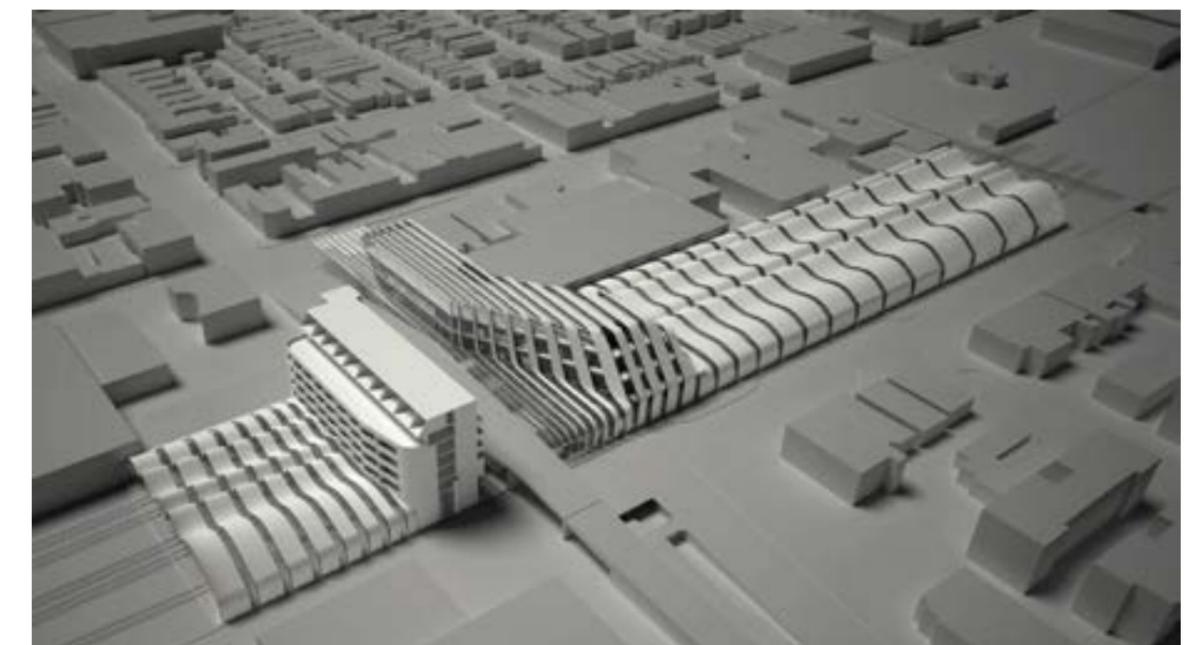


Reservoir Station Proposal (Image: Alec Richardson)

The Reservoir designs all accommodated the program within the VicTrack land; The Burnley schemes that attempted to stay within the 'station footprint' found it the most difficult to achieve a good outcome (although all were far better than existing conditions), and those that selectively acquired adjacent land, or extended their reach into public land beyond that owned by VicTrack, achieved the most well-resolved designs in the terms of broader place-making agenda.



Burnley Station Proposal (Image: Farah Yusuf)



Burnley Station Proposal (Image: Jason Nunn)

Those designs that included a grade separation were able to achieve significant improvements in local permeability, integrating the surrounding precinct and creating more potential for active frontages and a wider range of mixed-use intensification outcomes on adjacent land. While the elevated designs reduced the overall land area for air-rights development, the trade-off was argued to be the significantly lower cost than tunnelling, and the ease of access to and from the platforms. In contrast to raising or lowering roads, both rail up and rail down approaches enhance the creation of a continuous ground plane of public space. Additionally, all designs were required to provide 100% weather protection over the entire platform area, allowing for architectural inventiveness and expressive possibilities for giving civic presence to stations in suburban settings.

New modes of practice in design, research and teaching

Potentially one reason why the outcomes of the studio were so interesting is that they were simultaneously very realistic and very provocative. All of the schemes proposed by the students were readily constructable and more or less feasible as proposals for consideration. The level of architectural detail meant that the public spaces described could be quite tangibly investigated – which goes well beyond the level of detail a professional team would apply to what is effectively a strategic assessment of the site potential. The continual involvement of such a wide range of professional viewpoints in the studio process (including transport planning, urban planning, civil engineering, urban design and architecture amongst others) meant that the proposals were grounded in best practice thinking about the problems without requiring the students to become experts in issues outside of design. In this the studio process models professional practice where design needs to be the integrative process of reconciling divergent technical approaches to solving a given problem, just at an earlier stage than design thinking would usually be engaged. The realism also meant that the challenges posed by the studio work were not easily dismissed. The questions posed by the work were in effect directed squarely at preconceived assumptions. A prime example is the number of above-grade stations that received favourable comment at the final review, despite the strong reservations of many of the government experts expressed during the earlier briefings, with both the local governments being prompted to review their structure plans.

The mutual exposure of architects, senior bureaucrats, academic researchers/teachers and students to each other's expertise and skills with the freedom to think about a design problem in a congenial setting enables flows of new knowledge in all directions that is multivalent rather than linear, reflexive rather than didactic. However it is asymmetrical, in the sense that what is 'transferred' is not equal between the participants, but depends on perspective in relation to positions within the studio. At one level, the students have the most to learn about what a good station is, what good urban design is, how to design and so on, and the industry stakeholders and researchers/teachers are there to facilitate their learning. At the same time, the sites are real and have been selected by the industry partners for a variety of reasons, the main one being that there is a need to learn what the possibilities and potentials are for those sites beyond what has already been done and what is made possible by current planning or economic conditions.

Acknowledgements

The first studio was led by Ian Woodcock and Simon Wollan and funded by the Master of Architecture Program in the Melbourne School of Design at the University of Melbourne; The research project 'Transit for All: better station design and access infrastructure' is led by Chris Hale (UoM, Infrastructure Engineering), Ian Woodcock, John Stone and Kim Dovey (UoM, Faculty of Architecture, Building and Planning) and funded by a UoM grant under the Carlton Connect program with a combination of financial and in-kind support from industry partners Public Transport Victoria, Department of Transport, Planning and Local Infrastructure, VicRoads, Metro Trains Melbourne, The Metropolitan Transport Forum, the Cities of Darebin, Moreland, Yarra, Melbourne and Hobsons Bay, MGS Architects, Cox Architecture, Grimshaw, Caldis Cook Group and Urban Circus. Students in the first studio were: Farah Yusuf, Jason Nunn, Michael Duncan, Chi Hang Yu, Kat Christie, Qing Ping Lim, Alec Richardson, George Yiliang Hua and Joel Richardson.

Endnotes

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Biography

Ian Woodcock is an architect, researcher and teacher. He is Research Fellow, Urban Design at The University of Melbourne, and he is a studio leader in the Master of Architecture program of the Melbourne School of Design

Simon Wollan works in urban design and architecture applying both analytical and placemaking approaches to urban renewal. His recent work with MGS Architects has focussed on community and institutional projects for local government and universities, as well as strategic studies for transport interchanges and local activity areas. Previously he was a member of an urban design research group at the University of Melbourne investigating processes of residential intensification, community responses to higher-density development and the impact of gentrification on the distribution of cultural activities in Melbourne. His work was exhibited at the 2010 Venice Biennale and he has co-authored a number of refereed journal articles in urban design

PASS ME THE MIXING BUCKET: THE RIBBED CATALAN STUDIO AS A DESIGN/ RESEARCH CASE STUDY

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DESIGNING/
EDUCATION
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

The Ribbed Catalan, a large scale ribbed tile vault, was the result of a collaborative, award winning design/build/research studio involving students enrolled in the M.Arch. program at the University of Technology Sydney, guided by masterclass instructors Dr Philippe Block (ETH Zurich / Block Research Group), Melonie Bayl-Smith (UTS / Bijl Architecture) and David Pigram (UTS / Supermanoeuvre).

The studio provided an opportunity for the M.Arch. students to undertake an experimental design/build intensive workshop that also straddled the instructors' intersecting research interests, being masonry vaulting, digital/analogue relationships and innovative teaching. By harnessing these research interests, the studio brief delivered direct, high level learning outcomes through not only the physical process of building, but also via the reflection tasks undertaken at the studio conclusion.

After an introductory session, the students pursued a parallel design and research process, directly engaging with a sophisticated digital software interface utilised for formal explorations. Alongside the design process the students experimented with a variety of construction techniques, necessitated in part by the use of standardised Australian building materials that performed well beyond their usual application. These vault materials were donated or provided at cost, creating broader industry interest in the studio and establishing relationships for future collaborations.

The premise for the brief and studio structure tested outcomes from the author's BuildAbility research project (2011), which asserted that design/build and material/making studios provide opportunities for expanding design and integration skills in students, and engendering learning that transcends the specifics of the studio brief, including deep peer-to-peer learning, developing investigative intelligence, and enhancing students' appreciation for material and form.

This case study will present an overview of the Ribbed Catalan studio intent and execution, unpacking the decisions and outcomes behind

the research inputs and outputs, as well as providing commentary on how design/build studios can successfully provide a platform for diverse learning and research outcomes.

Design/Build studios, similarly known as 'Learning by Making' studios, have continued to proliferate in architecture schools, as evidenced at the recent TU Berlin DesignBuild-Symposium which brought together educators, students and practitioners from around the world¹. As demonstrated by the speakers and projects presented at the Symposium, there exists a strong belief amongst invested educators, students and practitioners alike that design/build studios are highly effective, offering an integrated teaching platform that delivers intensive learning opportunities. This conviction is underpinned by the manner in which the very nature and format of design/build studios swiftly moves students out of their comfort zone into challenging experiences, with a potency and immediacy that engenders humility and respect within the individual for the process of building and what is required to realise a design, particularly if more complex geometries, junctions and forms are pursued.

As a recent and relevant reference point, the DesignBuild-Symposium content revealed that a significant number of the studios presented were related to socially conscious community or humanitarian projects. Whilst these studios are valuable with respect to their material community contributions, potentially innovative pedagogies and experiential learning opportunities, the influence and transferability of any design research outcomes (intentional or otherwise) can be readily diminished by the specificity of the site, community or country in which the studio takes place.

In contrast, whilst there is a temptation to rest on the laurels of novel formalism and material effects, design/build studios concerned with making, materials, construction methodologies and structural innovation have a greater opportunity to produce universally interesting and transferable research outcomes, even when coupled with a real brief and site. So rather than attempt to endow upon architecture students a certain level of mastery in order to realise a 'knowable' and usually normative design, the core focus of these exploratory design/build studios emerges not as the actual built outcome - however impressive this might be given time, material and skill

restraints - but instead as the development of an investigative intelligence in the participants. As a result, this broad-based, high level learning outcome reinforces the enormous capacity of design/build studios to sit within ongoing or discrete research projects, and to be fruitful with respect to speculative outputs and stimulating the imaginations of students.

To further explore the methods and frameworks inherent to a productive design/build studio underpinned by a research project intent, this paper will focus on the Ribbed Catalan vault studio. The Ribbed Catalan vault was the built outcome of an award-winning collaborative design/build/research masterclass involving a team of thirteen M.Arch. students at the University of Technology, Sydney. This two week studio was held in October 2012 and was led by Dr Philippe Block (ETH Zurich/Block Research Group), with Melonie Bayl-Smith (UTS / Bijl Architecture) and David Pigram (UTS / Supermanoeuvre) as instructors.

Traditional Catalan vaulting techniques and the structural form finding principles inherent to vault construction have regained interest in recent years (Fig.1) with the advent of new stone and masonry cutting technologies as well as the development of software tools enabling the creation and virtual testing of complex vaulted structures.

The conception and building of freeform masonry vaults such as the timbrel vault (Fig. 2) built in 2011 by Lara Davis (formerly of Block Research Group) has been enabled with the advent of software such as RhinoVAULT (rV), a Rhino software plug-in developed by Matthias Rippmann, a current member of the Block Research Group. In the case of Davis' timbrel vault, the capabilities of rV were tested, as was the marrying of CNC fabrication with low tech, readily available and recyclable scaffolding materials such as cardboard boxes and wooden pallets.

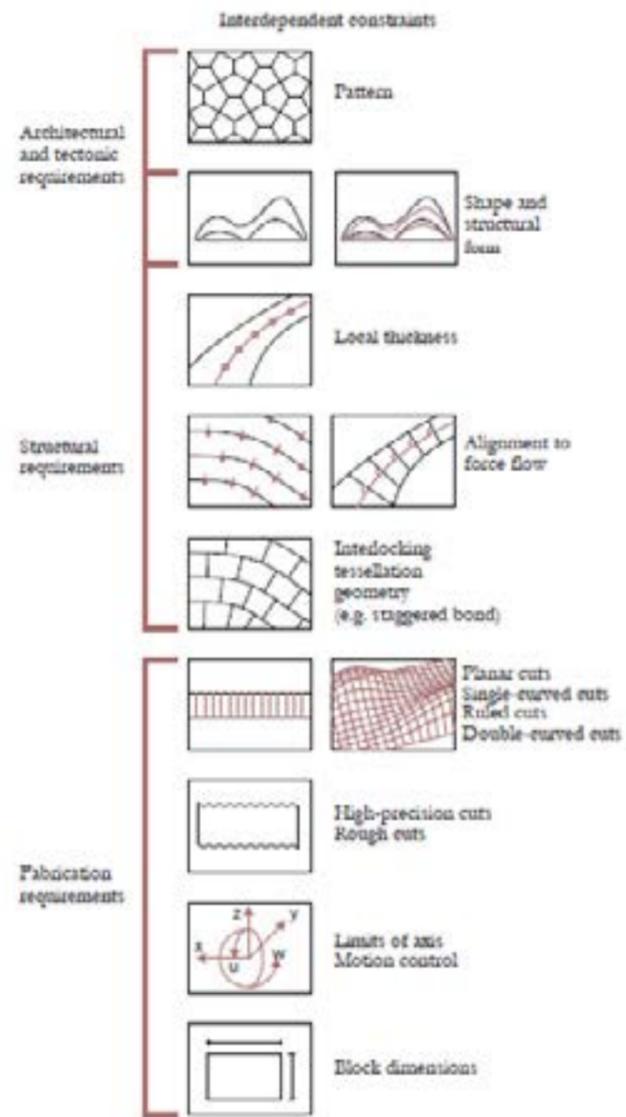


Figure 1: Diagram of the key parameters of structural masonry, particularly unreinforced cut stone shells, Block Research Group, ETHZ, 2012. Image: Dr Philippe Block and Matthias Rippmann.

This intermingling of digital/analogue and high/low relationships, exemplified by the use of simple materials and powerful parametric design/testing software, became the key driver for the inception and research incentives of the Ribbed Catalan studio. This was not only due to the compelling intersection of the instructors' ongoing individual and joint research interests, but also because of the potential learning outcomes for the students with respect to designing, testing and building a novel and geometrically challenging vault.



Figure 2: Freeform tiled vault built by Lara Davis (PhD research project) undertaken with the Block Research Group, ETHZ, 2011. Photo: Lara Davis.

From the very beginning, significant consideration was given to the teaching and research methods that would stimulate and eventually inform the success of the masterclass. While on first appearance the studio structure may not seem particularly open ended, the deployment of an easily learned construction method allowed extensive freedom to be given over to the design modelling and testing of the designs in RhinoVAULT.

In turn, giving this freedom over to such a highly flexible software tool as rV opened up design research opportunities for geometrically complex construction that would have been literally impossible to consider or test prior to the advent of rV. It is at this juncture that it becomes clear that the studio intent allowed an opportunity for otherwise impenetrable and highly speculative structural engineering research to become manifestly tangible to the architecture student, the practitioner and the academic alike.

Moving from these research intentions, the desired student activities and learning

outcomes encompassed the following: engendering an understanding of the innate value of structural form finding techniques through research, architectural design processes and the translation of these into a material assembly via prototyping processes; challenging the utilisation of traditional construction techniques and standardised Australian building materials to open up new ways of thinking about the act of building; and cultivating an understanding of the potential and limitations of working with few and simple materials, in conjunction with appreciating the complexity and challenges of building.

From this springing point, the Ribbed Catalan studio was formulated so as to contribute to Dr Block's larger ongoing research project of masonry vaulting, as well provide an opportunity to examine how students deal with the challenges of moving between digital and analogue design and representation tools, particularly when dealing with these modes at 1:1 scale. To commence the workshop, the students undertook an initial exploration of traditional Catalan vaulting techniques and structural form finding principles, through some basic arch building exercises as well as reviewing historical precedents.



Figure 3. Initial prototypes produced to understand capacity and opportunities of ribbing with the available concrete tiles, Ribbed Catalan Masterclass, UTS, 2012. Photo: Melonie Bayl-Smith.

After moving through this preliminary phase, the students were issued the studio brief, which was to pursue a Catalan masonry vault design that investigated the opportunities and limitations of fully three-dimensional networks of structural ribs in tiled vaulting, and explored the boundaries of the traditional construction techniques. In answering this brief, the students were given the opportunity to actively pursue a parallel design and research process, engaging in both digital and analogue technologies and explorations to realise the geometrically and structurally complex form (Fig. 3).

As identified in this student reflection statement quote, the specific construction method enabled the studio intent rather than suffocating it, creating parameters which the students quickly recognised and were then able to challenge in a clear and focused prototyping process:

"The design-build studio helps students to consider the structure of the form, allowing them to understand the real challenge of creating building forms, especially the process of translating the design into the 1-to-1 scale of construction."

Alongside the digital modelling and design process, the students experimented with construction techniques, necessitated in part by the use of the Monier concrete roofing tiles that were cut down and radically reconsidered, performing well beyond their usual application. The potential interactions and design outcomes that lead to the final built form involved the deployment of three key approaches and situations: direct engagement with RhinoVAULT for formal explorations and structural form finding (Fig 4.); inductive hands-on prototyping and testing (Fig. 5) to quickly and intuitively research the necessary construction methods and details; and investigating and trialling a series of construction management processes.

The methods and processes tested and utilised included lightweight and readily adjustable low tech cardboard and polystyrene foam box guidework and scaffolding (Figs. 6, 8), mortar mixing in hand-held pliable plastic buckets to enable an ease and flexibility in the mortaring process (Figs. 7, 8), and undertaking detailed tiling cuts and setouts (Fig. 8) - to understand the manner in which the vault would be both built in accordance with the documented final design (Fig. 12) and then tested to failure (Fig. 13).

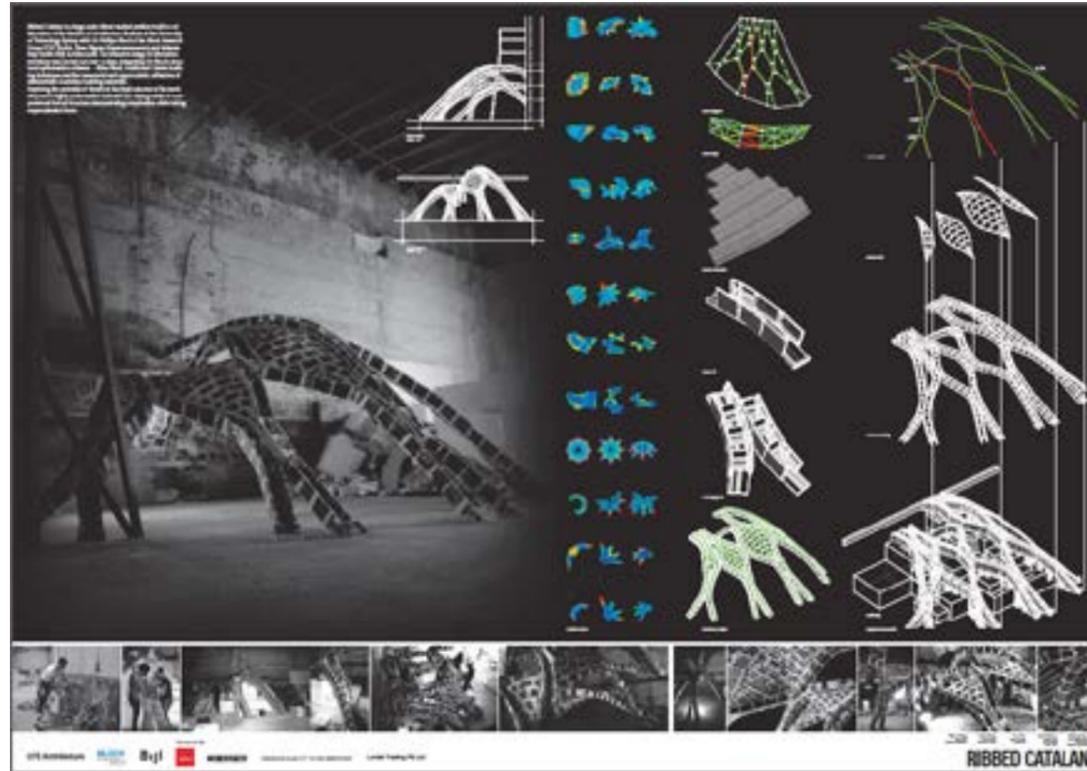


Figure 4. Poster documenting the process and design of the 'Ribbed Catalan' tiled vault, demonstrating the origin and close development of the iterative design testing in RhinoVAULT alongside prototyping and resolution of the scaffolding and construction methods for the actual build. Image: James Lauman and Jordan Soriot using documentation by the Masterclass students.

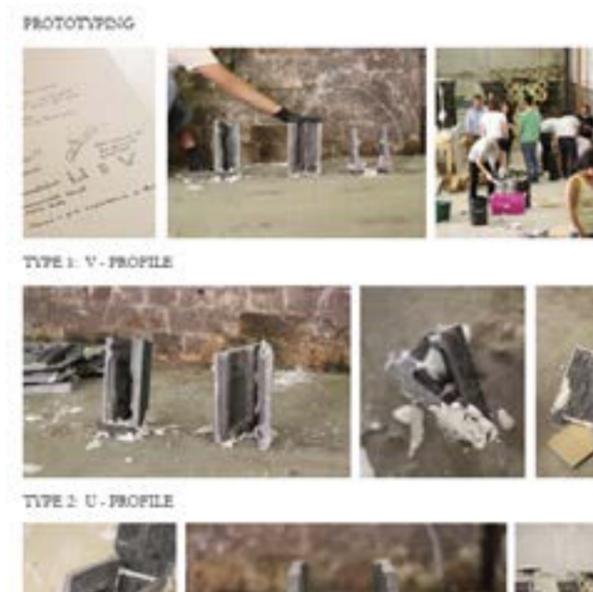


Figure 5: Prototyping for the ribbing elements. Photos: Natalie Ma and Sandra Mendonca

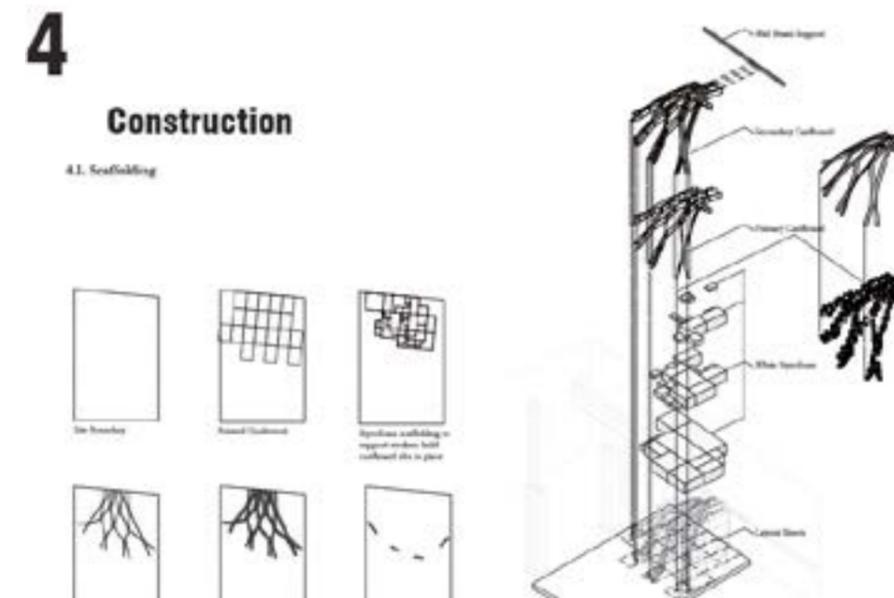


Figure 6. Scaffolding and guidework axonometric and layout diagrams which arose from the intersection of the scaffolding prototyping process and the vault design development testing in RhinoVAULT. Image: Aaron Yeoh and Philena Au Yeung



Figure 7. The vault in progress – by commencing the construction of each of the eight individual ribs at the start of the build process, an ongoing prototyping process was allowed to take place, with some demolition and rebuilding of the ribs occurring early in the build process after the geometries of several specific ribs revealed a range of construction challenges. Photo: Michael Ford_studio

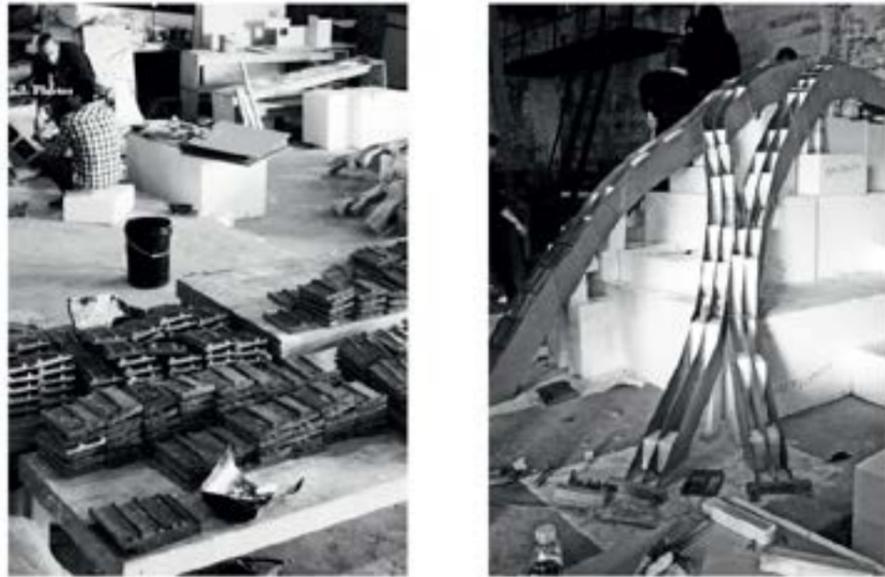


Figure 8. As the mortaring materials and method required a high level of efficiency, the construction management methods were also tested and refined to suit the build process. This included a rigorous tile cutting, numbering and stacking system, with one team mixing mortar whilst another placed and mortared the tiles. Photos: Sandra Mendonca and Natalie Ma

This experimentation was supported by the instructors' own ongoing discussions around this physical extrapolation and integration of their overlapping research interests. These interconnecting conversations and processes allowed a high level of feedback flow between the instructors and students, opening up the research pathways and developing them within the fluid prototyping, designing and building processes. An example of this is the bracing and reinforcing of the ribs – after various structural appraisals and physical tests, the ribs came to rely on perpendicular tile placement at centres over a standard cement fill with geotextile mesh inlay reinforcement placed along the base of each rib (Fig. 9).

Key to the eventual structural success of the vault, this solution only came about by a testing process jointly informed by the structural expertise of Dr Block, the extensive construction knowledge of the co-Instructors, and the empirical prototyping and building experiences of the students (Fig. 10). Here, the feedback flow supports peer to peer learning and what emerges are interactions and working relationships that could potentially be applied to the innovation of architectural practice, as might be concluded from this student reflection statement extract:

"In architectural practice, a design is developed and then construction begins. I thought, however, that the constant transition between digital design and hands on construction and prototyping, especially in the earlier stages of the studio, was extremely beneficial and allowed us to further understand the different ways design can be used to push material boundaries, and vice versa. I believe that if the design and construction processes were kept separate our overall vault design would not only have been less innovative in its design but potentially would not have 'stood up'."

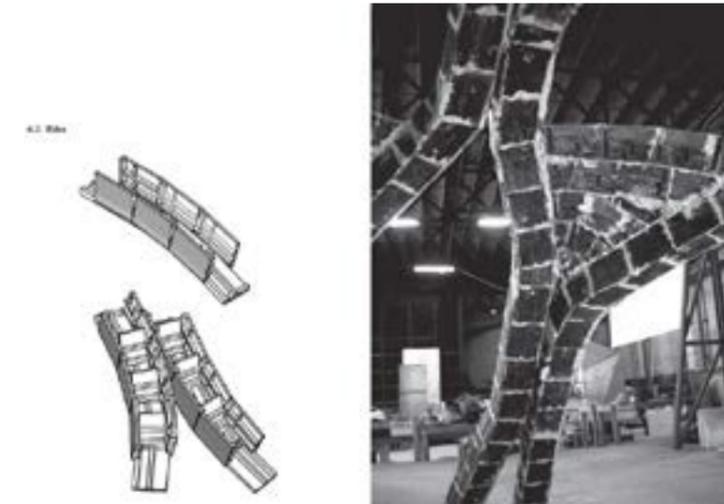


Figure 9. Rib construction and reinforcement / bracing details were developed and refined during the prototyping process that occurred concurrent to the vault building. Image shows commencement of the 'patching' or 'infill' to the ribs. Image: Masterclass students, Photo: Aaron Yeoh



Figure 10. Aerial view of construction process for the ribs, demonstrating the laying of the tiles over the guidework. Photo: Jordan Soriot

The masterclass ran for a total of thirteen days, within which the Ribbed Catalan vault was conceived, designed, prototyped, built and completed (Fig. 11). The tightness of the time program, whilst lamented by some students in their reflection writings, pushed rather than hindered the level of experimentation contained in the studio because of the immediate need to find the best solution.

As the students were confronted with the realities of their design decisions, which seemed insurmountable at first, the impending deadline engendered a deep and necessarily effective learning culture in the overall group, quickly engaging them with the research intent for the studio. In actively refining the tacit and explicit knowledge gained through their experimentation, the students usually remained motivated and quickly become capable of providing efficacy and transparency on the various successes and failures of the experimentation.

Once identified and properly harnessed, this design/research feedback loop allows the accumulating information to flow into tangible outcomes, either by informing and influencing the prototyping activities of the other teams, or in binding the teams together to execute the building of the final design.



Figure 11: The completed 'Ribbed Catalan' tiled vault. Photo by Michael Ford_studio

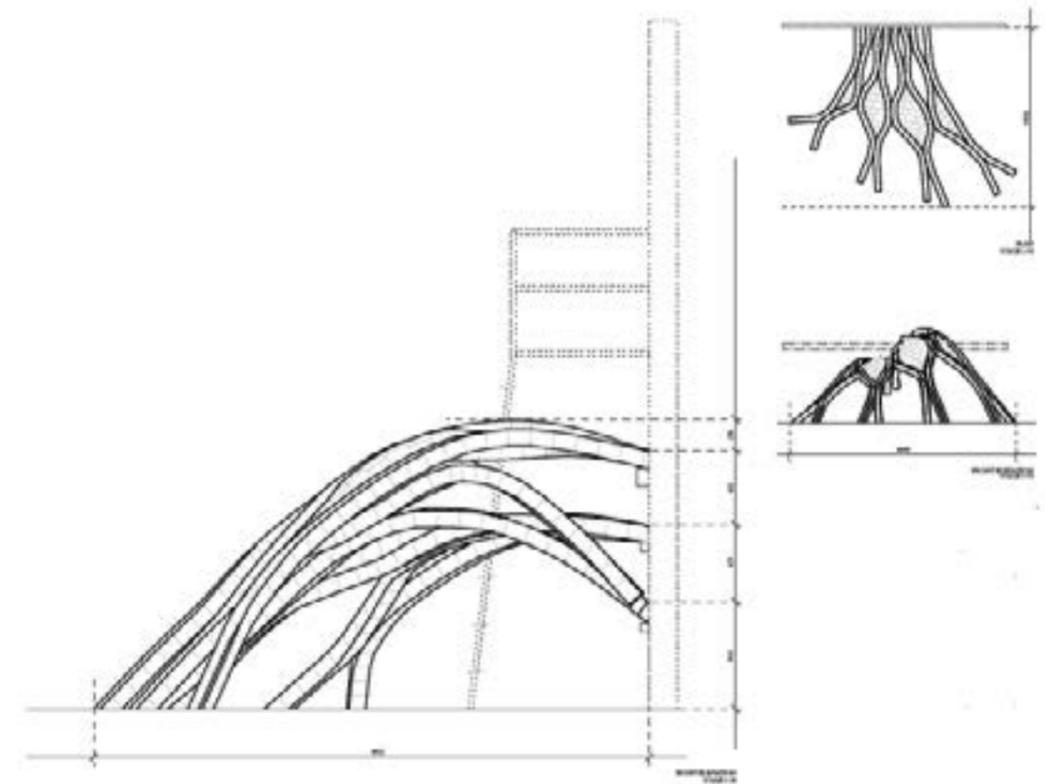


Figure 12. Orthographic drawings of the final vault design. Images: Jordan Soriot and James Lauman.

This further demonstrated that the pursuit of a well considered and focused design research intent can be realised in the design/build studio format because of the open platform given over to the experimental making activities that usually characterise these types of studios. Further, apart from allowing the students the possibility to align a part of their studies with established, innovative research, key to the success of research via design/build workshops is the capacity to harness the deep peer-to-peer learning that emerges, particularly through dividing the larger student group into small teams. Typically, these small teams develop an investigative intelligence specific to their assigned specialty under the overall studio intent, and, by virtue of their scale, generally increase communication flows and maintain accountability between participants.

In conclusion, the innate suitability of the design-build studio platform for informing and undertaking research projects is perhaps best summarised in this student quote:

*'There is a lot of potential in the structure and content of a design / build studio—particularly if it presents advancement of any innovative architectural technologies. Even if the resulting work of these kinds of studios often fails, in certain respects, as design that can be directly translated into highly-finished and practical pieces of architectural componentry, the work is still able to hold its place as a materialised idea that can inspire further progress and refinement as a prototype.'*⁶

From this reflection, it is evident that clearly identified learning outcomes significantly influence the success of research activities in the design studio, because of the momentum provided by a focused, curious and somewhat restless group of investigators, and also by the drive to seek tangible results irrespective of apparent failure or obvious success.

At this nexus, the act of designing is at its most potent, its most affecting - and surely this is the least that should be proffered to the students of today and the architects of tomorrow.



Figure 13. The Ribbed Catalan vault was subsequently tested, with no evidence of movement or failure at a point load of more than 1.5 tons. One of the ribs was then demolished in order to destabilise the structural integrity of the vault, after which the point load caused the failure of the vault. Photos: James Lauman.

Endnotes

- 1 TU Berlin, Co-Coon DesignBuild–Symposium webpage <http://www.a.tu-berlin.de/cocoon/php/symposium.php> (accessed 14 August 2013)
- 2 2013 Graduate & Student Awards of the Australian Institute of Architects State Chapter: Structural Innovation in Architecture Prize - Winner; Digital Innovation in Architecture Prize – Commendation
- 3 The research intent and process of building the freeform timber vault is documented in Davis L., Rippmann M., Pawlofsky T. and Block P. Efficient and Expressive Thin-tile Vaulting using Cardboard Formwork, Proceedings of the IABSE-IASS Symposium 2011, London, UK.
- 4 Extract from Reflection statement submitted for the design/build studio 11524 MASTERCLASS: DESIGN TECHNOLOGIES 2 by UTS M.Arch. student James Lauman (2012)
- 5 Extract from Reflection statement submitted for the design/build studio 11524 MASTERCLASS: DESIGN TECHNOLOGIES 2 by UTS M.Arch. student Laura Hinds (2012)

- 6 Extract from Reflection statement submitted for the design/build studio 11524
MASTERCLASS: DESIGN TECHNOLOGIES 2 by UTS M.Arch. student Jordan Soriot (2012)

Biography

Melonie Bayl-Smith is the author/co-instructor/researcher for the project. She is Director of Bijl Architecture and Adjunct Professor at the UTS School of Architecture. A Byera Hadley Scholar, Melonie has run her own practice for over a decade and her involvement in the profession straddles practice, research and teaching, including design studios, workshops, professional practice and construction.

Philippe Block is the lead Instructor/researcher for the project. He is an Assistant Professor in the Department of Architecture and Block Research Group, ETH Zurich

David Pigram is a co-Instructor/researcher for the project. He is a Lecturer at UTS School of Architecture, and Director of Supermanoeuvre

REBUILDING IN RANONGGA: REFLECTING ON PRACTICE BASED RESEARCH

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CONFERENCE

STUDIO NEXUS < > DESIGN RESEARCH

Abstract:

Two hundred million people are displaced annually due to natural disasters with a further one billion living in inadequate conditions in urban areas. Architects have a responsibility to respond to this statistic as the effects of natural and social disasters become more visibly catastrophic when paired with population rise. The research discussed in this paper initially questions and considers how digital tools can be employed to enhance rebuilding processes, but still achieve sensitive, culturally appropriate and accepted built solutions. Secondly the paper reflects on the impact 'real-world' projects have on architectural education.

Research aspirations encouraged an atypical 'research by design' methodology involving a focused case study in the recently devastated village Keigold, Ranongga, Solomon Islands. Through this qualitative approach specific place data and the accounts of those affected were documented through naturalistic and archival methods of observation and participation. Findings reveal a number of unanticipated results which would have been otherwise undetected if field research within the design and rebuilding process was not undertaken, reflecting the importance of place specific research in the design process. Ultimately, the study proves that it is critical for issues of disaster to be addressed on a local rather than global scale; decisions cannot be speculative, or solved at a distance, but require intensive collaborative work with communities to achieve optimum solutions. Architectural education and design studios would continue to benefit from focused community engagement and field research within the design process.

Introduction:

Natural and social disasters are becoming increasingly frequent and their effects more physically catastrophic. Research indicates that in the future this will continue to worsen, contributing to the global housing crisis and number of displaced persons.¹ Architecture encompasses the act of providing shelter, one of the three basic requirements of survival. There is a great responsibility for architects to respond to this situation as disasters become increasingly frequent and population rise. Arayedh identifies a key concern; 'architects are encumbered by the need to be original,'² this desire generally results in responses overlooking basic yet highly significant cultural considerations. Therefore, it is critical to examine the issues revolving around the responsibility of architects, their response to disasters and the needs of different cultures and communities as part of the design process from the early stages of architectural training within academic environments and beyond.

The research discussed in this paper initially questions and considers how digital tools can be employed to enhance rebuilding processes, but still achieve sensitive, culturally appropriate and accepted built solutions. Secondly the paper reflects on the impact 'real-world' projects have on architectural education by discussing Hannah's research over a year long thesis unit and its effect on her design research and her practice as an architect. This case study explores the impact of onsite research and how engaging with 'real world' issues and communities allows students to understand fundamental design issues in a deeper way, emphasising the importance of such learning activities to architectural education.³

Background Context:

A review of literature pertaining to post-disaster reconstruction identifies a number of emergent issues surrounding the need for humanity and permanence in current rebuilding processes, with many occupants rejecting the infrastructure often provided.⁴ This rejection has the potential to trigger issues of social dysfunction, undervalued land and damaged socio-cultural networks, which can be directly attributed to architectural disaster responses.^{ibid} As interpreted and extracted from the current literature, common causes for rejection include:

- limited opportunities for customisation and individualism;

- restricted public engagement and social participation;
- unawareness of socio-cultural issues or 'culturally alien architecture';
- inappropriate material use;
- modest incremental housing models; and
- public rejection of radical ideas⁵

Further, Johnson argues that current approaches are overly expensive, implemented too late, too long lasting and attribute to a number of undesirable impacts on the urban environment as a result of their temporary nature.^{ibid} Responses are generally characterised by standardized one-size fits all prototypes which are often expensive in terms of materials, difficult to replicate and nonresponsive to place. It is through the lived experiences and memories applied to a space by individuals or groups that a space becomes a place.⁶ The understanding and creation of place is an important aspect of architectural and urban design^{7 8} and therefore needs to be considered when responding to post-disaster reconstruction.⁹

Digital tools are increasingly being used in the fabrication of architecture to test formal and aesthetic limits. However their presence in the field of humanitarian design is narrow and experimental. Literature challenges current approaches and questions whether form driven design is ethical, arguing that it's undermining its powerful capabilities of generative modelling.¹⁰ The new mathematical and parametric capabilities of digital software provide the potential for current practices to shift from mass production to mass customisation. Sass defines digital design as 'a self-contained way of designing within a computational environment through the employment of digital tools and technologies'.¹¹ More specifically, digital tools encompass any computational methods or means that may be employed in the design process from inception to post-evaluation that contribute and aid in the optimisation and efficiency of the architecture. Common digital software employed in architectural practice may include, but are not limited to: Building Information Modelling (BIM), Parametric Modelling, Genetic Algorithm (GA) and Project Quality Management software. This research focused on questioning the role and appropriateness of digital tools and technologies in the context of remote post-disaster regions, specifically in Keigold village, Ranongga, Solomon Islands.

Field Research – Ranongga, Solomon Islands:

Ranongga is a 28 kilometre long, narrow island situated amongst the New Georgia Islands group of Western Province, Solomon Islands (Figure 1). In April 2007, Ranongga experienced devastation as a result of an earthquake and tsunami.¹² Permanent rebuilding efforts were delayed with communities occupying the poor conditions of temporary UNHCR tents for a number of years following the disaster (Figure 2 and 3). Emergency Architects Australia (EAA) coordinated the rebuilding process through visiting and engaging the community of Ranongga and have established a number of ongoing projects to address community resilience (Figure 4). Between the 11th and 22nd of July 2011 Hannah participated in an EAA organised reconstruction project of latrine shelters for the disaster victims.



Figure 1: Ranongga Island location



Figure 2: Keigold village disaster effects



Figure 3: Keigold village post-disaster relocation



Figure 4: Keigold village – current condition

Methodology:

Qualitative methodologies involved two weeks of intensive fieldwork within the community of Keigold, Ranongga, and required participation in manual latrine construction (Figure 5), including;

1. Digging and preparation of the latrine pit
2. Sourcing and retrieval of building materials including timber, stone and sand
3. Mixing, pouring and curing of concrete for the latrine slab and footings
4. Assembly of timber structure
5. Cutting and fixing cladding and roof sheeting
6. Leveling of earthworks and improvement of site drainage

The aid work was completed within a multidisciplinary team of 12. Personal experience was recorded through the use of visual diaries, written journals and photo documentation. Volunteers worked in pairs, within the larger team, to build one latrine shelter for an allocated family. The purpose of the visit was to determine the effectiveness of existing processes of construction and speculate on the potential use of digital tools.



Figure 5: Completed latrine project

Post-Field Research:

A series of qualitative interviews with EAA volunteers, Architects, and Design professionals were conducted to question the role and appropriateness of digital tools and technologies in the reconstruction of post-disaster regions. The questions were structured to ascertain:

- whether there is a place for high-tech digital tools in remote disaster regions;
- what drives the appropriateness of digital tools, and;
- speculation and identification of specific appropriate digital tools.

Responses were analysed using a thematic approach identifying categories, themes and patterns. The data from the multidisciplinary groups allowed a relevant reflection to be obtained pertaining to the immediate local experience at Ranongga, as well as projecting the discussion onto a global scale.

Findings:

Observations proved traditional construction methods employed were highly appropriate and successful in terms of place and culture, contributing to building community resilience through:

- collaborative community driven processes;
- sustainable material selection and sourcing; and
- sensitivity to vernacular through the employment and integration of local skill and craftsmanship (Figure 6, 7 and 8)



Figure 6: Local Vernacular Variations



Figure 7: Local Vernacular Variations



Figure 8: Local Vernacular Variations

Observational field studies revealed the current success of manual rebuilding techniques highlighting the critical need for architects to engage in community and cultural living practices before constructing their understanding of place, to avoid imposing external misinformed values on a community. Field research exemplified the importance of the community in providing expertise and driving the design process. It became increasingly obvious that it is inappropriate to push a design agenda based on technology, economics or materials; rather there needs to be conscious consideration and incorporation of the cultural situation of that place. Drawing from lessons learnt in the field, there emerged a number of identifiable areas where digital tools such as; Personal Digital Assistant systems (i.e. palm pilots and tablets), optimisation and generative software (ie. Grasshopper and Rhinoceros), quality management systems and 3D visualisation software (i.e. Revit, ArchiCAD, 3D Studio Max) may be employed to improve current processes, specifically in their contribution towards; local training and education, communication, visualisation, optimisation and assessment.

Post Field Research: Determining the Role of Digital Tools

The access to and use of digital tools in alternate capacities was encouraged and described by interviewees as absolutely critical. Findings exposed the potential use of digital tools in two primary capacities; primarily as 3D modelling software and secondarily as digital communication devices. Participants suggested in locations as remote as the Solomon Islands, it is important to emphasise the building capacity of local people: 'Whilst potential tools may be limited there remains a lot of scope for them' [WY]. There was a common concern that the success of the tools and their input, relies on their ability to be simple and sophisticated for unskilled communities to use; 'there is a lot of value in putting professional knowledge in the hands of semi-professional people however this relies on the simplicity, accessibility and practicality of the tool' [DK].

Research participants identified and discussed a number of potential ways digital tools may be employed in such situations to facilitate aid assistance, these can be best categorised through five key themes:

- Digital tools in local training and education
- Digital tools in communication and visualisation

- Digital tools and parametric design for optimisation and efficiency
- Digital tools and evaluation

Synthesising digital tools and local vernacular processes

However, as the study proves, it becomes particularly difficult to speculate where and to what extent digital tools would be appropriate due to distinctly different characteristics of place: 'ultimately, architecture does have a role to play... where it is far more easily facilitated, digital processes are invaluable' [PG].

Discussion:

Hannah's (The Students' & Architects') Reflections

The Solomon Islands field research immensely affected my design approach. I went on the trip with a very clear research agenda, having formulated a number of expected research outcomes. The hypothesis and preconceptions vastly shifted as a result of observations gathered in the field and subsequently upon return, the original intent of the research required reconsideration based on the learnings that emerged. The field trip exemplified the importance of the community in providing expertise and driving the design process.

As a student the intensive hands on experience allowed an understanding of building processes, materials and sustainable practices, particularly the optimisation of resources and minimisation of material waste. This understanding involved developing an awareness of a materials lifecycle, particularly the labor and processes involved prior to materials arriving on site. Additionally, the fieldwork heightened my personal value of multidisciplinary teamwork and the importance of engaging and communicating with other experts to achieve the best design outcomes. Ultimately, the field experience broadened my understanding of the scope of architecture and the enormous contribution that can be made in facilitating skilling and empowerment of communities through the transfer of knowledge.

The learnings acquired as a student have translated to my current approach as a registered architect. The research has challenged me to reflect and reconsider the

current role and dependence on digital tools in design processes and architectural practices, with their role being reinterpreted as variable depending on the project. Additionally, the fieldwork undoubtedly contributed to my construction knowledge. The ability to attain hands-on experience is invaluable in the learning process, I identify the importance of being involved in site visits as a significant contributor to early professional development.

A greater appreciation for the role of the client in the design process and the importance of being able to communicate, gather and interpret their knowledge and requirements has developed. This learning has contributed to increased skills and involvement in community engagement, communication and work shopping, critical in acquiring accurate preliminary briefing information. I maintain an ongoing interest and recognise the role and responsibility of architects in raising awareness, funds and contributing to more appropriate emergency design responses.

Recommendations for Architectural Education:

The research was conducted during the postgraduate course, Masters in Architecture, and contributed to the development of specialised research knowledge. The trip was self-funded, there was difficulty in attaining financial support for the research either internally or externally to the university. Lack of funding limits research quality and possibilities. As a result, ambitions are often compromised, with research either abandoned or conducted in isolation to context. This model disadvantages both students and universities who are commonly striving for high quality educational and innovative research outcomes. The shifting nature of architecture drives the need for the development of a more appropriate research model to be adopted within architectural education. This may be addressed through resolving the synthesis between studio, research and practice, as detailed in these key recommendations:

- Strengthening and encouraging practice-based learning, through engaging practices and developing meaningful associations, allowing students to learn in a real world environment on real world projects;
- Through financial incentives and university funding at a course Masters level which encourages students to test diverse research agendas and ensures innovation and advancement;

- Encouragement of multidisciplinary research through collaboration with other schools within built environment and creative faculties that would simulate real world scenarios;
- Through study tours integrated in unit curriculum which would encourage students to learn together through the experience of different places and cultures; and
- Through the integration of projects which employ hands-on processes and require students to deliver built project outcomes.

Through this experience I have become increasingly aware that the shifting practice of architecture requires more diverse research opportunities and support through institutions to ensure the maintenance of high quality outputs. I identify the advantages of practice based research and the importance for issues of disaster to be addressed on a local rather than global scale. Decisions cannot be speculative, but rather require intensive collaborative work with communities to achieve optimum solutions. Sinclair's work aligns with this aspiration; 'All problems are local, all solutions are local'.¹³

The Supervisor's Reflections:

Travelling to the Solomon Islands and participating in an Emergency Architects reconstruction project for the purpose of this research was not part of the formal curriculum of the unit. Hannah decided to extend her research past the classroom in search of a hands-on experience. The benefits of supporting and potentially providing informal learning experiences based on 'real world' situations such as this one, are continually being proven to be of increasing benefit to architectural education, 'real world' contexts provides an intense relationship between designing and building.¹⁴ The integration of theory and practice, required for complex problem solving in real world settings, challenges the design studio and introduces a density of imaginative responses through collaboration and experimentation.¹⁵ Not only do community-based projects allow students to understand social issues, they develop a sense of civic responsibility¹⁶ and ethical practice.¹⁷

Hannah's initial research question was broad and ambiguous. Her intention to explore the creation of culture through digital tools in post disaster reconstruction

was worth pursuing as it identified an area of investigation that could be developed further. The importance of place to her research only became evident once she had travelled to the Solomon Islands. Had she not done so, her research would not have gone past the speculative direction it was heading. As her supervisor this was a difficult situation to be in as I could not force or expect any student to step outside the classroom in such a manner. As Hannah immersed herself into the living practices of Rannonga and reflected on it through her journaling and photographic records she understood the intricacies and needs of the community at a much deeper level. She quickly realised that digital tools were not appropriate in the context of Rannonga. Although this may have been disheartening for the purpose of her initial inquiry, she was able to dive deeper into the research and identify additional questions that deserved attention.

Conclusion:

The unexpected findings that emerged through Hannah's research journey engage with the notion that, 'Architecture is a process of giving form and pattern to the social life of a community . . . [it] is not an individual act performed by an artist-architect charged with his emotions'¹⁸ whereby the success of the architecture is driven by community input. We can conclude that onsite research provides experiences that cannot be reproduced in the formal settings of university classrooms or studios and therefore needs to be supported, both financially and in kind, by academic institutions and practices. Understanding the needs of a community and place are fundamental to the design process, particularly in post-disaster reconstruction. Current architectural studio models would continue to benefit from 'real world' community-based projects in combining theory with practice. Design is a form of research,¹⁹ the nexus of teaching and research remains within the scaffolding of the design process and practice.

Endnotes

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Biography

Hannah Slater is a registered Queensland Architect practicing in Brisbane, Australia. She received her undergraduate Bachelor of Design, Architectural Studies (2010) with first class honors and her postgraduate Masters in Architecture (2011) from QUT. Her research interests interrogate architectural solutions for post disaster housing through employing place specific research methodologies.

Glenda Caldwell is a Lecturer in Architecture. She has a Bachelor of Science (Architecture) from the University of Michigan, Ann Arbor, USA. Having commenced a Masters in Architecture at SCI-Arc in Los Angeles, she completed the degree in Miami at the Florida International University. Glenda participated in the dLAB course at the Architecture Association, London in 2009 focusing on digital fabrication.

Glenda is the unit coordinator for fourth year architectural design and first year introduction to visualisation II. Other teaching responsibilities have included Masters design and research, third and second year architectural design, Integrated Technologies, and Sustainable Systems. Her research interests focus on digital fabrication, architectural pedagogy, alternative research methods, and the creation of place.

MATERIAL PRACTICE

LEANNE ZILKA
RMIT UNIVERSITY & ZILKA STUDIO

**DESIGNING/
EDUCATION**
CONFERENCE

STUDIO NEXUS DESIGN < > RESEARCH

Abstract

Research studios can provide an environment of innovation by providing a nexus of teaching, research and academic knowledge. Studio teaching at RMIT can be defined as the delivery of knowledge that is then applied to a set of questions, issues and concerns facing the built environment. This definition is not enough to meet the demands on new graduates today to not only innovate within their profession but beyond it where they need to find their own areas of practice that may not be clearly defined. The flexibility of the research studio can be used to push knowledge and skill for both student and studio leader into areas of architecture or beyond that have not been considered. This paper will discuss the research studio as a vehicle to extend teaching and learning outcomes for students, test research questions for the studio leader, expand the impact of the work produced and lastly provide potential clients or external participants with a demonstration of different possibilities. I will discuss these issues in relation to a material practice that I have been developing through the research studio, illustrating them with examples from research into new materials.

“The capacity to innovate, the ability to solve problems creatively or bring new possibilities to life, and skills like critical thinking, communication and collaboration are far more important than academic knowledge”¹. Research studios can provide an environment to innovate by providing a nexus of teaching, research and academic knowledge. Studio teaching as defined by RMIT University, architecture program, is to deliver knowledge and then apply this to a set of questions, issues, concerns facing the built environment. However there are more demands on new graduates today to not only innovate within their profession but beyond it, they need to find their own areas of practice that may not be clearly defined. The flexibility of the research studio can be used to push their knowledge and skill into non- traditional areas of architecture. This paper will discuss the research studio as a vehicle to extend teaching and learning outcomes for students, test research questions for the studio leader, expand the impact of the work produced and lastly provide potential clients or external participants with a demonstration of different possibilities. I will discuss these issues in relation to a material practice that I have been developing through the research studio.

The design studio at RMIT University is one that students ballot for at the beginning of each semester. Studio leaders design and structure their own content which includes the studio premise site and program. Groups of 12-14 students are then assigned to a studio and students work together in smaller groups of 2 -3 for 14 weeks concluding with a final presentation to staff and/or external practitioners that expands the discussion and acts as peer review. Within the studio structure the research studio can take place where the research extends the design studio by engaging with a broader community than the immediate studio members. These members can include other disciplines, industry, local government, as well as manufactures or material specialists. The studio structure allows the cohort of students close contact between studio leader and student and together they have the ability to tackle questions where there is not necessarily a clear precedent to draw from, or a clear outcome.

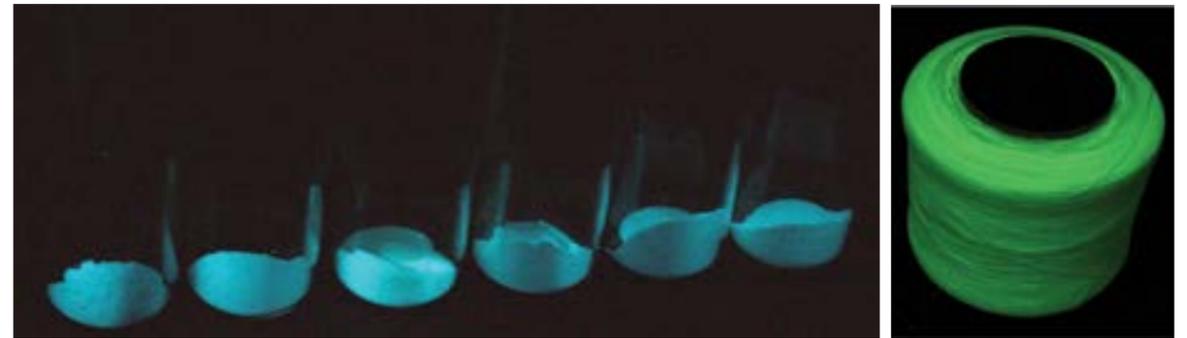


A group of RMIT students from Aerospace, Textile design, architecture and business ‘brainstorming’ possible overlaps with each other, while looking at fibre composite structures

From the academic or independent practitioner point of view, the research studio enables them to “evolve their practice through their own self-interrogation and re-discovery”² using the vehicle of the studio as a way to work through their own research questions. Prof. Heron notes that the dissemination of an architect’s work may be in buildings or published projects, but the laboratory for invention is in its own practice and engagement with peer review³. Conducting research ‘in the medium of design itself’ we then ‘speculate through the medium of design on the future directions of their design research’⁴. Research studios do the research at the same time as designing. Unlike the sciences where ‘an investigation is expected to be conducted about some problem or set of issues that can be clearly defined, held to be sensible, and valuable to investigate’⁵, design research is a seeking out of the unknown and unexpected⁶.

There is a distinction between research for design rather than research through design, the former being conducive to the scientific model of research that sits outside the design process but is employed when necessary. Research studios conduct research through design which makes the application of new technologies and materials and their connection to architecture an area well suited to the design research studio giving structure for the nexus of teaching and research. Where can new materials/technologies be tested and demonstrated prior to being used? Can a material use be expanded by taking it through a design studio where an unearthing of applications might occur? There are many innovations in the area of materials that are yet to be applied to architecture. From a pedagogical point of view, studio leaders are able to set a structure that assists students to take on unknown territory allowing them to understand how to incorporate information outside their own experience and into their design thinking adding to their design 'tools'. The research studio sets up a framework that guides students through the obstacles of producing relevant design solutions. This structure is something that they can then use to pursue projects on their own, learning to use research as not only something that informs the design but that can lead to further opportunities.

An illustration of this teaching/research nexus can be seen in a collaborative team of architects, material scientists and textile designers that have looked at Long Life Afterglow Phosphorescent Materials, commonly seen in glow-in-the-dark products. These materials were recently improved by a team of material scientists and industry through an ARC linkage grant. The material improvement was lengthening the glow time after a short exposure to natural or artificial light, producing a nano-particle size material that could glow for up to eight hours. This increase glow time together with the variety of substrates, suddenly expanded its scale of application making it applicable to space. This material was used in several studios that sought to investigate the potential of the material at an architectural scale. Students were exposed to the material in sheet, fibre and paint form and were engaged with hypothetical and real briefs.



Glow material, in raw nano particle form (blue version) and embedded in fibre (green version)

The research studios were employed to discover opportunities to scale up the use of these materials from egress signage to a passive lighting solution bringing research from the ARC Linkage into the studio. The city of Port Phillip became part of one of the studios as they were interested in finding out if the material had the potential to be used in one of their public spaces – the Graham Street Underpass in Port Melbourne. Students tested the materials in its various forms and then developed spatial ideas relating to the site. The work done in studio contributed to the emergence of a passive urban lighting strategy. Pedagogically, students who had little exposure to full scale materials were able to work with these allowing them to visualise the effects through physical models testing them in situ. Light levels were critical to understand in order for the material to be used appropriately, and through experimentation students were able to understand the limits of the material and how much light is needed to navigate through space touching on issues of perception and space. Their open-ended investigation was supported by a range of specialists, from material science and the city of Port Phillip to further inform their projects. By simply expanding the use of a material into an architectural application, students needed to investigate a variety of issues that relate to this problem. Such as light levels, perception, public space at night. Etc.



Glow embedded around Graham Street Underpass (image courtesy of Ben Stafford)

The investigation with the city of Port Phillip, industry, material science and architecture was successful in showing council and industry the opportunities for the material with no pressure to commit to any one design as well as allowing students to think about developing space from a micro (material) to a macro (urban) scale. The council agreed to trial the paint version of the glow material for one of the areas in the site, it should be noted that none of the designs the students did were used but rather the studio showed how the material might be useful. The work was tendered out and a builder appointed, the industry partner who was the glow material manufacturer received requests for information but for unknown reasons the paint was never used. This was a disappointing end to the collaboration, as it would have been one of the first examples of this new material being used as a passive urban lighting strategy. The pitfall was that the expertise embedded in the studio was not harnessed by the council during the construction phase where we could have trouble-shooted the problems and assisted with solutions. The learning journey of the students was also cut short because they had gone from conceptual development where they learned about perception and space, how a public space might operate at night, and how to create sympathetic form that would harness the material qualities but were stopped at the implementation of these ideas. So while the material based research studio can attempt to demonstrate how new materials might be applied to situations and meet the basic pedagogical requirements of a design studio, there needs to be an additional structure that can ensure there is involvement past the research studio, as the students can continue to engage with projects to understand how to implement and drive design projects. Since this project I have undertaken others that use a design consultancy contract developed within the University designed specifically to allow for the formalising of a

relationship that has begun in a studio environment. These consultancies can help to clarify the intellectual property issues and payment of services that extend beyond teaching and learning outcomes.

A second pitfall lies in the pressure on students to satisfy not only the design studio education requirements but also the requirements from the industry or collaborating partners. The student needs to negotiate between all of these potential conflicts but ultimately they are beholden to a grading schedule that should reflect the complexity of the research studio. The studio leader needs to be aware of this and ensure that the students are not debilitated by any conflicts.

Peter Downton talks about Studio learning as important because of the nature of design knowledge and the fact that it is so richly intertwined within designing itself⁷. The studio is critical to design research because the studio allows for ideas and approaches to be tested as close to reality as possible. Kate Heron adds to this by saying that just as the work of an artist may be disseminated in a public showing or performance, the research laboratory is firmly based in the workshop or studio⁸. The material practice that I have developed through teaching studios has been developed to ensure that the sometime esoteric material choices (such as fibres as they relate to architecture) become fully grounded through the studio questions and/or the people collaborating in the studio. The distinction in the quote by Thomas Friedman at the beginning of this paper, "that the capacity to innovate is far more important than academic knowledge" assumes that these two elements lie separately. In the research studio they can easily be intertwined through application. Academic knowledge can be built at the same time as innovation.

The robustness of the research studio can be seen in its ability to involve a range of disciplines, in order to provide enough knowledge for the complex set of problems to be addressed. The relationships that happen in the studio allow for meaningful progression through a set of issues where the structure of the research studio can embed participants or questions that allow for a more grounded result even though it might begin in the esoteric. In addition to this it is critical that the complexity of turning a material into an architectural project is broken down into studios so that each issue can be built upon from work done in previous studios (see diagram below). The process starts with a material play, where students work with the material to investigate its spatial properties and how best to use it, this is followed by

hypothetical projects and finally a real project/client and 1:1 fabrication. These studios are also interwoven with electives that might investigate a particular element to bring clarity to the next studio iteration.

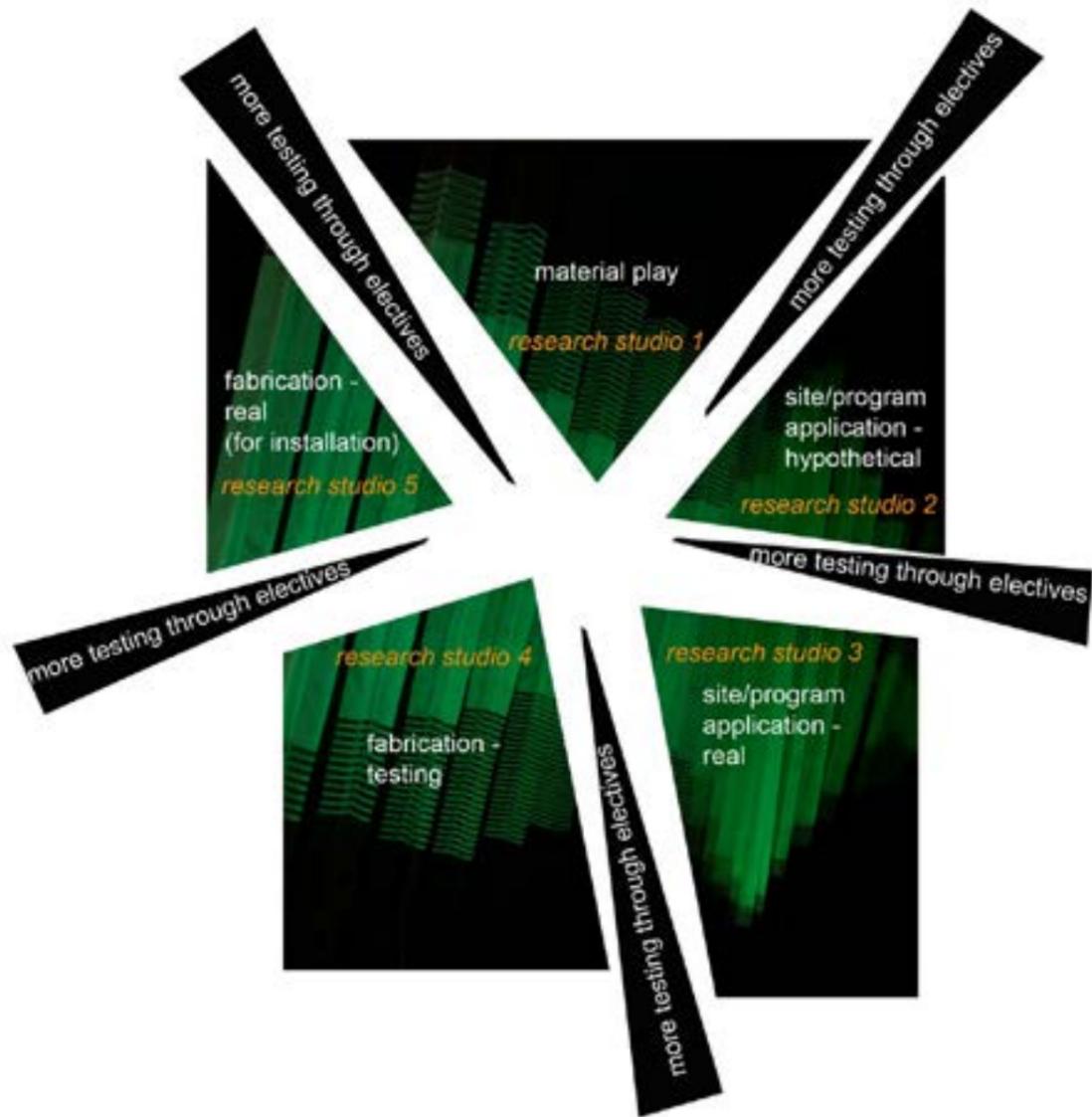


Diagram of studio series. This shows how the research progresses through a set of studios to inform the research as well as controlling the complexity for the benefit of the students' learning.

When investigating new materials and technologies, it is ideal if the results from the research studio are disseminated through exhibition or physical display. The act of making/fabricating for exhibition not only demonstrates the material to an audience but also extends the research into fabrication. By resolving fabrication issues, new

discoveries can be made that can further propel the research. An illustration of this can be seen with the glow material research. After several research studios that worked with textile design and material science we understood the limitations of the material and how we could conceive of a space that would be effectively illuminated by the glow material.

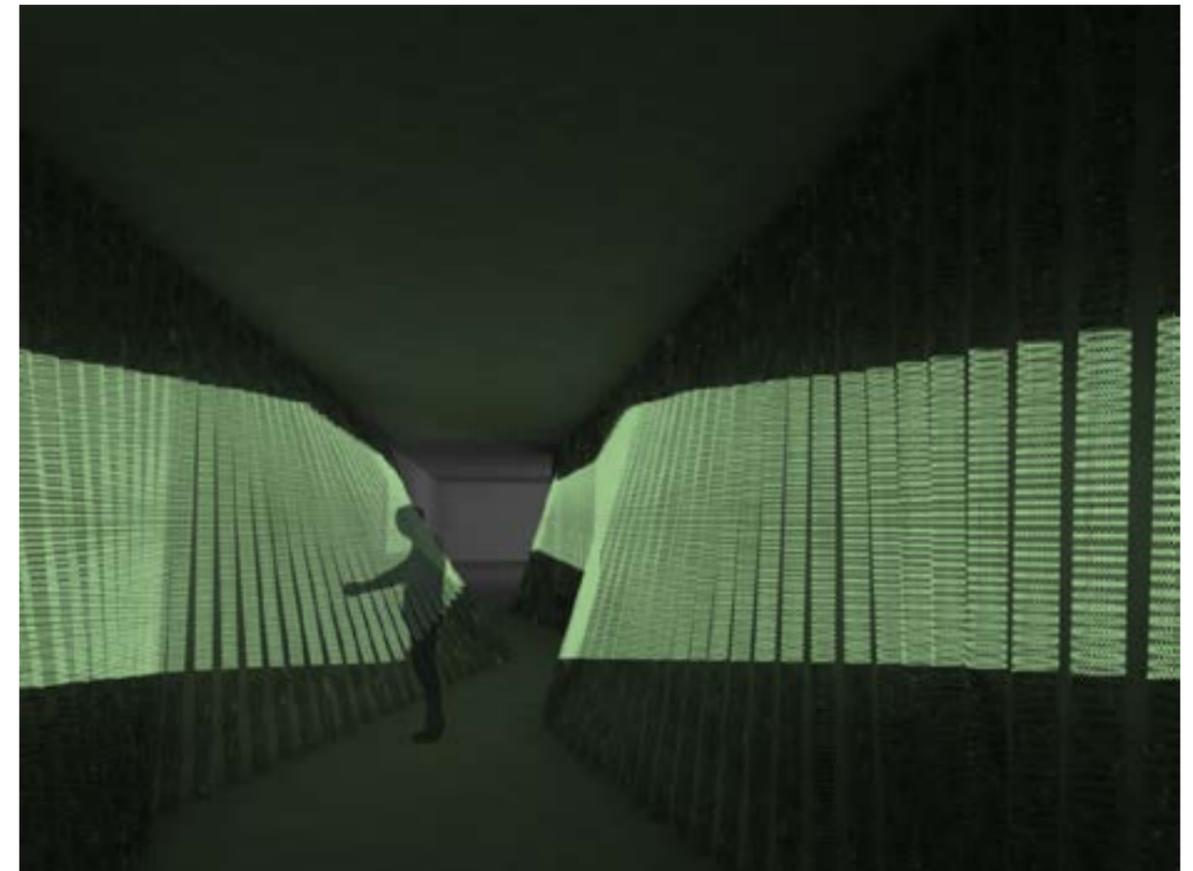


Image showing a digital rendering of the glow material knitted into tubes

The push from digital representation to physical allowed for a continuation of the research. Students were able to understand how to mass customise knitted structures that were not garments. The digital knitting technology is a closed system that does not allow for the fabrication of anything outside the set templates, so the research moved from how to conceive of a glow space into how to fabricate using the new material and non-standard fabrication technologies. The series of studio investigations went through various scales starting with a 1:1 scale, moving through to 1:100, 1:200 then back to 1:1 when fabrication was looked at, where each studio concentrated on a specific element or scale culminating in the 1:1 fabrication.



Glow tubes illuminated by artificial light



Glow tubes glowing without any artificial light

Photographs courtesy of Shannon Mcgrath

Research studios will become increasingly important to push architecture further and re-establish it at the forefront of material development. The research studio allows for a flexible and responsive environment, not available in a commercial practice, where the esoteric ideas can flow into a broader set of applications that can have a longer time frame, not be immediately profitable and use a different set of skills than those available in practice. The student journey can be one that takes them out of the hypothetical and into the real where the constraints are not debilitating but ones that open up opportunities not previously seen.

Endnotes

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Biography

Leanne's research and practice has established a model for applying new and existing materials, using multi-disciplinary design teams to address problems facing the built environment. Some of the materials investigated have included long life afterglow phosphorescent materials, waste stream laminates, aluminium and canvas. Leanne has used her studio teaching to create opportunities for her students to think about how new technologies can be used in architecture and applying them to the problems facing the built environment.

STUDIO CHRISTCHURCH

UWE RIEGER & CAMIA YOUNG
THE UNIVERSITY OF AUCKLAND

**DESIGNING/
EDUCATION**
CONFERENCE
THE FUTURE OF PRACTICE

Abstract

The Paper addresses the question of how the design studio can provide a platform for preparing future practitioners. In this context it introduces Studio Christchurch as a new initiative to create an interdisciplinary Christchurch based research and design platform as an open exchange platform led by the four architecture schools in New Zealand.

Across both undergraduate and postgraduate levels, Studio Christchurch focuses on practice oriented outcomes that aim for applied design propositions in order to actively participate in the discussion on the future of the city. Moving away from individual and singular outcomes, the work produced by Studio Christchurch is long-term, goal oriented by developing a continuously growing body of work.

The paper describes the educational and professional context for Studio Christchurch's three key principles: teamwork, cross-disciplinary collaborations and the assembly of collective knowledge.

STUDIO CHRISTCHURCH

Studio Christchurch is a collaborative Christchurch based research and design platform for architecture and related disciplines. Studio Christchurch focuses on practice oriented outcomes with the clear aim to investigate, test and develop concepts that lead to applied design propositions. The vision of an exemplary Christchurch rebuild is seen as a shared opportunity to bring together tertiary institution, industry, the profession and governmental bodies. Through highly visible presentations, Studio Christchurch is conceived to stimulate and actively participate in the discussions shaping the future of the city.



Figure 1: Studio Christchurch presentation and Wigram Air Force Museum. Photo by Jonny Knopp

Background

In May 2012 the current president of the New Zealand Institute of Architects (NZIA), David Sheppard, invited all of the New Zealand's architecture schools to participate in the discussion about the redevelopment of Christchurch, and encouraged the schools to engage with Christchurch-based design topics. This represented a shift from immediate disaster relief, to longer term planning for Christchurch's future.

Today Christchurch is in a pivotal time in its history, decisions made now of what to build where and when will come to define the city. Recognising resources for reconstruction are limited, it is critical to think strategically about what types of construction could attract further investment, and what projects are more likely to act as catalysts for growth than others.

Beside the commercial implications of the enormous scale of the rebuild, a driving motivation for the local presence of international companies is Christchurch's potential to become a model city for the 21st Century. When Christchurch is compared to other cities around the world, it has three unique potentials: first, it has the advantage of abundant water, arable land and a moderate climate conducive to farming; second, with a population of approximately 370,000 inhabitants, it is large enough to be relevant as a major city but also small enough for technology and infrastructure to be implemented quickly and efficiently; and lastly, because of the massive rebuilding effort following the earthquakes, there is an opportunity to rethink the urban form. Christchurch could capitalise on this opportunity by recognising these inherent traits and become an exemplary city, modelling and implementing sustainable urban design.

The current international interest in Christchurch is reflected by the fact that the city is named as one of the 'Top 10 Most Watched Cities' in the online magazine Foreign Policy¹. Additionally Christchurch is number six in the Lonely Planet's top ten destinations for 2013².

Objectives

The invitation by the NZIA and Christchurch's specific context offered the opportunity to go beyond the presentation of individual studio projects, which had been independently developed at the four architecture schools since the February earthquake in 2011. Studio Christchurch was formed as coordinated response.

A main objective is to investigate alternatives, test solutions through design and see that findings are translated into applied propositions for the city. With this common focus in mind Studio Christchurch offers a platform for the collaboration between architecture schools and related disciplines, in partnership within the profession, industry and governmental institutions. A further short term aim is to enhance the interdisciplinary exchange with the three Canterbury tertiary institutions: University of Lincoln, University of Canterbury and Christchurch Polytechnic Institute of Technology.

By building upon an international interest in re-build strategies for Christchurch, the initiative has the opportunity to become a hub for an international network of architecture schools and to emerge as a highly visible presentation platform contributing to public discussions on the development of the city. As an educational platform Studio Christchurch has the additional objective to prepare future architects with new skills and work methods for the demands in contemporary practice.



Figure 2: LUXCITY 2013 by Studio Christchurch was the first public event in the `Red Zone`. Photo by Geof Wilson

Outputs

With its recent projects Studio Christchurch has focussed on three areas: testing solutions through design, the communication of ideas through public urban events and the collection of background data. The following are given as examples of outcomes: Studio Christchurch Summer School 2013, the event studio LUXCIY and the Future Christchurch design group.

In January 2013 Studio Christchurch organized the first Summer School in Architecture based in Christchurch. This was a collaboration between Christchurch Polytechnic Institute of Technology (CPIT), UNITEC, Victoria University of Wellington (VUW) and The University of Auckland (UoA). Fifty-five MArch(Prof) & BAS students developed and tested design proposals related to the Christchurch Green Frame as outlined in the official planning document by the Christchurch Central Development Unit (CCDU). The five studios worked in close cooperation with Christchurch City Council and the Christchurch Branch of the NZIA. The summer school ended with a public discussion of the designs in the foyer of the Christchurch City Council. Driven

by the interest of international engineering company Aurecon and New Zealand's major architectural firm Warren and Mahoney, the project received substantial funding to summarize outcomes in the form of a giant 1:100 Green Frame model and a catalogue publication³. Two public exhibitions and a private invited discussion were used as a shared platform between Studio Christchurch, the two project sponsors and governmental bodies to discuss their perspectives on the Green Frame.



Figure 3: Summer School presentation at Christchurch City Council. Photo by Erica Austin and original diagram courtesy of CCDU adapted by Erica Kenney

With LUXCITY in October 2012, Studio Christchurch introduced a highly effective and engaging form of architectural communication. A one night event set up to reach beyond presenting ideas, towards generating a public desire for architectural design and a returning urbanity. A total 350 students from CPIT, UNITEC, VUW, UoA and the Auckland University of Technology (AUT) organized in 16 design courses worked for one semester on large scale installations. The design studios utilised light and ephemeral materials in combination with large demolition machinery to present ideas for the future of the city. Local bars, restaurants and clubs worked in collaboration with the design studios to create temporary sculptural venues on demolished building sites. The City of Light attracted over 20,000 people to re-occupy the vacant city centre of Christchurch. LUXCITY was selected 'Event of the Year 2012' by the Christchurch Press⁴ and is highly regarded⁵ as exemplary project in Christchurch's transitional period. LUXCITY was both a proposal for the future and an instant realisation of urbanity.



Figure 4: 19 large scale student installations at LUXCITY attracted 20,000 visitors. Photos by Erica Austin

Since 2011 the School of Architecture and Planning at the University of Auckland has been running design studios under the title of Future Christchurch on undergraduate and post graduate level. To date over 100 students have participated in the seven course. These have become an essential part of Studio Christchurch project in that they bring with them a substantial background knowledge through their research driven approach. Future Christchurch has investigated seven topics: V1 Research and Design, V2 Materials and Resources, V3 Economies, V4 Inherent Assets and Unique Identities, V5 Architecture & Structure, V6 Questioning the Blueprint, V7 Polycentric City. The 2012 'Future Christchurch' Masters Thesis team of students were awarded highly commended for their research and innovative team approach at the prestigious NZIA National Student Design Awards⁶. The outcomes of Future Christchurch Group has been presented in form of public talks and summarized in the Future Christchurch book series⁷. These generated a wide range of interest and were purchased by the Canterbury Earthquake Recovery Authority (CERA), Christchurch City Council (CCC) the profession and industry.



Figure 5: Future Christchurch publications. Photo by Camia Young

Architectural Competencies

On the basis of social, political, cultural and economic contexts, architecture is facing increasing scrutiny with respect to its local and global environmental impact. Studio Christchurch's response is a specific focus on the qualitative factors that influence the value of urban environments and define expectations on contemporary building performance. A response which requires the input from various specialists and disciplines and reacts on a mode of practice which is moving towards an integrating design and project delivery.

For Australia and New Zealand this shift is reflected in recent investigations initiated by the Australian Learning and Teaching Council which led in 2011 to the Learning and Teaching Academic Standards Statement for Architecture⁸ (LTAS Architecture). The document streamlines the expectations for Architectural Master students to seven Threshold Learning Outcomes (TLOs) summarized in three key areas of expertise: Knowledge, Design and Practice management. The explanation for these key areas makes clear that expectations circulate around: the "diversity of different fields of knowledge", the "interaction between disciplines", the "complexity of a heuristic design process" and the "necessity to communicate amongst colleagues and clients on a diverse range of disciplines and backgrounds". The LTAS Statement hereby introduces a wider view on the discipline in its operational behaviour. It is moving away from the understanding of an Architect as an 'Independent Practitioner' as referred to in the current National Competencies Standards in Architecture⁹ (NCSA), the document which defines the accreditation criteria for New Zealand and Australia. A further outcome of the LTAS investigation is the expectation of developing a "diversity of methods in architectural education which recognises various contextual factors as characteristic of the field". In its consequence this leads to the need for new forms of architectural education in order to prepare the architect for a collaborative and interdisciplinary design process.

On a global level this need is reflected in the emergence of an increasing number of alternative architectural education platforms. Prominent examples for this are Auburn University's Rural Studio, Architecture Association's Hooke Park, the ETH's Future Cities Laboratory in Singapore, Aedes Network Campus in Berlin and many others. Common among these diverse platforms is that they are all embedded in a 'real world context'. With multiple collaborators involved, their aim is to react on acute

architectural, social and environmental demands, which expand beyond the limitations of institutional structures and the focus of assessment criteria for predefined outcomes.

Within the `real world` context of Christchurch, a specific advantage is the shared agenda for an exemplary rebuild, which allows for both cross disciplinary collaboration and the collaboration between institutions, officials and public.



Figure 5: Summer School Green Frame exhibition. Photos by Erica Austin and John Knopp

Real World Setting

The current shift towards `real world setting` in education is embed the strategy of Authentic Learning, which

“typically focuses on real-world, complex problems and their solutions, using role-playing exercises, problem-based activities, case studies, and participation in virtual communities of practice. The learning environments are inherently multidisciplinary [...] Going beyond content, authentic learning intentionally brings into play multiple disciplines, multiple perspectives, ways of working, habits of mind, and community.”¹⁰

The authentic learning experience has been framed by 10 design elements¹¹ as pragmatic checklist that can be adapted to a broad range of subjects:

- Real world relevance
- Complexity of task

- Multi-faceted problems
- Collaboration
- Multiple perspectives
- Individual and collaborative reflection
- Multi-disciplinarily
- Integrated (real world) assessment
- Outcomes as a designed product
- Multiple solution outcomes

These principles are reflected in the Studio Christchurch project on multiple levels. In collaboration with the profession and the local municipality, Studio Christchurch looks at complex questions which are relevant in the current context. Being a neutral platform the advantage of Studio Christchurch is that it can investigate different alternatives without being biased by a financial interest or corporate strategy. With a large number of partners involved the diverse theoretical and practical starting points foster a variety of outcomes. While areas and aims of the investigations are clearly framed, the problems behind them are inherently complex. This is why the work requires the consideration of multiple perspectives, and relies on a multidisciplinary and collaborative approach.

Studio Christchurch's work is outcome focussed, which means the results need to be summarized in a final form which makes the information publicly accessible. The success of the end product is measured by its relevance to the targeted audience and their engagement.

In summary Studio Christchurch is setup to prepare young architects for contemporary practice by applying 3 principles: teamwork, cross-disciplinary collaborations and collective learning.



Figure 6: Future Christchurch thesis group in discussion with Christchurch City Council, profession and industry. Photo by Erica Austin

Collective Learning

A further strategy of Studio Christchurch is to move away from the individual and one-off design studio outcomes. The work produced by Studio Christchurch is goal-oriented with a long term perspective. The individual student contributions and projects are embedded in a perspective of learning and creating by building upon the ideas of others. This way they are creating a collaborative outcomes through a continuously growing body work.

Springer References defines Collective Learning as

“generally conceptualized as a dynamic and cumulative process that results in the production of knowledge. Such knowledge is institutionalized in the form of structures, rules, routines, norms, discourse, and strategies that guide future action. Learning emerges because of interactive mechanisms where individual knowledge is shared, disseminated, diffused, and further developed through relational and belonging synergies. Collective learning can therefore be conceived as an evolutionary process of perfecting collective knowledge.”¹²

In order to cultivate this dynamic body of work, the emphasis for Studio Christchurch is on publicly presentable outcomes, which includes the accessibility of information and the network of knowledge behind it. Taking advantage of structures in digital information technology and communication media, the concept of collective learning is seen as a mode for architectural investigation and production.

Conclusion

Within its one year existence Studio Christchurch has demonstrated the effectiveness and the demand for an exchange platform within the Christchurch context. Students and tutors as participants of this platform actively assemble, edit and produce knowledge which is moving beyond pure architectural education and towards purpose driven, collective outcomes. Studio Christchurch offers three unique opportunities for architecture schools and related disciplines to connect studio work with real world issues.

Firstly, Studio Christchurch produces practice-oriented outcomes on a clear subject area that allows for trans-disciplinary collaboration with a focused common goal. Because of its local engagement, Studio Christchurch attracts collaboration and knowledge sharing on both a national and international level.

Secondly, Studio Christchurch has as an independent centre the time and people power to collect information, develop a broad range of solutions and test alternatives. This “time to think” is a scarce resource amongst the professionals who are working on day-to-day or week-by-week deadlines.

Thirdly, Studio Christchurch can effectively support students to feel confident with complex thinking and to emerge as globally engaged graduates who can solve problems through knowledge sharing and collaboration.



Figure 7: LUXCIY event site mapped against the CCDU plan . Photo by Geof Wilson and Original Diagram courtesy of CCDU.

Endnotes

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- 5 Bob Parker, Mayor of Christchurch, Letter to the organizers of the Festival of Transitional Architecture and the Heads of Schools at UoA, AUT, Victoria University, CPIT and Unitec, 3.12.12:

"...The opening event LUXCITY, was stunning and brought thousands of Christchurch residents and visitors back to the central city at night. The experience was highly symbolic in its celebration of the creative opportunities in Christchurch's rebuild [...]

I would especially like to thank the undergraduate architecture Students who, with the support of their supervisors, designed the spectacular large-scale fabrications and flew to our city from across the country to work alongside the construction industry to install them onsite. The many hours they contributed on a voluntary basis I hope provided them with valuable experience as well as creating fantastic event for our community[...]

Thank you for giving the people of Christchurch this opportunity to experience this interesting and thought-provoking approach to Christchurch, the Transitional City. I wish you every success should you hold this festival again in the future." Bob Parker, Mayor, Christchurch 3.12.12
- 6 NZIA Jury, Justification of NZIA Gaphisoft Award November 2012:

"This is an exceptionally professional treatment of a challenging situation – the reconstruction of post-earthquake Christchurch – presented in an exemplary manner. Indeed, the presentation would be the envy of many professional bodies or agencies. The rigour of the research is evident, as is the concerted effort to make sense of the findings. The whole exercise demonstrates the virtue of collaboration; the project could not have been realized to this level if it had not been a collective effort. Therefore, besides being admirable in itself, it shows the way forward for the architectural profession by highlighting the skills architects bring to complex urban problems." NZIA Gaphisoft Honourable Mention 2012

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Biography

Uwe Rieger studied Physics and Architecture at the University of Muenster and the Technical University of Berlin. Since 2006 he is teaching at The University of Auckland as an Associate Professor for Design and Design Technology. With a specific focus on construction and efficiency his research field Reactive Architecture is dealing with an autonomous correspondence to changing conditions such as climate, weather, frequency of use, programme and topography Over the past 15 years he has development responsive systems combining physical reality and place-bound data concept in form of experimental prototypical installations and practice-oriented applications.

Camia Young teaches design at The University of Auckland's School of Architecture and Planning and is the practice coordinator for Studio Christchurch. Camia has nine years of architectural experience: five years with Herzog & de Meuron in Basel, Switzerland, two years with the Office for Metropolitan Architecture (OMA) in Rotterdam, the Netherlands and two years with Studio B Architects, an architecture firm in her home town, Aspen, Colorado, USA. Beyond her work experience, she has three degrees in Architecture: a master's degree from the Architecture Association in London, a master's degree from the Southern California Institute of Architecture (SCI-Arc) in Los Angeles, California and an undergraduate degree from the University of Colorado in Boulder.

THE SELF & THE SYSTEM

**MICHAEL ROPER &
JAMES STAUGHTON**
ARCHITECTURE ARCHITECTURE &
WORKSHOP ARCHITECTURE

**DESIGNING/
EDUCATION**
CONFERENCE

THE FUTURE OF PRACTICE

ABSTRACT

The contemporary city can be characterised as a network of infrastructures, attempting to optimise human welfare within the limits of the natural world. The successful city achieves this while maintaining social cohesion and cultural breadth, understanding something of the human spirit.

Indeed the city is a human organism. Its beginnings are in the mind of the citizen. Transforming thought into flesh, it extends itself to the physical realm, where its will, at first chaotic, forms patterns of movement and urban operation, establishing systems for the body and for the mind to follow. And so it perpetuates.

Whoever wishes to affect this organism, must operate from deep within and from far without. An understanding and intuition for both the self and for the system are key.

Through our design studios, we aim to foster broad, global-thinking problem solvers. At the conclusion of the semester, we expect our students to be versed and agile in the physical mechanisms (infrastructural, geographical) and cultural forces (political and social) that underpin urban existence, training them to look both to their subjective experience as well as outside themselves, to challenge the urban systems within which they operate.

THE SELF & THE SYSTEM

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Whoever wishes to affect this organism, must operate from deep within and from far without. An understanding and intuition for both the self and for the system are key.

EDUCATING ARCHITECTS

Much has been made of the changing nature of the architecture profession. Where once the architect could expect to have a comprehensive practical knowledge of the built environment, the role now demands that architects synthesise specialist input from a growing band of consultants with often competing objectives.

As such, many believe that the role of the architect is being eroded. We contend that as long as societies require shelter, creative minds will be called upon to resolve the often conflicting forces which underpin contemporary urban life. There will always be a role for those adept at synthesising the pragmatic with the poetic – those able to address both the physical and emotional dimensions of shelter. Nomenclature notwithstanding, the ‘architect’, in some form or other, will remain a vital figure.

As educators we need to ensure our architects have an understanding and appreciation for the roles of specialist consultants along with the confidence to draw their disparate expertise together into a greater vision. Architects must be skilled to solve multi-faceted problems, working strategically across multiple scales and with an appreciation for the co-dependence of the whole and the part - the self and the system.

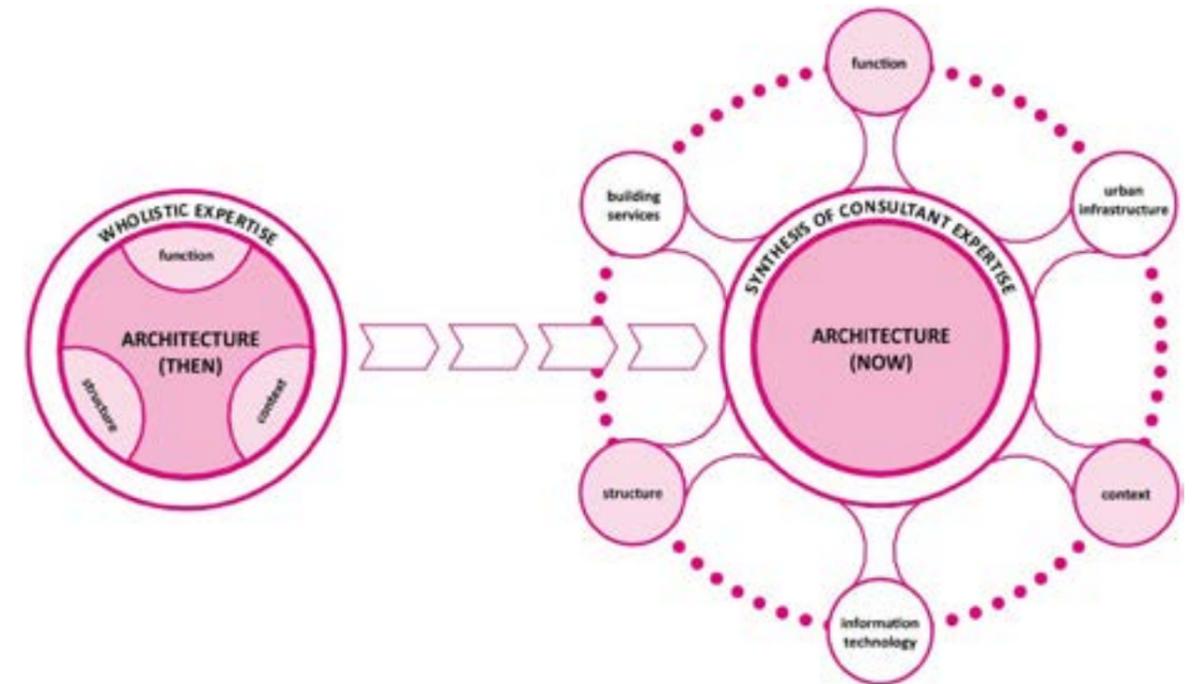


Figure 1': The Evolving Role of the Architect

THE DESIGN STUDIO

Through our design studios, we aim to foster broad, global-thinking problem solvers. At the conclusion of the semester, we expect our students to be versed and agile in the physical mechanisms (infrastructural, geographical) and cultural forces (political and social) that underpin urban existence, training them to look both to their subjective experience as well as outside themselves, to challenge the urban systems within which they operate.

To this end, our design studios are built around:

1. The Travelling Studio
2. Global Networks (The ANCB)
3. Systems Thinking

Together, these three facets of the design studio promote a more global comprehension of urban systems as well as encouraging students to draw upon subjective insight to develop incisive urban and architectural responses.

1. THE TRAVELLING STUDIO

At home, students are limited by a subconscious deference to an accumulated knowledge of their own city's inner workings and narratives. The travelling studio encourages students to explore urban opportunities with fresh eyes, re-invigorating an appreciation for both the subjective self and for the urban systems within which they operate.

Stripped of well-worn reference points, the foreign city is laid bare to the student. They come to sense the city's unconscious – its undercurrents – developing instincts for the manifold cultural forces that drive a place. Unlikely insights are magnified by ignorance. This heightened subjective state is fertile ground for originality, equipping them with new tools for urban invention.

The studios begin and end in Melbourne, with a period of design work in the foreign city. Geographically and culturally, students are subjected to states of both distance and proximity. At times they are geographically close and culturally distant; at other times, culturally close and geographically distant. In this way the studio attempts to alternate between objective analysis and subjective insight, objective insight and subjective analysis, developing schemes which are based in real-world issues but with the insight of a certain 'subjective distance'.

Importantly, upon returning home, students have learnt the value of treating their home city as a foreign place. They have learnt to more carefully interrogate the cultural assumptions underpinning their work, understanding the value of deeper self-analysis in order to more meaningfully engage with the urban systems around them.

2. GLOBAL NETWORKS (THE ANCB)

Many urban problems have universal commonalities. As such, it is particularly valuable for students and their teachers to be exposed to the issues facing the rest of the urban world. To date, both of our RMIT design studios have spent three weeks at the ANCB campus in Berlin. The ANCB program provides an excellent template for a more global education model, calling on students to confront familiar issues in unfamiliar territories.

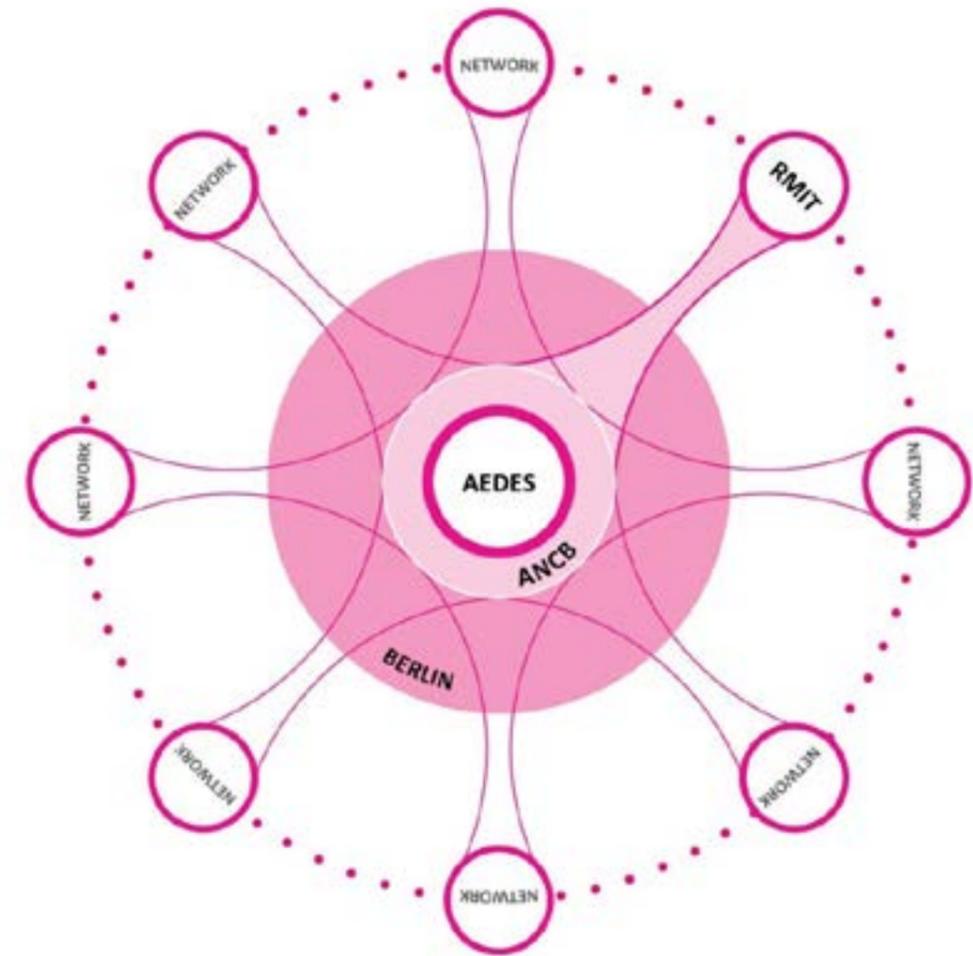


Figure 2?: Founded by Aedes Galleries, the ANCB is a Berlin-based network of international universities.

Established in 2009 by Aedes Galleries, the ANCB has approximately 20 partner universities of which RMIT is one. The Aedes group are highly active in architectural and urban discourse, with an extensive annual program of exhibitions, talks, publications and symposiums. Here, students are exposed not only to the city of Berlin, but to the ideas of architects, urbanists and other specialists from all over the world.

As such, running a design studio at ANCB often involves participating in a broader discourse. Over the course of our involvement with ANCB, we have participated in exhibitions, contributed essays for publication, moderated conference panel discussions, conducted live interviews with international practitioners and critiqued other visiting architecture schools.

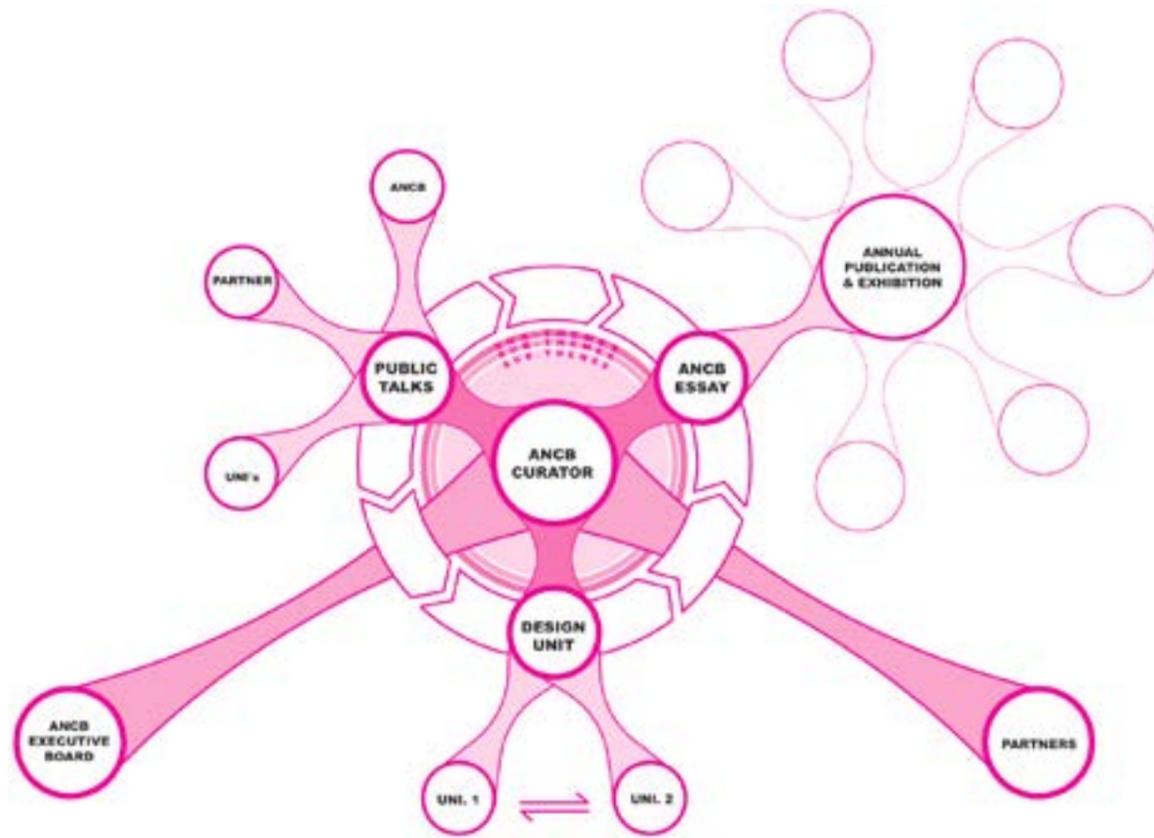


Figure 3³: ANCB Pedagogical Structure Diagram

This exposure to a global discourse expands the breadth of design approaches our students bring to bear on their own projects, further encouraging students to challenge assumptions about their own cities and about their own approach to design.

3. SYSTEMS THINKING

Contemporary cities are comprised of a complex web of social, technological and environmental systems. In order to meaningfully engage with cities, we believe architectural teaching must foster systems thinking. Where historically educational models have typically focussed on the sculptural, material and aesthetic dimensions of architecture, we think the contemporary studio leader should also encourage students to interrogate the various systems underpinning their design concerns.

In the design studio, we encourage students to identify broader social and infrastructural challenges, and to address these challenges through specific,

considered design responses. Key to our approach is an appreciation that carefully considered interventions, however small, can have broad reaching implications on the culture and operation of a city.

In order to more fully interrogate urban systems, we often encourage students to explore temporary and provisional interventions. Engaging students with *the ephemeral* allows them to abandon the architectural myth of permanence, understanding that our cities are in a perpetual state of systemic transition. In this environment, students seriously entertain design proposals which may otherwise be considered frivolous or irreverent. It asks that students pay careful attention to the cracks in possibility, encouraging them to seek out unique urban opportunities.

Under our guidance, students have tasked themselves with tackling such issues as transport systems, food production, tourism and environmental waterways, while developing an awareness for finance models, government legislation and cultural responsiveness. In each case, our design studios have involved the direct input from local governments, activists, academics, user-groups and environmentalists in order for students to more fully understand the implications of their design proposals.

CASE STUDIES

The following case studies draw together our pedagogical approach as outlined above. In each case, the design provocation was developed in response to concurrent themes under exploration at the ANCB. Each was loosely structured according to the following:

Pre-travel (Melbourne)

- Abstract esquisse exercises addressing the broader studio themes – *self & systems exploration*
- Specific research into Berlin's history, politics, infrastructure etc. – *systems exploration*
- Cultural investigation into Berlin through its depiction in film, art and literature – *self exploration*

- Abroad (Berlin)
- Collation of initial observations through site and self-analysis exercises – *self & systems exploration*
- Development of self-directed design briefs, drawing upon developing concerns – *self exploration*
- Exposure to local governance bodies and organisations – *systems exploration*
- Development of design responses

CASE STUDY: LATENT URBANISM

ANCB Catalyst: Re-act Lab workshop, symposium & exhibition focussing on informal urbanism.

Studio Provocation: When Conrad Schumann left his post guarding the Berlin Wall, choosing instead to throw down his rifle and make a leap for Western liberty, he became more than just a symbol of Cold War defection: he became the first *Latent Urbanist*. Seizing opportunity in an increasingly inhospitable city; exercising his rejection of systemic urban division; he demonstrated how small, carefully considered action, enacted where the fabric of our cities are most fragile can have the most potent consequences.

This studio shares that dream: to realise what lies dormant, both physically and culturally in the city of Berlin. It addresses Berlin's urban in-betweens, focussing on its squats, riverbanks, communes, rooftops, no-man's lands and under-crofts as sites for physical, cultural and political appropriation.



Figure 44: Conrad Schumann leaps for liberty. Like steam condensing to water, Schumann underwent a profound 'urban phase change', releasing latent cultural energy to his environment.

Broader Discussion:

- Participation in Re-act Lab workshops and symposium at ANCB
- Social housing talk by Dr Jochen Hucke from the City of Berlin
- Guest presentation by Platoon 'social mobilisation unit'
- Guest presentation by Berlin urban activists Raumlabor
- Tour of Berlin squats by Anna Tweeddale

Student Project: Sergei Netchaef

Sergei Netchaef undertook the following exercises before developing his own brief for the final design project. Variations on these exercises were undertaken by all students:

- Researched approaches to distributed urbanism
- Researched Berlin's history during the Weimar Republic
- Analysed Berlin through the lens of the film 'Goodbye Lenin'
- Undertook mapping exercises analysing Berlin's rental markets, the relative web-presence of Berlin's various districts and the subjective inclusivity/exclusivity of select Berlin destinations
- Developed a distributed scheme of culturally symbiotic tourist hubs
- Developed a condensed, centralised alternative to his distributed scheme, attempting to address any systemic urban concerns with a traditional, singular building

Through a highly personal mapping exercise, Sergei identified that a sense of social inclusion and activity could be achieved simply by demarcating a site for public use. He experimented with this idea by marking a simple square on the pavement and observing how groups of people engaged with this new space. Growing out of his observations, Sergei set himself the task of developing a project that would cater to the needs of Berlin's newest arrivals and long-term cultural tourists. Embracing the city's proclivity for provisional structures and urban appropriation, Sergei's project proposed a series of modular units able to be adapted to the changing requirements and social makeup of its users. His project was a successful marriage of personal insight and systemic analysis.



Figure 55: Sergei Netchaef's social experiment with demarcated space

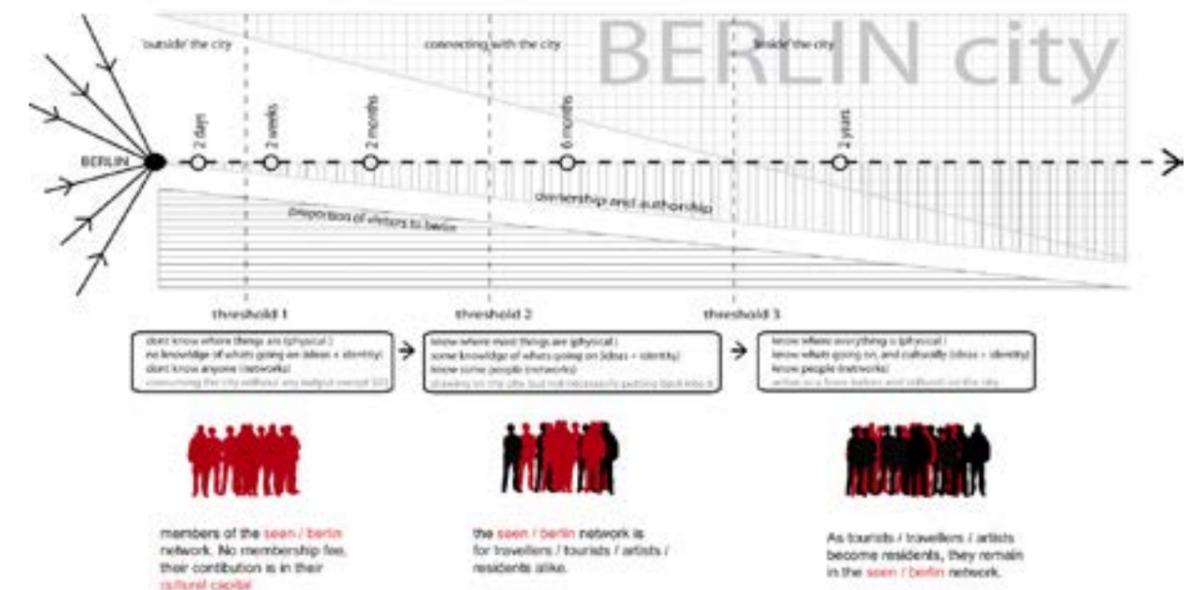


Figure 66: Sergei Netchaef's analysis of social integration for Berlin's transient populations

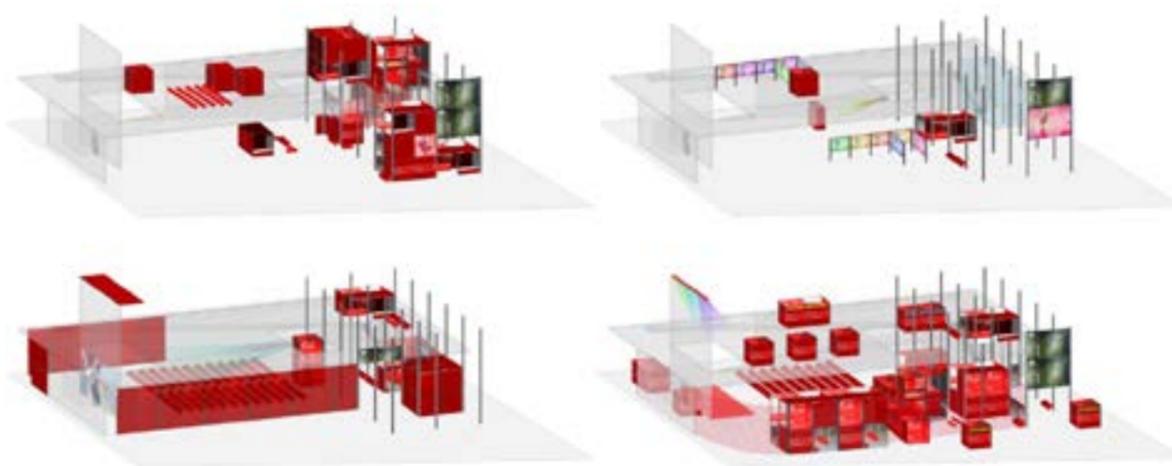


Figure 77: Sergei Netchaef's adaptable, modular design proposal

CASE STUDY: WATERSHED

ANCB Catalyst: 'Water: Curse or Blessing' – international symposium and exhibition exploring waterways in urban environments throughout the Asia Pacific.

Studio Provocation: The Spree River has played a unique role in shaping the city of Berlin, becoming a symbol of former east-west division as well as more recent reunification. Even today, the Spree is the site of countless cases of contested land, where the battle between Berlin's cultural and commercial aspirations are played out. Here Berlin witnesses riverside feuds where not-for-profit cultural organisations go head-to-head with large development corporations. In many ways, this is a battle that goes to the historic heart of Berlin's socialist and capitalist ideals.

This studio examines rivers in their natural, agricultural and urban environments. Specifically, it considers how rivers have shaped our civilisation and how, in turn, we have shaped them. Students enrolled in this studio will be studying two distinctly different river conditions: the largely agricultural/natural river systems of Australia, and the very urban condition of the Spree River in Berlin, Germany.



Figure 88: Spree River, Berlin

Broader Discussion:

- Historic and cultural tour of Spree River by Ralf Wolheim of Inpolis
- Guest presentation by Takis Sgouros from City of Berlin discussing Spree development projects
- Guest presentations by Sally Below of Spree2011 and Spree activists Carsten Joost
- Guest presentation by Daniela Konrad from TU-Berlin exploring current and historic design proposals for the Spree River
- Moderation of panel discussion for international symposium, 'Water: Curse or Blessing'.
- Contribution of published essay to 'Water: Curse or Blessing'.

Student Project: Shann Yong

Shann Yong undertook the following exercises before developing her own brief for the final design project. Variations on these exercises were undertaken by all students:

- Researched relationships between waterways and man-made environments
- Researched Australia's Bulloo-Bancannia catchment division near the town of Quilpie
- Studied the site specific and ephemeral artworks of Andy Goldsworthy
- Developed a scheme of floating, nomadic birdhouses to highlight the ephemeral waters of the Bulloo River, embracing the river as a wild, natural force.
- Developed an artificial ring-shaped waterway as a flood protection mechanism, exploring humankind's exploitation of rivers.
- Analysed Berlin through the lens of the film 'Germany, Year Zero'
- Researched Berlin's history in the period since reunification
- Researched the Spree River's historical role in agriculture and industry

Through her early exercises exploring Australia's Bulloo River, Shann became interested in ephemerality and the nomadic and migratory patterns of river inhabitation. Continuing this theme, Shann identified Berlin's sizeable transient population and the prevalence of temporary and opportunistic land appropriation along the Spree River. Drawing these personal interests and observations together, Shann developed a proposal to develop the Muhlendamm Lock as an accumulation of riverside uses, drawing together an assemblage of river-craft and debris to create 'a new social condenser on the river that grows with the city'. Shann's personal interests in ephemerality and nomadism along with her analysis of Berlin's waterways, allowed her to identify a unique opportunity in Berlin's urban landscape.



Figure 9⁹: Shann Yong's study of ephemeral lakes along the Bulloo River, Australia

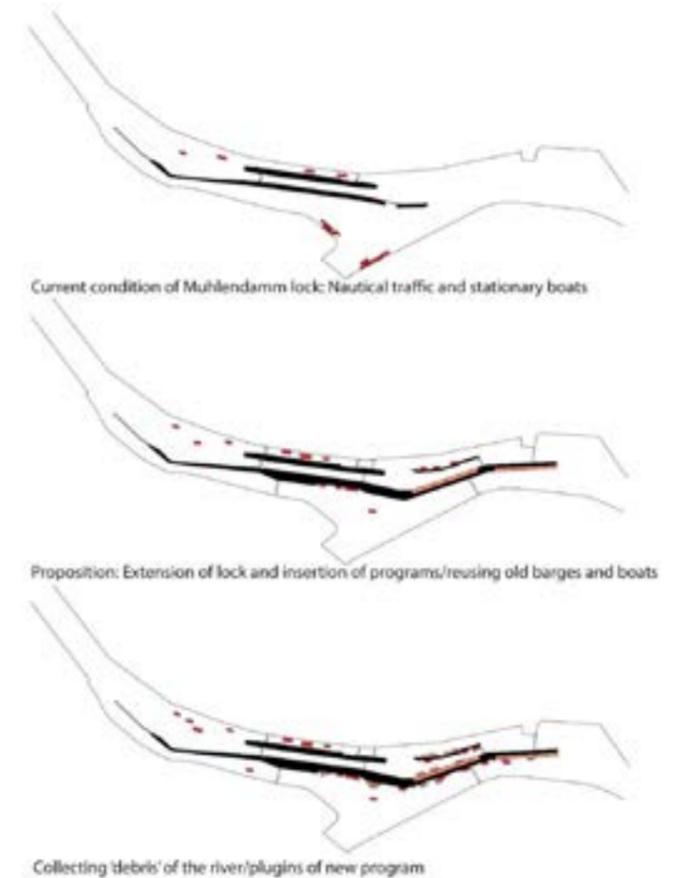


Figure 10¹⁰: Shann Yong's design diagrams for the Muhlendamm Lock, Berlin



Figure 11¹¹: Shann Yong's design proposal for the Muhlendamm Lock, Berlin

Endnotes

- 1 Diagram by James Staughton & Michael Roper, 2013
- 2 Diagram by James Staughton & Michael Roper, 2013
- 3 Diagram by Michael Roper and ANCB, 2009
- 4 Original photograph by Peter Leibing 1961, Artwork photographed on the Berlin wall by 'Ask me about loom', found on <http://www.flickr.com/photos/strippeybaz/> 2013; Modified image by Michael Roper, 2013
- 5 Photographs by Sergei Netchaef, RMIT, 2010
- 6 Diagram by Sergei Netchaef, RMIT, 2010
- 7 Images by Sergei Netchaef, RMIT, 2010
- 8 Berlin Map. Google Maps. Google, 16 August, 2013. Web. 16 August 2008.

9 Image by Shann Yong, RMIT, 2011.

10 Image by Shann Yong, RMIT, 2011.

11 Image by Shann Yong, RMIT, 2011.

Biography

Michael Roper is a director of Melbourne-based practice Architecture Architecture. As an active participant in the broader design culture, Michael engages in research, media, education, exhibition and publication and has been a regular contributor to architecture journals as well as broadcasting on Triple R radio's The Architects. Michael has taught extensively both in Melbourne and abroad and was the founding Program Manager of the ANCB campus in Berlin where he maintains an active role.

James has completed both a Bachelor of Planning and Design and a Bachelor of Architecture at the University of Melbourne, graduating with honours in 1994. This was complemented by a Diploma of Design from the Danish International School in Copenhagen in 1991. James is registered as an architect in the State of Victoria, is an active member of the Australian Institute of Architects and is an accredited Green Star Associate with the Green Building Council of Australia. In 1999 James co-founded the multi award winning partnership Staughton Architects and merged with Anthony Styant-Browne Architect to form Workshop Architecture in mid-2008. James has operated in the dual roles of Design and Project Director during this time having worked with various clients in the residential, institutional, commercial, urban design and public art sectors. James is a keen contributor to both the architectural profession and to architectural education. He is currently chair of the AIA Awards Taskforce, has sat on award juries as both member and chair. He is also a member of the Architect Victoria Editorial Committee and was a long-time member of the AIA Sisalation Prize Steering Committee, which directed the annual publication of the Take architectural research journal. James is a regular guest critic and design studio leader at both the University of Melbourne and at RMIT University and has also taught at both Monash University and Deakin University.

PEER TO PEER PEDAGOGY/ PRACTICE

EDMUND CARTER & JOHN DOYLE
RMIT UNIVERSITY & INDEX ARCHITECTURE

**DESIGNING/
EDUCATION**
CONFERENCE

THE FUTURE OF PRACTICE

Abstract

In 2009 a small website was developed for a Masters Design Studio at RMIT University. The studio was examining information driven approaches to generative architectural and urban design at a series of sites in Melbourne. The studio called for an intense period of empirical contextual mapping. The website allowed students with smart phones to log on from any location on the site and enter, classify and record information about a site. Over time a complex map was constructed with more than a thousand points of data recorded, which was later developed into a series of design proposals.

The development of this small, prototypical website reflects the reality of contemporary architectural practice and, increasingly, architectural education. Architectural practice has become increasingly decentralised, with projects carried out simultaneously across continents, connected by open source information sharing platforms - exemplified in UNstudio's new 'open source' practice model. Only recently the idea of a Facebook group in order to chart, curate, collate and communicate progress, ideas and commentary was foreign to many. Today, it is common place.

With the advent of the 'Itunes University' and the rapid expansion of online delivery of educational content, the established structure of the design studio has been challenged. With students increasingly engaging remotely, we speculate that the future of the design studio will be one that is perhaps best embodied in the idea of a "peer to peer" network topology. Information is ungoverned and unregulated, and student work becomes independently assessed, balanced and adapted outside the conventional role of the tutor as a guide or teacher. This paper will explore, through examples of studios staged between Tokyo and Melbourne, involving four universities, the potential for an open source model of architecture studio and its potential impact on the future of design practice.

Education evolution

The context in which design studio teaching takes place is in a process of change. Over the last two decades with the development of rapid communication infrastructures and the rise of the internet, the way in which students across all disciplines engage with higher education has irrevocably changed. As the potential for online platforms to deliver large quantities of high definition data in the form of lectures and other content, and facilitate interaction and discussion between learners and teachers through social media the physical presence of the university has been challenged along with the paradigm of face to face contact based teaching.

As a part of an increasingly competitive multi-trillion dollar industry, the higher education sector is under continual pressures to both increase efficiencies in the delivery of course content, as well as expand into new market places through the delivery of transnational and offshore programs. This has seen the emergence of new teaching structures geared towards the dissemination of content amongst a cohort of students that can number in the many thousands. The ultimate outcome of which is the development of the Massive Open Online Course (MOOC), which while initially developed as free to use systems, are rapidly being commodified through online marketplaces such the iTunes University, that provides an easily accessible graphic interface that is pitched at a broad base of users.

Online education versus the design studio

While these systems may work for 'one-way' systems that ape the structure of lecture based courses such as economics or engineering, the it becomes extremely problematic when considered in relation to the model of design studio teaching that has become prevalent since the advent of the modern architectural degree. While doubtless there are a great many variants on the model the design studio is primarily organised around what Donald Schön described as 'prototypes of individual and collective learning by doing under the guidance and criticism of master practitioners.' (Schön, 1985). As the name suggest the design studio is generally considered to be a physical place in which the learning method can be described as 'reflection-in-action,' (Schön, 1985) through which students engage in one or a series of iterative simulated tasks for which they receive critical review and feedback. As Schön describes, 'design is learnable but not didactically or discursively teachable.' Accordingly, the role of the teacher in a studio 'space,' is primarily that of a guide or demonstrator that is familiar with the approach and critical context of a given design question.

While the ultimate outcome or product of a studio project is valued, for the duration of an engagement the primary focus of the studio leader is on the deliberation and decision making that underpins a student's design process. Consequently, the culture of the design studio is inextricably connected the idea of a close 'feedback loop' between a student, their colleagues in the studio and the studio leader.

Conventional understandings of online educational platforms are often that they fail to meet the inexplicit and often open-ended ambitions of the design studio, much less establish a 'feedback loop'. This is a reflection of the architectural design process which is underpinned by precise, tactile considerations of material and scale (considerations that may not naturally be associated with digital environments), and also of the clumsiness of a raft of digital platforms which have been overly restrictive or unnecessarily complicated. Indeed, internet message board software has been around for over a decade yet remains decisively chronological in the way information is handled and displayed, and 'wikis', which are almost diametrically opposed in their functional character, are often without a sufficient or familiar structure and awkward to operate and maintain.

Contemporary digital trends, including the 'web 2.0 ' and 'cloud computing' phenomena reflect a shift towards functionally oriented, content driven online platforms that are easy to access initially and grow with the individual, adapting and expanding in capacity as required allowing the user to learn the interface through using it, rather than being taught. This behavior is fundamentally synonymous with expectations of design education and it is an accordant expectation that digital tools, as they continue to trend in this way and accompanied by an evolutionary increase in literacy amongst students, academics and practitioners alike, will only lend themselves more to the design studio context.

A shift in the practice paradigm

While the design studio remains embedded in a place based or face to face understanding of pedagogy, the landscape of contemporary practice has shifted considerably over the last 20 years. The international property boom leading up to the global financial crisis of 2008 was primarily driven by the rapid expansion of cities in developing regions such as China and the Middle East. Through this period the practice of architecture became increasingly internationalised, with firms seeking opportunities to build outside of their own domestic marketplace it has become common place to engage in speculative work abroad. Despite ever expanding range

of intercontinental transport connections, the challenge of executing complex projects in an alien context remote from a practice's main office has necessitated the development of new technologies and more interestingly, new models of practice that embrace and make use of these constraints as a productive force.

The most obvious example of this are the raft of regional satellite offices that have sprung up to local presence for major European and North American practices. While these practices report back to a main office, they are usually semi or completely autonomous. As with the content management systems described above, the workflow is clearly defined, with scope of work portioned out and communication limited to primarily asynchronous reporting structures such as email. Teleconferencing supports less frequent face to face exchanges, however in all but exceptional circumstances these are not necessary for the functioning of the practice.

The alternative to this is the class of small distributed practice structures that have proliferated since the turn of the century. It was only as recently as 1995 that the idea of engaging in design dialogue via online structures was considered a novelty, perhaps best evidenced by the title of Greg Lynn's article on Ben van Berkel, which anachronistically celebrates itself as 'a conversation by modem.' (Lynn, 1995) In the years following a whole series of practices have emerged through formative years spent collaborating on competitions, speculative commissions and other design engagements, while operating in distributed workplaces and frequently geographical locations that are remote from one another. The distinction between this and more established modes of practice is that while some members of a given team might be collocated, frequently there is no main office or base of operations, meaning that the work of an office is decentralised and distributed. Design is carried out concurrently, or as is the case of practices split across large longitudes, as an iterative sequence defined by the working hours of each time zone.

The implications of this on the practice of architecture are significant. On a pragmatic level it allows for practices to operate with a minimal capital outlay, remaining small and efficient clusters that can effectively follow the work and are not bound to any one marketplace. Moreover it challenges the expectations of contextual specificity through the physical presence of the designer, which is taken as

granted in most design schools, and legally mandated by professional architectural conventions.

In design terms the outcome of decentralised practice structures is a process of ideation and development that is extremely flat and non-hierarchical. Decisions do not proceed up a chain of command, but are collectively and simultaneously developed. In this way it is a model of a type of peer to peer practice whereby members of a team engage on relatively equal terms. While there is generally a degree of control in the form of a 'lead author' or responsible partner, frequently these roles are fluid and contingent on the specifics of a given project. For example, a particular partner in a network may assume a lead role for a project that is local to them, thus providing a recognisable point of contact for a client group. Figure 1 demonstrates such an arrangement, in this case the Network for Advanced Architecture & Urbanism, of which both authors are participating members.

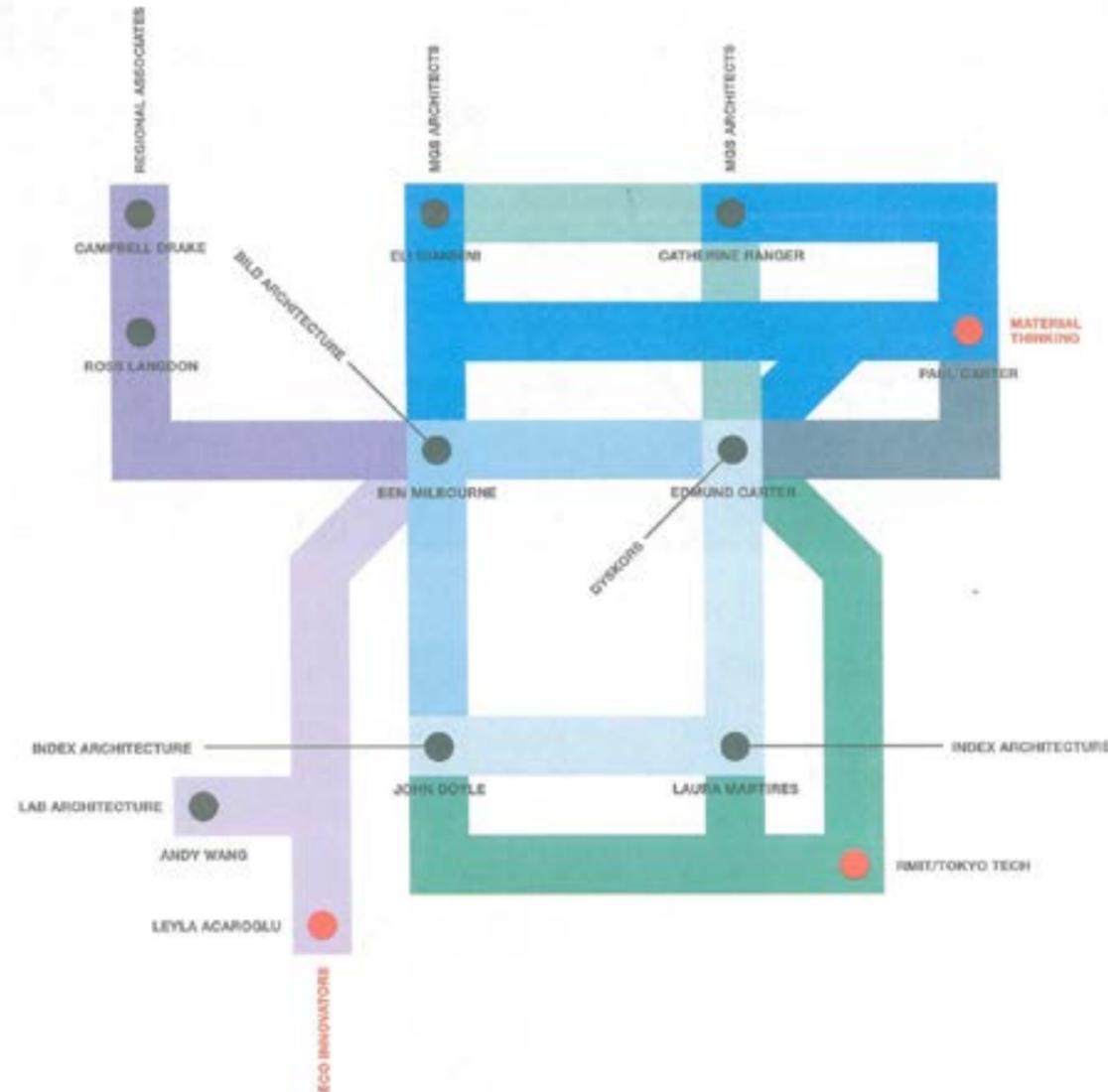


Figure. 1 - Peer to peer practice structure – Network for Advanced Architecture & Urbanism (INDEX Architecture, Bild Architecture, Dyskors et al.)

Many of the internationally recognised practices that emerged over the first decade of the 21st Century, began their lives as an extended series of cross-continental collaborations connected through an informal network of instant messaging systems, skype, email and file sharing through ftp. Beijing based MAD Architects emerged in the early 2000s through a series of competition projects that were undertaken between partners Ma Yansong and Yosuke Hayano, who were carrying out studies in New York and London respectively. They continue to work in different cities, with the Tokyo office supporting Hayano’s ongoing teaching commitments in Japan. Similarly the emerging Australian-UK practice, Regional Associates has carried out a series of projects in Europe, Africa and Oceania with its directors located at opposite

sides of the world. As a small practice with little or no staff, the majority of the work is carried out by the principals and yet through this collaborative network it has been possible to design, document and deliver several projects in remote and highly sensitive environments. This is best typified by the Kyambura Lodge (Figure.2) that was carried out while the partners were located in three different countries, while all contributing to the work.



Figure. 2 – Kyambura Lodge, Uganda by Regional Associates

How practice can inform pedagogy

Within architectural design studio pedagogy systems of information sharing and networking are becoming increasingly prevalent. The most obvious application for communication and sharing platforms is through international multi-institutional design projects. While face to face travelling workshops and symposia have increasingly become a part of these engagements, as is the case with practice, it is usually not practical to spend the extended period of time on location that are necessary to properly engage with a research or design task. As such it is essential to have mechanisms in place to capture and record the ongoing work of remotely located student cohorts, effectively providing opportunities to share and review each other’s insights.

The structure of sharing

An example of this can be found in the Urban Futures website (Figure.3), which was established to support a series of international travelling workshops loosely organised around the investigation of emergent approaches to urbanism and urban architecture. The website features background information, a blog structure to document ongoing events, and a categorised gallery space that allows participants to populate the site with image and text fragments of their research and design production. While obvious this gives a showcase to the glossy outcomes of design studio projects, more importantly it provides a vehicle whereby students can see the work of their colleagues located internationally, provide feedback and potentially converse through the contribution of their own work.

This structure was initially put in place for a travelling workshop to Tokyo during the Australian summer of 2011-2012. The workshop included staff and students from both RMIT University and Tokyo Institute of Technology, and speculated on the future of a much loved entertainment district in Tokyo's Shinjuku district. The actual time on the ground was fairly limited, with students expected to complete a large scale design project in 10 days. With this in mind, students were asked to develop a dossier of information about the site and design approaches to massive densification prior to start of the workshop. The website structure provided a mechanism through

which the students based in Japan could upload their initial site research, for the benefit of the RMIT cohort. Similarly, the Tokyo Tech students could keep track of preparations being undertaken in Melbourne, with the contents of preparatory research and the contextual design esquisses uploaded into the website's gallery. Considering the extremely minimal capital outlay required to establish the system, it operated successfully as a tool of collaboration and knowledge exchange.

Simultaneously in the world of practice the concept of the open source studio is one that is gaining some currency. This year UN Studio re-launched its practice as what they describe as 'an open knowledge-based practice.' (Boyer, 2013) This has involved opening the practice up to outside engagement through an online platform (Figure. 4). Through this new structure the public are able to create a profile through which it is possible to publish ongoing architectural work and research to be shared amongst the members of the knowledge community, as well as contribute towards the work being undertaken.

"Our aim (is) to encourage a co-creative approach to architecture; one which intensifies knowledge and ultimately results in a more responsive architecture born of innovation through co-creation." (Boyer, 2013).

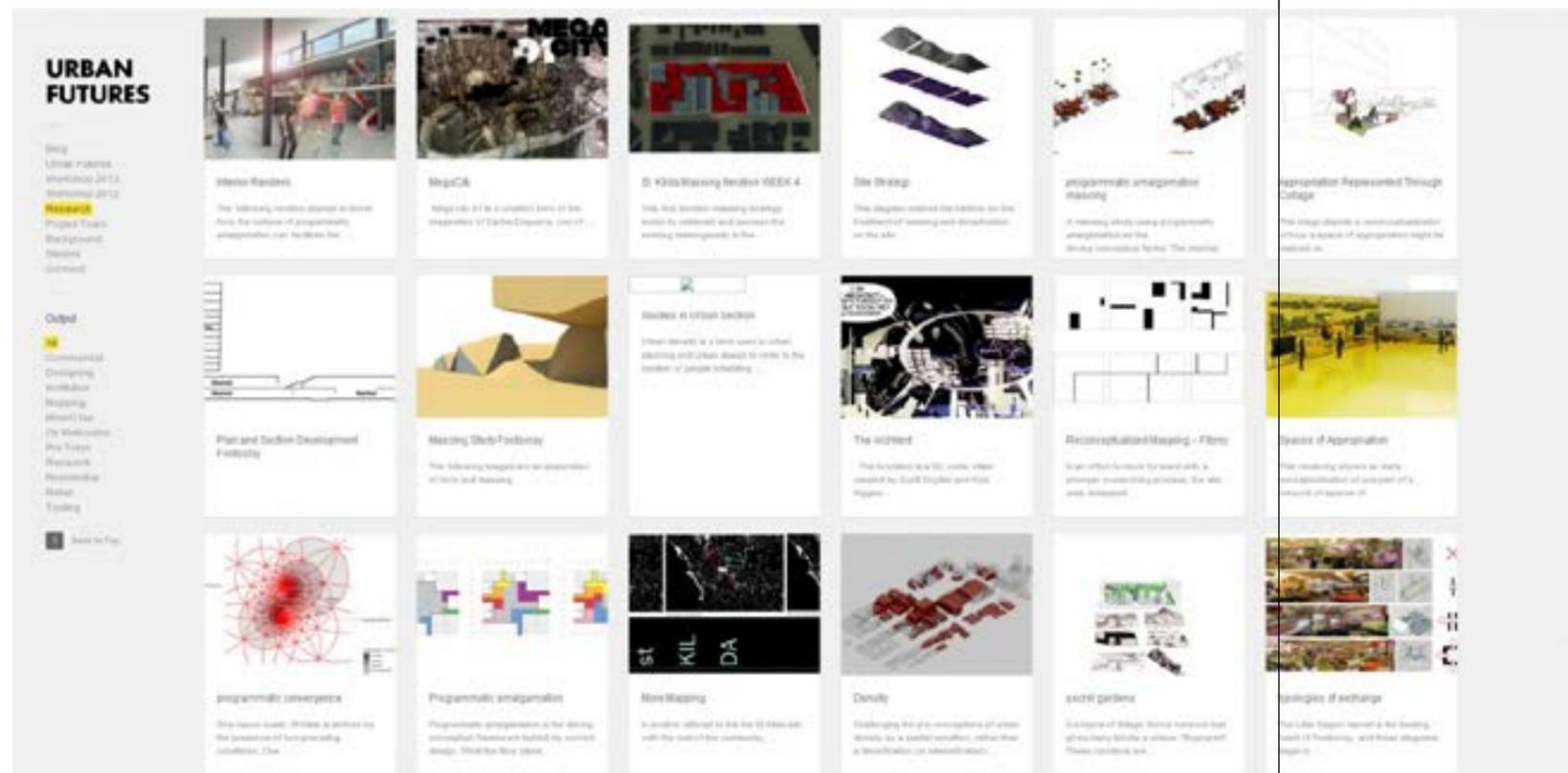


Figure. 3 – Urban Futures Website showing student generated content from a workshop in Melbourne.

This is indicative of a broader shift in the attitude of practice away from a top down or hierarchical model towards an acknowledgement of the fundamentally collaborative nature of the industry. Moreover, if the design studio is going to continue to be relevant it needs to be capable of incorporating and engaging with knowledge sharing structures.

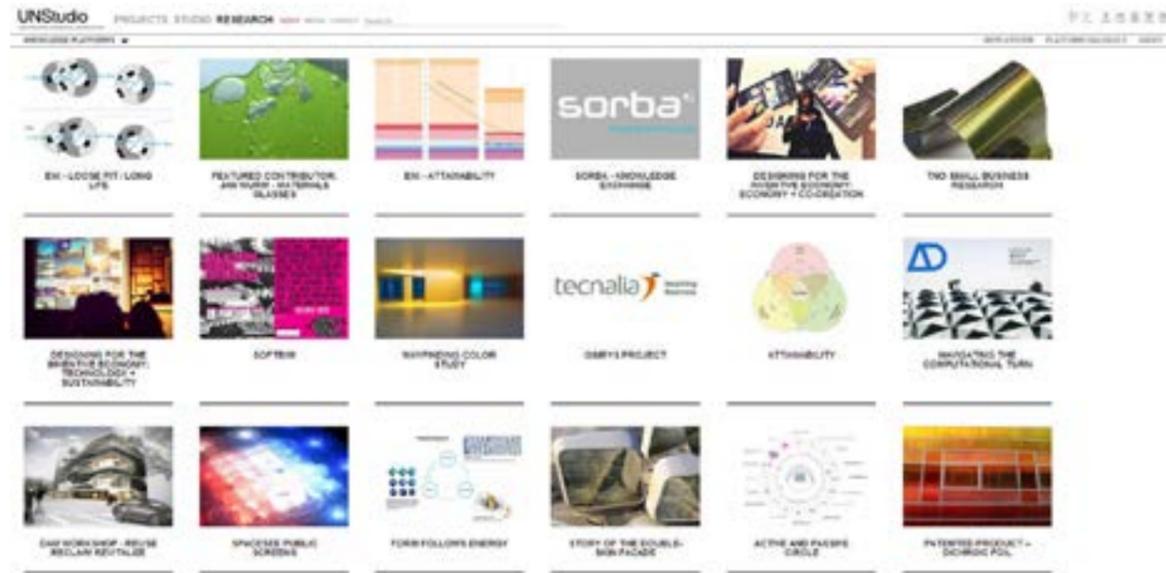


Figure.4 – UNstudio ‘Knowledge Platform’ is a website that allows for the sharing of projects and ideas.

Contributing to a common goal

In 2010 a design studio was commissioned at RMIT University that explored the speculation that urban environments and their complex, intertwined architectures, could be evoked and manipulated through the mapping and configuration of spatial and environmental data. The studio required students to visit a site in South Melbourne, record their findings, and then develop tools in order to turn this data into urban and architectural form, material and program. A particular challenge for the studio was having masters level students depart from their established assumptions of design, informed as it were by inherited aesthetic and architectural convention, and instead consider their role to be one where they became a ‘choreographer’ of information.

As part of the studio, and in response to the prevalence of internet-accessible mobile phones, a small website was developed by the studio leaders which allowed the

students to record this information on site. By accessing the integrated GPS function of the phone (commonly used by websites to provide directions) the location of the specific data entered could be cross referenced against not only date and time, but against other data entries occurring both concurrently and at later dates. In this way, and as evidenced in Figure 5 which shows the single step process of entering data, a complex tapestry of data pertaining to environmental factors such as light, wind and sound, and to anecdotal observations such as traffic and pedestrian population, were recorded. The resultant information was indexed against its type and available to all students as a spreadsheet.

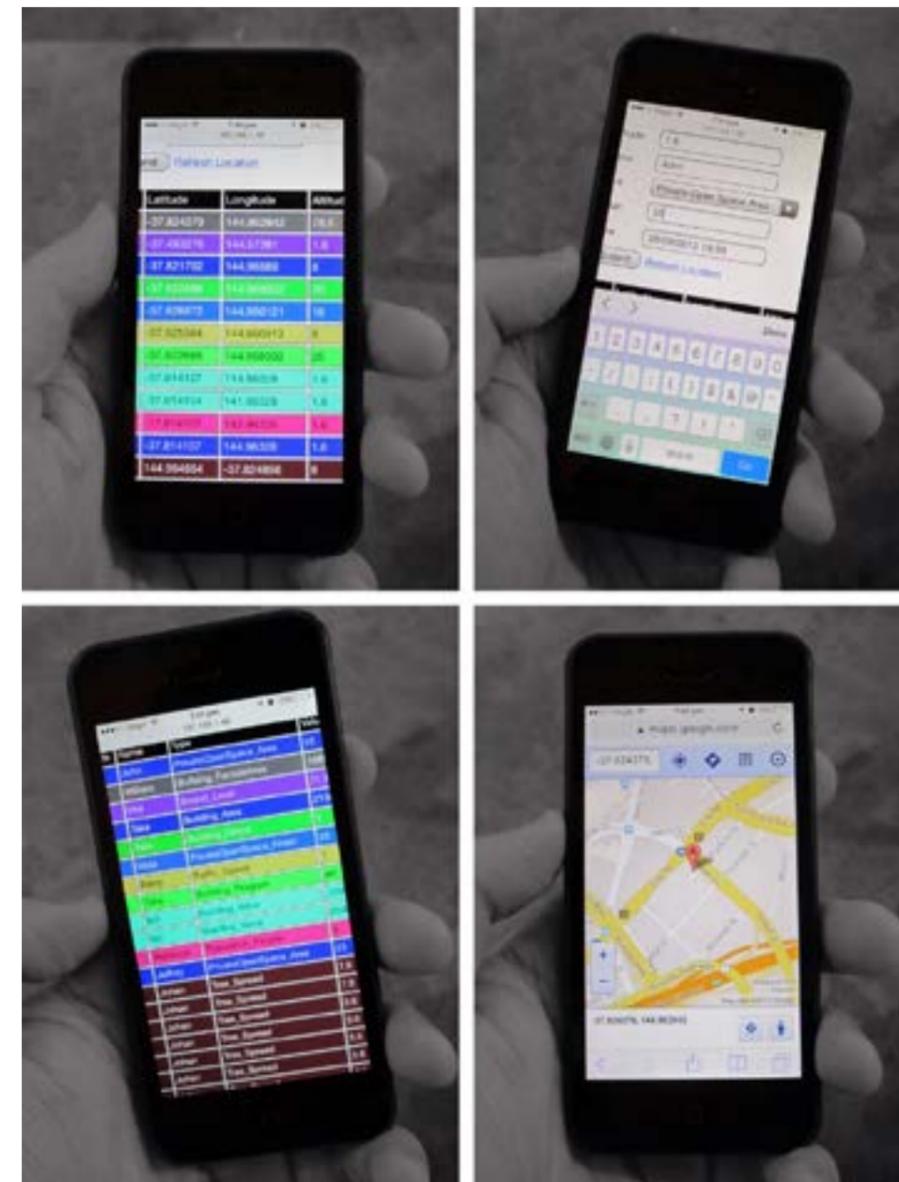


Figure.5 – Data entry using the Field Tactics website.

Aside from the obvious efficiencies of data gathering, working in this way allowed students a complex state of ownership over their design and over the studio outcome whereby their competence and comprehensiveness in mapping and recording data provided them with the credentials to deliver a project of greater sophistication. Working in parallel with their colleagues afforded them the opportunity themselves to be privy to a vast amount of information not normally accessible to the individual without the perceptual constraints of ownership associated with group work. While it was not explored, the ability of modern phones and tablets to resolve a number of inputs (and simultaneously decode these inputs into spatial conditions as is the case with the Poppy3D iPhone device) further enriches the possibility of this as an approach that fosters collective ownership, non-hierarchical self-empowered agency and, ultimately, a greater degree of integrity in the design outcome. Figure 6 demonstrates the first attempt at corralling this information into a formal response, with data inputs geo-located and then assigned a volume based on the value inherited, while Figure 7 shows selected outcomes of the studio.

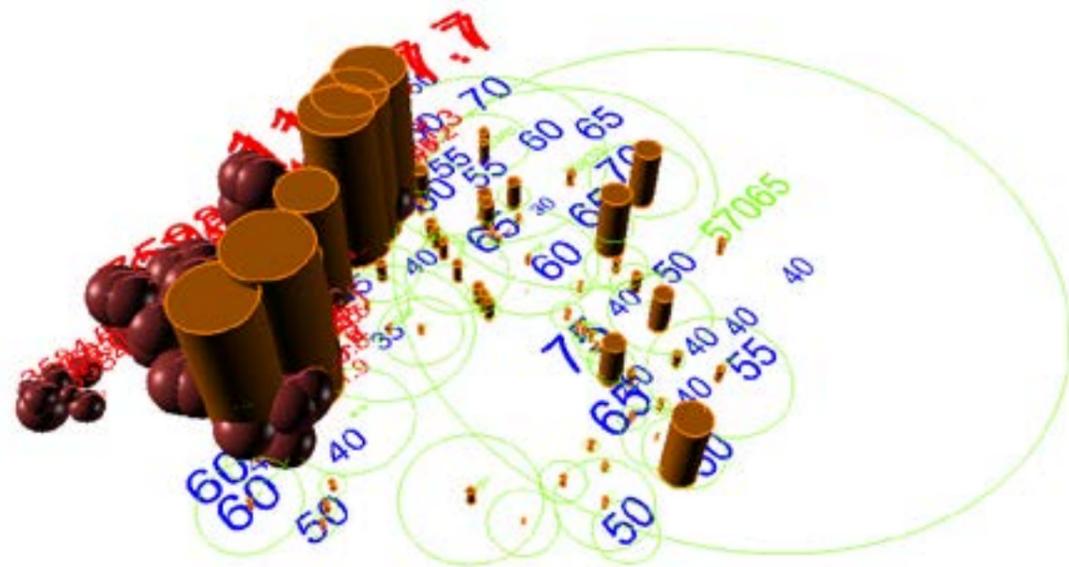


Figure. 6 – Field Tactics Studio - Initial Data Visualisation

This approach is also synonymous with models of crowd sourcing which rely on a transparent set of criteria and deliverables, minimal (but some) assumption of risk, a collective common 'good' and the receiving of 'satisfaction of a given type of need.' (Estelles-Arolas & Gonzalez-Ladron-de-Guevara, 2012) Given that this

approach results in additional student investment it is a particularly important conclusion, and also suggests that the role of the studio leader is one where they set a considered, appropriate and sufficiently interesting agenda in which to invest in and provide the means for students to be collectively empowered.



Figure. 7 – Field Tactics Studio – student work that explored the manifesting of recorded data as architectural design (students William Golding and Takasumi Iinoue)

Completely flat teaching topographies

The inexorable move towards the online delivery of content in education provides a unique opportunity to challenge the ontology of the design studio and more broadly the studio culture that underpins the practice of architecture. By moving from a hierarchical model to one whereby participants engage at an equal level the studio encourages participants to understand the design process as being fundamentally open and collaborative in nature. In this context, the challenge for the studio leader is in embedding a robust critical framework within the organisational structure of the studio, while retaining an open ended approach to ideational and technical approaches students choose to undertake. Architectural practice in the twenty first century faces a complex series of challenges and must be flexible and adaptable now more than ever. The value of collaborative, multi-faceted and multi-dimensional team structures is already reflected in the shift of the role of the architect away from the project leader or 'master craftsman' role and towards being embedded as a specialist alongside other specialists from a variety of disciplines, whilst still maintaining a

holistic understanding of the developmental context. It is imperative that this transition to flexible, globalized and collaboratively oriented structures be reflected in architectural education through the provision of opportunity for individual agency among students, open-ended nonhierarchical information sharing and networking and through an integration of already existing methodologies and techniques found in lightweight, adaptable architectural firms around the world.

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Biography

John Doyle is an Associate Lecturer at RMIT University and director of INDEX Architecture.

Edmund Carter is a director of Hinge Architects, Dykors and maintains teaching and research positions at RMIT and Melbourne Universities.

PROFESSIONAL PRACTICE AS A PART OF A DESIGN CURRICULUM

BRUCE ALLEN

BRUCE ALLEN ARCHITECT, RMIT & MONASH UNIVERSITY

**DESIGNING/
EDUCATION
CONFERENCE**

THE FUTURE OF PRACTICE

Abstract

The teaching of professional practice has historically been separated from the design studio and seen as a means of training students for the office so that they earn their keep in the shortest time possible after graduation. The courses have usually been run by outside practitioners with little involvement with design studio pedagogy.

An analysis of registration candidate's log books shows an average of 5.4 years experience between graduation and registration and over that time an average of 440 hours of contract administration. Graduates clearly do not need to be trained for contract administration when they are not required to do this work until after registration, which is likely to be at least 5 years into their architectural career. Any training would be out of date by the time it is required, however if the principles or theory of practice are incorporated into the curriculum it will be relevant for much longer. Also, Professional Indemnity Insurers require that unregistered staff not be given responsibility to administer contracts.

The proposition put forward in this paper is that only the theoretical aspects of professional practice should be covered in the academic curriculum and this should be more closely integrated with the design studio.

We need to educate students to manage change not memorise a set of practice notes. Students need to be encouraged to apply their creativity to new forms of practice and management. This is best done if professional studies are run with a series of parallel design projects where the emphasis is on practice theory, design process and implementation.

The practical and applied aspects of practice are better dealt with after graduation when graduates prepare for registration and are actively involved in the work place.

The practical and applied aspects of practice are better dealt with after graduation when graduates prepare for registration and are actively involved in the work place.

In my experience and from observation on many National Visiting Panels, Professional Practice teaching is seen as a necessity to satisfy the requirements to gain recognition by the Australian Institute of Architects and accreditation by Registration Boards rather than an integral part of the design process. The staff are usually sessional practitioners who do not participate in the collegiate environment of the schools and are quite distant from the activities of the design studio.

The proposition put forward in this paper is that only the theoretical aspects of professional practice should be covered in the academic curriculum and this should be more closely integrated with the design studio.

In reaching this position I analysed the logbooks submitted by candidates seeking registration in Victoria in April 2013. There were 115 candidates of which 38% were female and 62% male. The average age was 29. The average length of experience was 5.45 years after graduation. This is shown in Figure 1. The average number of logged hours was 4,798 and the average number of hours spent on contract administration was 440, only 9% of work experience time. Figure 2 illustrates the breakdown of time spent for each of the mandatory competencies required for registration. As can be seen on Figure 3, 70% of candidates have less than 500 hours experience in contract administration over the first 5.45 years of their career.

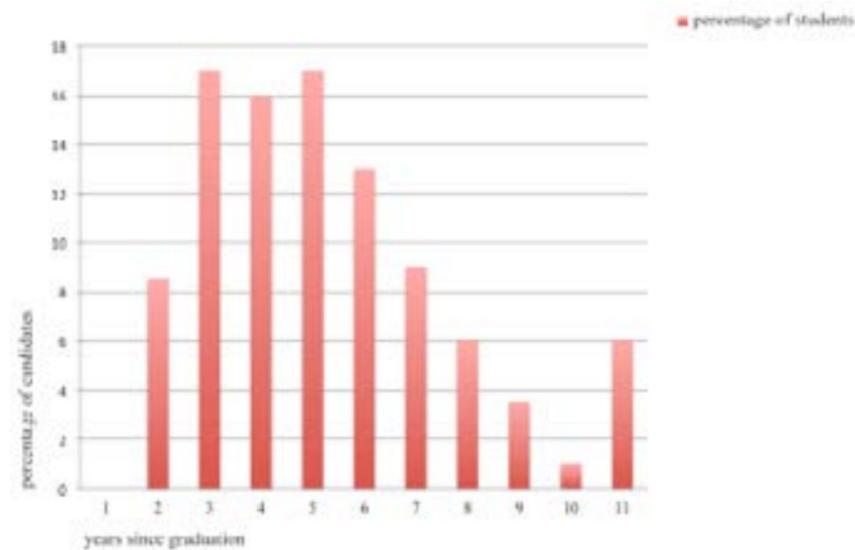


Figure 1: YEARS BETWEEN GRADUATION AND APPLICATION FOR REGISTRATION Victorian Registration Candidates, April 2013.

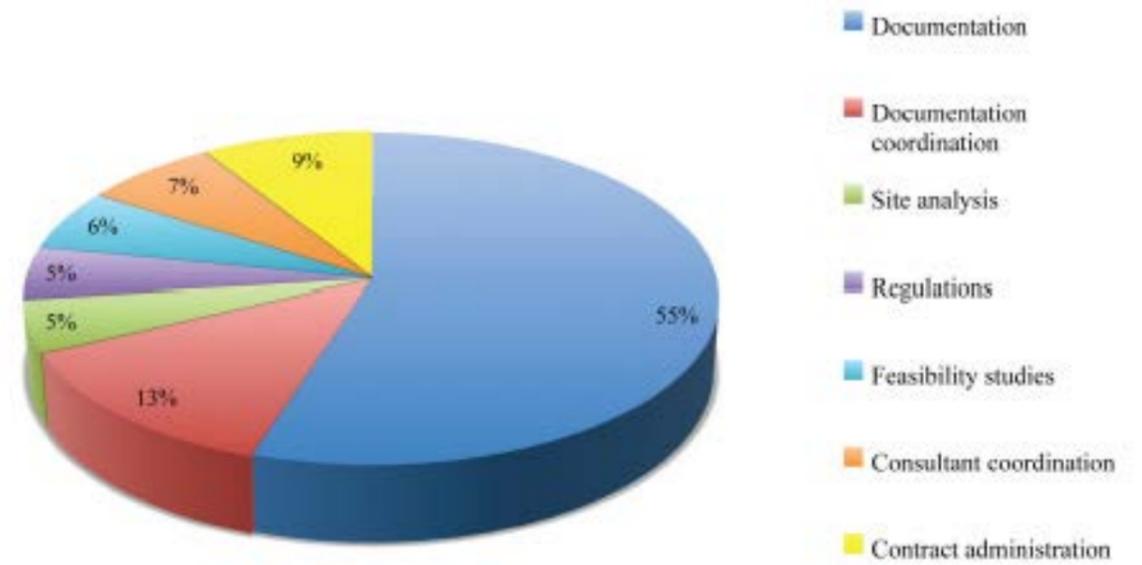


Figure 2: PRACTICE EXPERIENCE RECORDED IN LOG BOOKS Victorian Registration Candidates, April 2013.

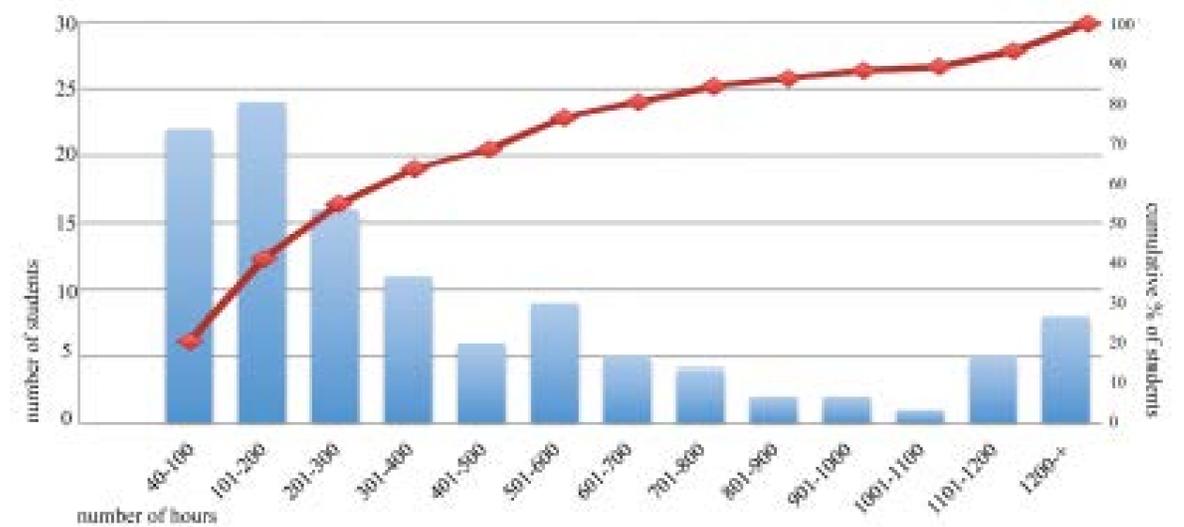


Figure 3: CONTRACT ADMINISTRATION EXPERIENCE Victorian Registration Candidates, April 2013.

My interpretation of this data is that time spent training students in the routines of office practice and contract administration is wasted because these skills are not required for the first few years of employment and by the time the graduate is registered, new systems will be in place.

Most would agree that it is desirable for students to spend time in an office during their course to observe the design process in action and the practical challenges involved with converting a concept into a completed project, Unfortunately many students are unable to obtain this experience.

A survey of final year students at RMIT University and Monash University in Semester one of 2013 showed that 33% and 47% respectively have not set foot in an architect's office. A summary of experience is shown in Figure 4.

OFFICE EXPERIENCE OF FINAL YEAR STUDENTS

EXPERIENCE (months)	RMIT UNIVERSITY % of students	cumulative %	MONASH UNIVERSITY % of students	cumulative %
0 months	33%	33%	47%	47%
6 months or less	30%	63%	26%	73%
12 months or less	5%	68%	5%	78%
24 months or less	13%	81%	17%	95%
over 24 months	19%	100%	5%	100%

Figure 4: OFFICE EXPERIENCE OF FINAL YEAR STUDENTS, RMIT University and Monash University Students, 2013, (Note: No distinction is made between part time and full time work.)

The problem with the training approach to professional practice teaching is that the curriculum is based on how things are done now and in the past rather than how they will be done in the future. The curriculum has also been based on how things 'should' be done which seldom aligns with how things are actually done in practice. I tell my students that if they follow every paper trail process established by the AIA Practice Notes or Acumen, they will go broke.

So we run the risk of teaching the history of practice and not preparing students for the future. We need to educate students to manage change, not memorize a set of notes. No two firms use the same systems for running a practice or a project so it is futile training them to follow a rigid management system.

In my office I prefer to introduce new graduates to my way of running a practice and projects and do not expect them to arrive with the necessary skills in this area. My experience has been that new graduates are intelligent and pick up procedures very quickly.

What would a new model look like?

I suggest that, using the mathematics analogy, professional practice should be divided into 'pure and applied' streams. The theory or 'pure' stream should be included and expanded in the academy curriculum and the 'applied' component picked up after graduation and before registration.

A similar model is available with the legal profession. The Leo Cussen Centre for Law provides a Graduate Diploma in Legal practice and describes its mission as 'beyond theory'. The practical training course (PTC) trains graduates for admission to the legal profession. The course is designed to achieve understanding and competence in the National Competency Standards for entry-level lawyers.

If the training role was removed from the professional practice curriculum the theory aspects of practice could be expanded and integrated into the design program.

I propose that the design studio have two streams working in parallel. One would involve the existing design studio and the other would involve design projects incorporating the practice themes.

At Monash and RMIT, I have experimented with a theme-based curriculum applied to design exercises done in parallel with the design studio. The themes include; risk, time, quality control, ethics, judgment, responsibility, persuasion, cost control, external controls, and life style. Group design work explores these themes and applies them to design assignments.

The RMIT course provides 3x1 Semester courses. I teach the final year which provides an opportunity for students to demonstrate the knowledge gained from the previous courses and develop skills in research, group work and creative problem solving applied to a design challenge.

Both courses could be easily converted to the model demonstrated in this paper but are presently designed to satisfy the accreditation process.

CASE STUDY 1

Students at Monash were asked to prepare design guidelines for new development at the recently rezoned Fishermen's Bend area in Melbourne. They then had to prepare a design to demonstrate the application of these guidelines. Figure 5 shows a master plan with zoning controls and a canal solution to address the projected rising water levels for the site. Figure 6 shows one of the many control diagrams produced for the site.



Figure 5



Figure 6

CASE STUDY 2

At RMIT, a group design project involved a management plan for rising water levels at Middle Park. The plan required creative solutions, political and cost implications, and in this instance a sustainable solution. Figure 7 shows the extent of the problem and Figure 8 shows the final solution.

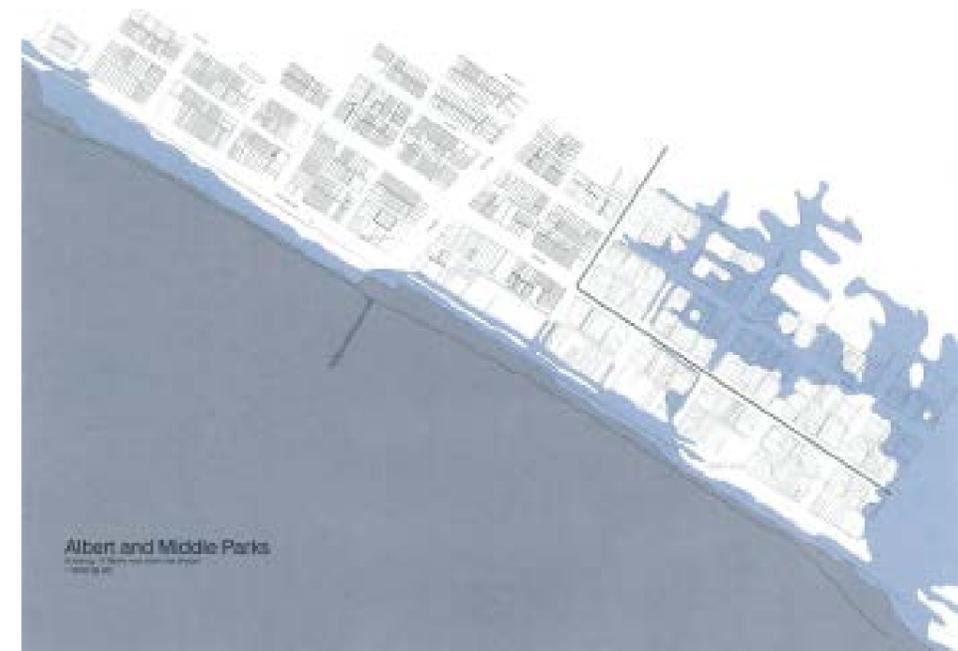


Figure 7



Figure 8

CASE STUDY 3

This year, students at RMIT were asked to find a church site with untapped development potential. Figures 9 and 10 show the work of a group who identified a need for independent living accommodation and used the site of a church in Toorak. The work involved analysis of design options plus a costed program for implementation and a strategy to sell the idea to the church.

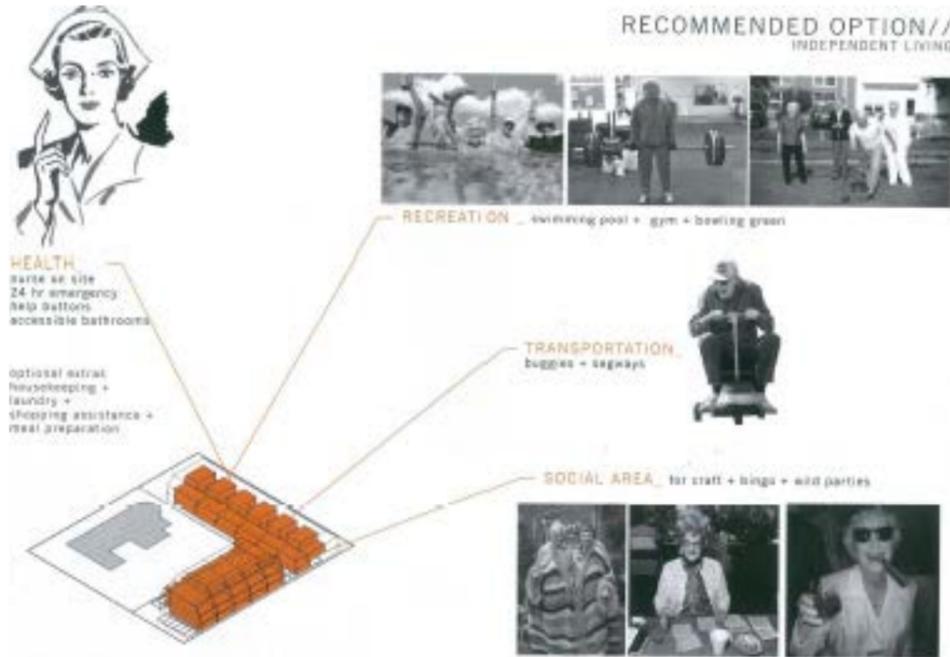


Figure 9



Figure 10

What steps are needed to make a change?

It would first be necessary to establish a viable structure for graduates to build on their postgraduate work experience to satisfy the competency standards required for registration. This could be provided by the AIA, a private provider, an academy or all three.

With this in place, the AACA and the AIA would need to be convinced that a reduction in professional practice training and an increase in professional practice education would better prepare students for future practice. The argument would be as follows:

1. Graduates have only limited involvement with contract administration in the first 5-6 years of their career.
2. Students need to be adaptable to a wide range of future practice options.
3. Practice management and contract administration is best learnt on the job.
4. A similar system works for the legal profession.
5. Design ability is the point of difference between architecture graduates and those of allied professions. This creativity needs to be fully exploited and applied to all aspects of the architect's role. It is better to use the limited time available at the academy to develop these skills rather than train students for the present workplace.
6. Current practice methods are not likely to be relevant by the time students are ready for registration.

Endnotes

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- 2 Figures 5 and 6. N. Krysiak, T.Le, A.Shaw, J.Slaone, and K. Walter. 'Lorimer Canals' (Student project, Monash University, 2013)
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Biography

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STUDIO ENTASIS -OR- STRETCHING THE EFFECTIVE RANGE OF THE DESIGN STUDIO

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**DESIGNING/
EDUCATION**
CONFERENCE

THE FUTURE OF PRACTICE

ABSTRACT

Architectural education has, as stated by AMO, fallen behind the rate of development of the architectural field. While this disparity may be related to the market economy, it is not necessarily the role of architectural education to keep pace with the market. By contrast, our regulated, competency-based system of architectural education is robust, but relatively slow to evolve. Together, these carry potentially serious economic implications. This urges a different approach to architectural education that might improve architecture's value proposition.

This paper articulates a view that a singular common element to architectural education – the design studio – might be utilised as an agent of public architectural advocacy. How might we consolidate the public value of architecture by extending the design studio as a prompt for public engagement?

In addressing this question, this paper reflects on personal experiences over ten years, and identifies four forms of engagement, Collective, Applied, Speculative, and Topical. Each is illustrated with a specific case study. In so doing, a multi-lateral, polyvalent series is established, in contrast to the stricter, more linear paradigm of today's prevalent neoclassical model of architectural education. The various ways in which each studio has attempted to contribute to the public conversation about architecture is briefly referenced.

I argue that architecture's great strength, as a generalist discipline that synthesizes knowledge and skills, necessitates an educational model possessing similar qualities, that also stretches the effective range of the design studio to include both education and public architectural advocacy. I propose an approach that is highly engaged with the various contributors to a project, intentionally ambitious in the questions posed, and that seeks to identify possible markets in order to demonstrate the public value of architecture.

I have chosen in the title of this paper a word whose use in the English language appears almost exclusively applied to architecture. I should like to begin by suggesting that there are here three lessons to observe. The first is that this exclusivity should be of some comfort, and remind us that if nothing else, there are things done by architects that cannot be explained in any other terms than those specific to the discipline. 'Entasis' is from the Greek ἐντανύω meaning 'to stretch tight', and is typically used in relation to the stretching of the bow-string¹. This in itself is perhaps an apt metaphor for us to acknowledge, and our second lesson, for it is something of this order that I am proposing we might apply to our concern, the design studio. We must hope for the dexterity of Paris, if not also his charm. By the time the word is adapted to architectural parlance, it is the term used to describe the 'subtly curved swelling' introduced in the elevational profile of a column, to correct the visual illusion of concavity produced by a straight shaft.² The third lesson is that, though apparently straight, the design introduces more material, and in so doing achieves more than might first appear (Figure.1). We need all of these things in our favour, for what I propose as the context of our discussion is considerably less generous.

There seems to be a view prevalent amongst architects that the purpose of architectural education is for training architects for the architectural field,³ by which, at least in part, we understand the practical role as required by the market economy. This may sound obvious, but supposing it is something believed, there are two problems. The first is that it places the onus on architectural education to keep in step with the market. This might seem to be a general view, if we are to take the comments of AMO, used as thematic provocation for this conference, as representative of a broad constituency:

"While the architectural field has changed more in the last 30 years than in the previous 3,000 thanks to the rapid acceleration of globalization and the convulsions of the market economy architectural education has mostly failed to keep pace." — AMO⁴

The second is that it conceals a value assessment; that is, that the field, as we understand it, is something worth training for. There are however good reasons to be suspect of this assessment. Architecture is not a well-paid profession, relative to others requiring the same amount of study, and the levels of professional liability are high. So it would not seem sufficient to view the market economy as the sole determinant of architectural education.

By contrast, in order to practice, our regulatory system requires the certification and standardization of architectural qualifications; for this we have a robust system of accreditation and registration, and these govern the education of architects.⁵ There is no question that this is good for the consumer; and there are significant advantages in nominating the core competencies required for architectural practice. They establish a "territory" for architectural services that are a compounded model of disciplinary expertise: they are both quantitative and performative, and founded in precedent knowledge.

But we must be careful, since Janus smiles somewhat wickedly upon this process: for in the very process of advancing a definition of architecture, and seeking to define a territory, we may be pouring concrete in our boots. In the first instance, we are then required to expend time and energy in the somewhat insular activity of maintaining professional standards. Second, as the AMO quote intimates, though the architectural field continues to change significantly, such a competency-based model

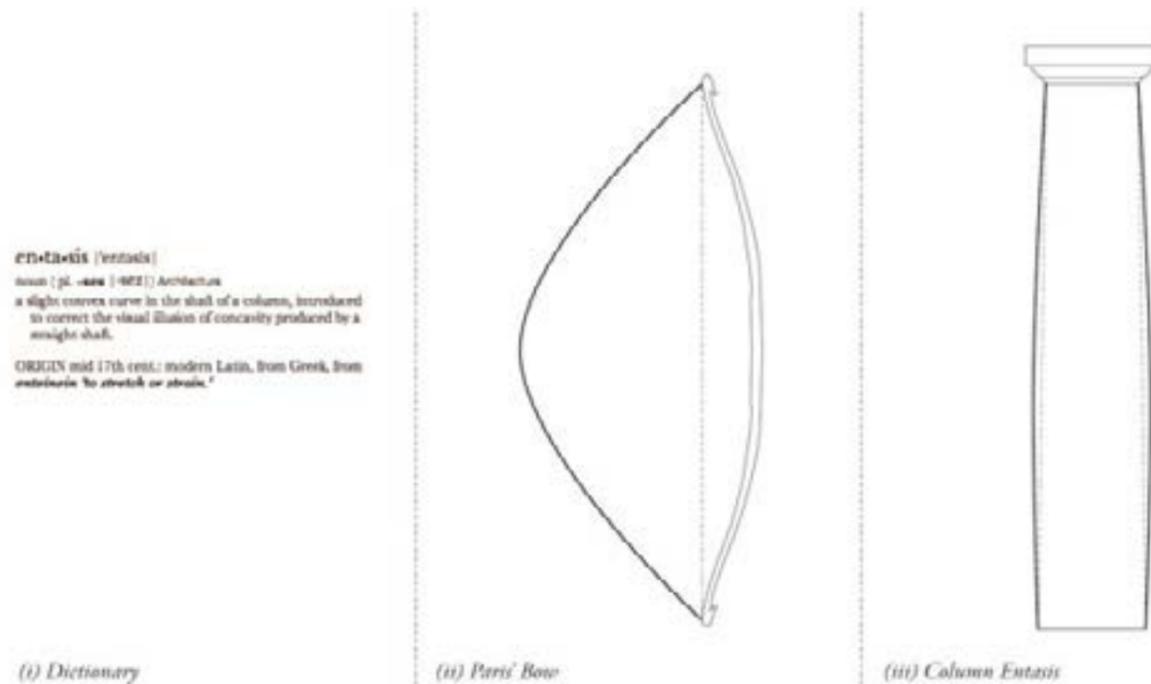


Figure. 1

of education, while robust, is non-discursive, relatively slow to evolve, and incapable of expanding at the rate of growth of the economic system. Thus, to merely shore up the boundaries will, in an expanding market, likely only result in a diminishing marginal return. We may have protected the borders of professional standards, only to simultaneously come to the realisation that the market has migrated to other providers.

We can infer then, that architectural education is not fully servicing the market. It is a classic problem: in the competitive marketplace, how do you increase return, using only the same amount of resources? The beginning, I am convinced, lies in the way we view education; and within architectural education, the design studio is the singular common element.

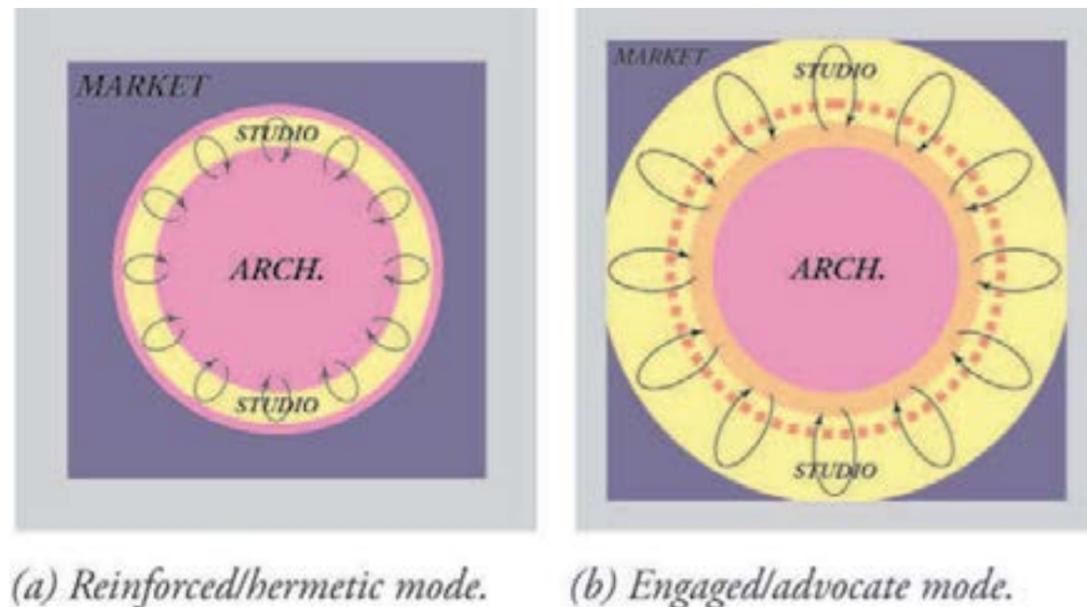


Figure. 2.

There are many ways of wielding this fundamental pedagogical instrument. The neoclassical model, for example, utilises the design studio as a forum for learning by repetition and replication of downsized architectural responsibilities (Figure.2a). But as has been suggested, this model makes assumptions that are increasingly out-of-step with demand. Rather, the design studio might be utilised in a more outward-oriented mode. Free from the immediate dictates of a client, the design studio is an opportunity to identify and service needs that might not otherwise be pursued – somewhat aligning with the implicit social contract of an architect to the public.

How, then, might we consolidate the public value of architecture by extending the design studio as a prompt for public engagement? (Figure.2b)

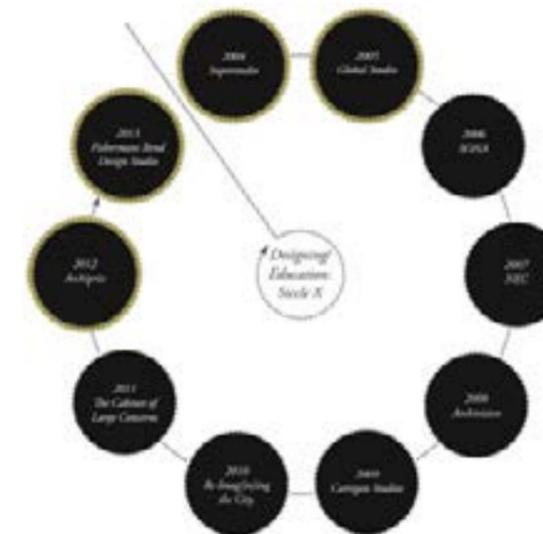


Figure. 3

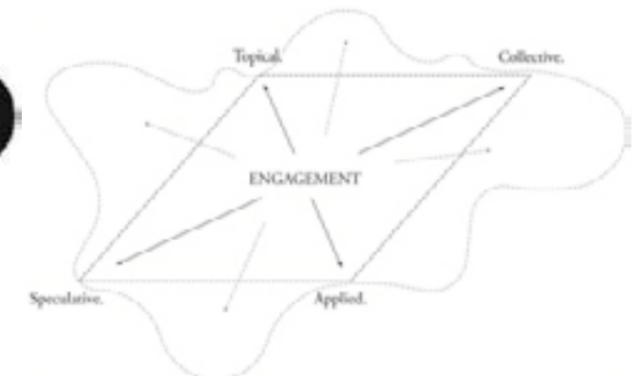


Figure. 4 Engagement Quadrant

For my part, I have for the past ten years (Figure.3) been engaged in a sort of protracted, arms-length campaign via the design studio, and the present context presents an opportunity for some public reflection on this point. Viewed as a cycle, the experience seems to present four avenues of engagement that taken together might form a quadrant, which for the purposes of explanation I have titled 'Collective', 'Applied', 'Speculative', and 'Topical' (Figure.4). I shall now outline in brief an example of each.

i) Collective: Superstudio NSW 2004⁶

This studio was a program well beyond the established norm. Not only did it actively engage all four schools of architecture in New South Wales, it also brought together the Australian Institute of Architects, the Year of the Built Environment and the Government Architect's Office, and various other government, professional and media agencies. In an intentionally abbreviated, hyper-concentrated format, the studio was designed to be generative of ideas of a very public dimension: students were asked to develop a 2020 Vision for Sydney, within the context of the Sydney Metropolitan Strategy. For this, the event received substantial comment in the press, but above all promoted strong debate about Sydney's future—not least evidenced by

iii) Speculative: Archiprix Moscow 2013

Archiprix is an organisation that, according to its own claims, collects, organises, awards and presents the best graduation projects in the world, from the disciplines of Architecture, Urban Design and Landscape Architecture. As part of its award program, it also curates a week-long studio workshop for the nominated entrants; I attended one such event in Moscow this May. In this instance, the brief was particularly speculative: assuming various tenets of Moscow's built heritage—schoolyards, military zones, railroads, etc—the hypothetical 'What if...?' was put, with the presumed expectation that the outcomes might attain the level of experimentation synonymous with the city's revolutionary past (Figure.7). In the case of my studio group, the question was applied to the generous swathes of green space that are a distinct part of the city's periphery. By framing such speculation as an act of 'research', each studio, in a way, created its own design problem, and left it to the speculative capacity of architecture to propose within a public forum, the value of architecture. This sort of entrepreneurial approach is highly ambitious and has the potential to create a market for architectural services where previously there has been none.



Figure. 7 Bart Goldhoorn, Archiprix Moscow curator, at the final presentation, Strelka Institute, May 2013

iv) Topical: Fishermans Bend Design Studio, RMIT 2013⁸

This studio, by way of contrast to the previous three, was neither extra-curricular, nor international. Offered alongside multiple other studios as part of the upper pool program in a typical semester, the studio undertook an intentional engagement with a topical issue, in this case the recently rezoned 240ha precinct of Fishermans Bend, to the south-west of the Melbourne CBD. This presented to students an opportunity to engage with actual stakeholders (*Places Victoria*) as well as the questions and processes surrounding urban redevelopment. The ambition of the studio might have been bigger than student capacity, but for the fact that there were 3-4 projects that responded to the questions of the urban problem, and imparted in response an architectural form that depicted a way of living commensurate with a new vision for the precinct (Figure.8).



Figure. 8 Fishermans Bend Design Studio, final exhibition, RMIT Design Hub, July 2013

If AMO's statement is to be accepted, architectural education has, over the past thirty years, been distanced from the architectural field and so, presumably, the market. The studios presented in this paper are four examples of how the needs of the market might be identified and acted upon in the freewheeling global markets of the twenty-first century. They are connected by their general intent, to a view of architecture that believes it to be in no small part a public act. Architecture, per se, has not so much been defined, but sought out, and in the process engaged with the public. The cycle is notable for its multi-lateral, polyvalent relationship to the problem set of architecture. The studios have engaged with significant problems, that are beyond the traditional, normative domain of the architect-as-authority. In so doing, they freely admit *inexpertise*, but are assertive in the capacity of design as a form of engagement that might generate a satisfying outcome. In so doing, architecture has made the offer, and returned the richer.

Architecture's great strength as a generalist discipline, with particular acuity in the synthesis of knowledge and skills, necessitates an educational model possessing similar qualities. I have submitted, to this end, a short series that seeks complexity and diversity, as opposed to consistency and certainty, and that is highly engaged with the various contributors to a project, from consultants to community, to financing, economics and politics.

If we are to be strategic in our views of architecture as a public good, that adds value, architectural education needs to stretch the effective range of the design studio, in order to both educate and include an outward goal with public architectural advocacy as a priority.

Endnote

- 1 "ἐντανύω" Liddell & Scott Greek-English Lexicon, Perseus Digital Library, accessed 16 August, 2013, <http://www.perseus.tufts.edu/hopper/>
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- 3 Architects Accreditation Council of Australia (AACA) and the Australian Institute of Architects (the Institute), Australian and New Zealand Architecture Program Accreditation Procedure (ANZ APAP) (April 2012), 4.

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- 5 AACA and the Institute, ANZ APAP, 4.
- 6 Project directors: Bryna Lipper, Alan Miller, Joshua Morrin, Stephen Graham (all then-students at the University of Sydney)
- 7 The author was Project Manager for the inaugural studio, Istanbul 2005
- 8 Taught with Professor Louis Sauer, RMIT Upper Pool Architecture Studio, Semester 1, 2013

Biography

Joshua Morrin holds a Master of Architecture from RMIT University, and a Bachelor of Design from the University of Sydney (First Class Honours and the University Medal).

His graduation project was awarded the Anne Butler Memorial Prize for Design (2011), shortlisted for the Bluescope Student Biennale (2012), and exhibited in London at the RIBA Presidents Medals (2011) and Archiprix Moscow (2013). He is also the recipient of the AIA/BVN Victorian Graduate Prize (2011).

Prior experiences introduced him to the world of Architecture. He was the first Project Manager of Global Studio in Istanbul 2005 (Anna Rubbo, Convenor), then National President of SONA (2006-7). He is a former recipient of the AIA/SONA Student Prize for the Advancement of Architecture, and the Byera Hadley Travelling Scholarship (administered by the NSW Board of Architects).

Most recently, he was an invited contributor to the exhibition Peter Corrigan: Cities of Hope (RMIT Gallery, 2013). He currently works at Lyons, where he has been engaged in a range of projects, alongside teaching in upper pool studios at RMIT.

AGENCY, REDIRECTED

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**DESIGNING/
EDUCATION**
CONFERENCE

THE FUTURE OF PRACTICE

ABSTRACT

In response to changes in both the practice of architecture and changes in terms of architecture's field of operation: the global economic, political and cultural context of its production, the following paper proposes to re-examine the inherited unit system of the graduate educational M.Arch design studio. Contrary to 'alternate modes of practice' that propose in critiquing the profession, an abandonment of the discipline of architecture, this paper instead calls for a clarified return in the educational context to architecture's core material and spatial skill set redirected relative to the animating diagrammatic condition that since the 19th century has relied on architecture's capacities in material and organizational experimentation to build cities.

This paper has emerged from our increasing sense of frustration at the diminishing capacity of architecture to effect transformation on itself and on the things around it. We are asking ourselves continuously, in a field that insists on so often defining itself in terms of novelty, where does our agency lie such that we might effect real change, both internally and externally to the field? In the educational context this becomes a question of how most effectively can we deploy the M.Arch design studio as both a teaching and a research environment tasked with arming graduates with the tools to positively intervene in practice conditions.

Recent changes to a global political and economic landscape have altered the field within which architecture is made and deployed. Alejandro Zaera-Polo has observed a kind of acceleration of conditions where

“the increasing complexity of global developments – the distribution of power within the world economy, the transnational competition between cities, the development of world-wide environmental policies, the growing importance of media as a political force, the increasing number of private agents in the provision of services and infrastructures – all are redefining the politics of architecture and urbanism.”¹

And yet at the same time as the context of the operation of architecture in a broader sense is being challenged, the profession has also faced marginalization in its direct field of action – the design and management of the production of buildings. The environment in which architects must now practice contains a new level of complexity. Increasing specialization and expanded consultation teams within each project must be negotiated in the context of managerial approaches to public procurement external to the project. Global opportunities amplify these issues given different cultural and economic environments.

The importance of the graduate Masters of Architecture (M.Arch) design studio in this context is that it is both the site of the education of each new generation of architects, but equally it (or its equivalent) has since the second half of the 19th century been a powerful site of disciplinary experimentation, feeding new knowledge into practice in a conditional and reciprocal relationship. The M.Arch design studio is one of the key disciplinary sites that allows us to ask anew with each generation and within the context of architecture, ‘What is the city?’ - a question that contains

within its diagnostic and propositional gesture, an explicit demand each time that we also define who we are in response.

At various times since the late 1960’s one response to the changing demands of practice has been a series of propositions for ‘alternative forms of practice’². This idea of ‘alternate practice’ most often involves the re-assertion of the relevance of architecture in fields where acceptance has been greater and impacts more easily measured – such as engagement in social projects, arts based projects or in aid and humanitarian work. In all cases the architect will create positive outcomes through means other than conventional built work. Contained within this work is an implicit critique of the profession of architecture as it is currently constructed.

PROFESSION V DISCIPLINE AND ALTERNATE FORMS OF PRACTICE

It’s useful here to clarify the difference between notions of ‘profession’ and that of ‘discipline’. In the context of this paper, when we refer to the term ‘*profession*,’ we are referring to the historic organisation of experts that emerged in the 19th century and equally to those aspects of the institution that make it possible for individuals to participate in architecture as a recognizable and legitimate social practice. Hyungmin Pai reminds us that,

“as much as architects are enabled by their participation within a larger social construct [the profession] they are also constrained by these same external conditions.”³

‘*Discipline*’ on the other hand, while also being formed within the same social boundaries and resources as the profession, sustains a relatively autonomous field of practice. Importantly, the discipline ‘can be known without tracing every work realized by the profession’ suggesting why ‘paper architecture’ and unbuilt work carries as much influence in the discipline as does built work. ‘Discipline’ refers to the body of knowledge - and particularly it refers to a set of material and formal skills – “that cannot be reduced to the constructs of other fields.”⁴ It can be seen that the discipline in this definition is simultaneously an open and a closed system. It is open in as much as it can be taught, learned and transmitted, while it is closed in the sense that it requires commitment to a conventional system of knowledge and practices in order that one might engage in it and be engaged by it;⁵ a fact that led

Jeffrey Kipnis to notice while writing about the diagram and on consideration of Le Corbusier's Villa Savoye that

*"It works for me and on me, but I can understand why others just see a nice looking house."*⁶

When we step into the speaking position of architect, we both assume a professional posture in terms of legal responsibilities and framings and as a community of interest, but Kipnis also noticed that as an architect the diagrammatic content of the house, the domestic, of which the Villa Savoye is an exemplar, worked on him and through him – suggesting, as others have pointed out many times – that our agency in terms of architecture's capacity to affect change is conditional, not total – and that critical to it is that moment of exchange cultivated via disciplinary engagement.

Though the history of the profession and the discipline are irrevocably intertwined in the construction of the architectural institution, they do not run parallel.⁷ In returning then to that category of architects working in non-conventional practice, in government, or in arts based collectives or aid agencies, there is a claim made to validate the relevance of the discipline but contained within the work is usually a critique of the profession as it is currently constituted. While such forms of practice provide significant lessons to be absorbed by all architects, these lessons have been lost in the implicit critique of the profession suggested by alternate practice – so rather than the reinvigoration of the discipline in all of its finely calibrated and conditional agency we instead witness its abandonment.

DESIGN STUDIO: THE UNIT SYSTEM

It is to these conditions and to this context then that this paper is directed: in response to changes in the practice of architecture and its field of operation, how can we better formulate the conditional relationship between the experimental conditions of the Masters of Architecture design studio and practice itself, such that we begin to cultivate a terrain of judgment that allows us to better distinguish novel churn from real transformation.

The architectural design studio has historically since the early 19th century and the transformations from the apprentice system toward the Beaux Arts, been the core of

both an architect's education, but equally, it has been where each generation of architects cultivates and experiments with the discipline's conventions and material and formal skill sets. While many things have changed in the profession and discipline of architecture over the past few decades – as Zaera-Polo and others have pointed out – many things have fundamentally remained the same in terms of *design studio* structure since the last major review of design studio teaching in the early 1970's. Here there emerged via Alvin Boyarsky at the Architectural Association the 'well-laid' pedagogic table⁸ of the unit system – the year long, elective, vertically integrated, experimental design studio. Competitive between both tutors on single year contracts, and competitive between students, the unit system was unique in the expectation of a consolidating and rolling design research agenda year on year. Out of this came the stellar studio leadership alumni: Rem, Zaha, Bernard, Zenghelis, Libeskind. Beginning in 1968 with the International Institute of Design, a summer school initially housed at the Bartlett, by the time Boyarsky took on leadership of the AA in 1971 the basic structure of the unit system that he inherited was turned into a machine for producing sedimented intergenerational trajectories of research and experimentation.

At the time of Boyarsky's initial tenure, the field was captured by a sense of the Modern Movement's failure in terms of the existing and traditional city, and a searching around for solutions to the question of architecture's relationship to its outside. The iconography of Archigram, and in Archizoom their critical parody; the search for architecture's signifying capacity in work like Venturi Scott Browns *Learning from Las Vegas*; the urban ramblings of the psycho-geographers and their search for an urban architectural subject. The unit system was able to accommodate all of this diversity on its 'well laid table' of numerous alternate forms of practice. By the 1980's this was coupled with the searching by architecture into parallel fields: cultural theory, literature, philosophy and others. Stan Allen has written in *The Future that is Now, from Architecture School: Three Centuries of Educating Architects in North America* (2011)⁹ that by the 1980's, decoupled from the pace of making buildings, the rapid proliferation of new theories about what architecture might be or can do soon outpaced material production. Zaera-Polo claims that education programs began producing 'legions of bad novels, bad sociology, bad psychology, bad philosophy and bad movies being presented at juries as advanced architectural "research"'.¹⁰ This tendency still exists in a generation of students poorly acculturated

in the discipline – a situation we place at the feet of those who are a product of this period and are now charged with the education of the next generation.

PRESSURES POST BOLOGNA

At UTS, like many Schools of Architecture in Australia, we've inherited a kind of unit system "lite": the same aspiration for a well laid pedagogic table, the same ambition for broad experimentation, competitive in proposition to students as elective options, broadly diverse in content and pedagogy offered across a number of elective studios - but only fifteen weeks long, less than half the weekly contact hours and sometimes double the student numbers.

Since the late 1990's and the Bologna agreement, the consequential shift in Australian Universities from undergraduate to graduate design studios has seen an increasing expectation from Universities of traditionally recognized and weighted research outputs from graduate programs. That is, at some level, *a graduate research program is expected to make a contribution to the production of disciplinary knowledge.*

Post Bologna, the question of who develops this research and at whom it is directed toward is of increasing importance. One problem that we can see is that, increasingly, there is an amplifying academic research culture that focuses less on problems faced by the profession where it overlaps with the disciplinary-specific conventions and systems of knowledge and practices of architecture, and more on a self-referential field of judgment internal to the academy itself. This is not to say that research work should be in the service of the profession, but rather that with often limited ambition to engage the disciplinary specificity of architecture at any level, the danger is that we are witness to an academy which robs both the profession and the discipline of architecture of what Pai observed as being the irrevocably intertwined architectural institution - where the profession and the discipline co-exist but do not run parallel¹¹.

One way in which this new research regime has failed to deliver benefits for this profession and discipline is that often there is a limited or unclear relationship between research outputs from faculty and the studios they teach. In addition, the

unit system depends on sessional studio tutors, drawn from outside the full time staff of the school, to carry the full responsibility for a studio and all that it entails (research agenda, theoretical and historical contexts and pedagogic structure or method). A problem here is that studio leaders (whether from the academy or practice) cannot be expected to possess full command of an issue across the breadth required to inform this intertwined institution of profession and discipline.

The historic dependence of schools of architecture on small and/or newly established practitioners as teaching staff running independent design studio 'units' is particularly problematic in this regard. The demands of new practice, the minimal preparation and research time allocated to a studio contract and the immersion of the practitioner often in problems at a scale of detail that would not necessarily support larger agendas, particularly regarding urbanism and architecture's relationship to it. The core critique here is not of the capacity or quality of tutors. Rather it is that they are forced to operate in an environment thin with research direction or other teaching or intellectual support. It is for these reasons that studios struggle to move beyond the most superficial account of architecture's relationship to the problems it encounters in the field, failing to fully engage with and fulfil the studios' role in cultivating disciplinary experimentation and contributing to disciplinary knowledge. Instead the M.Arch design studio constituted like this almost actively participates in the erosion of the potential of the discipline through the production of students both unable to think and act architecturally – that is spatially and materially – and, alarmingly, with only the most superficial sense of the depth of understanding required to meet the problems architecture is called in to work on.

CULTIVATING A TERRAIN OF COMPARATIVE JUDGEMENT

At UTS we've made a move to respond to some of these concerns regarding the relationship of architecture to what it is called to work on with the introduction of studio streams into the M.Arch design studios. These organizing themes include materials and technology, computation, urbanism, sustainability and activism. This categorization into a thematic grouping has been a way of organizing the breadth of elective studios offered, galvanizing and focusing their energy in simplified directions for a semester. However, this still has had a limited effect on how we're able to accurately measure success beyond the 'student experience' as recorded in Student

Feedback Surveys, a category of judgment removed from any actual value to the field.

If we look at the activism stream for example, in its first iteration we might see it as the 'Live' studio. The live studio is the one where we congratulate ourselves on having moved out of the realm of theory and into the domain of practice: the 'real world' with a 'real client' - as if this were the problem - a client somehow lending us greater credibility in the pursuit of a relationship between discipline and practice. The next reactive and critical iteration of this might be seen in something like the Sydney South Central model run by Tarsha Finney in 2012, deliberately working to constitute 'the client'. Unlike the live studio, Sydney South Central proposed a problem and sought, on the occasion of the student work, to actively constitute a community of interest and action around an urban issue into which the studio then inserted itself. By identifying stakeholders, neighbourhoods or collectives of interest, media support, political support and engagement – and professional investment through the production of drawings, seminars, symposia and publications – this studio's ambition beyond education was to contribute to a projective process of clarifying dispute, and a clarification of what might be possible, of what the Ultimo Precinct might become.¹²

Another iteration of the activism studio can be seen in a studio such as that run by Gerard Reinmuth over two years looking at the issue of the detention of refugees in Sydney specifically at the Villawood Detention Centre. Here the focus of the project was around a particular political and social issue, the aim being to shift student's perspectives on what sort of effect they might be able to have via their spatial interventions. This studio was played out against a backdrop of political debates about refugees and detention and increasing dissent, riots and fires at Villawood. The studio was organized around two key phases of exploration: firstly the exposure of students to the complexity of issues surrounding the "problem" itself, contextualizing the condition via international comparison across many aspects of the refugee issue, from numbers, origins, alternate conditions in other countries and so on. The second phase of exploration was in the design of a perimeter fence, which offered students the opportunity of asking questions of both the organization of the facilities behind the fence but equally allowed an exploration of organization, thresholds, limits and transparency, both literal and phenomenal, asking questions of

architectural representation in the process and then asking students to engage with spatial issues at the perimeter of the facility where it intersected with mainstream Australian suburbia.

Despite the success of both of these studios in terms of student experience, ultimately all of this work left us dissatisfied. In a sense, if the first iteration of the activism stream relied on the sheer force of personality of those leading the studio to cultivate communities of interest, in the second instance, the deploying of a disciplinary skill set in the direction of a 'political' misunderstands the nature architecture's political agency. While the students had a rich social and cultural experience and in the terms of the academy the work was a success, neither studio did much to contribute to any understandings of where architecture's material and formal agency is. As Kipnis has argued

"it is possible that speculative architecture produces something like a directed politics, but not as an instantiation of an ideal concept of the political"

as we were doing here. Instead, he argues architecture's capacity resides in something more like

"an original political effect specific to architecture, irreproducible by any other medium and irreducible to any other terms."^{13 14}

Such 'an original political effect' is fundamentally material. Our conclusion following this work is that we need to exercise a different kind of disciplinary focus on process as a political act where the 'building' or studio output becomes known not as the normative outcome of architectural processes, but as a consequence of having built sound political relationships¹⁵. The studio outputs become material evidence of a process involving transformations in prevailing ideological positions, that is, transformations in the condition or problem toward which architecture's unique disciplinary skill set is deployed, both internal and external to the field. It is this as a framing of the work in the design studio that we need to clarify.

DESIGN PROCESS: ARCHITECTURE'S RELATIONSHIP TO ITS OUTSIDE¹⁶

We understand that unique to architecture's disciplinary practice is a design process predicated on type.¹⁷ Type here is not understood as belonging to the object of architecture,¹⁸ but rather type is a process of reasoning that is fundamentally predicated on a reference to precedent and past solutions. The diagram calls to it, this unique disciplinary capacity: "Diagrams underwrite all typological theories."¹⁹ In this sense, the diagram isn't understood as a simple graphic annotation system, but rather following Foucault²⁰ it is a complex spatial socio-political arrangement of knowledge that in certain conditions relies on architecture's capacity for organizational experimentation and materialization.²¹ The diagram doesn't belong to architecture. It

"doesn't point toward architecture's internal history as a discipline, but rather turns outward, signalling possible relations of matter and information".²²

It is the animating diagrammatic condition, and architecture's unique city building relationship to it since the 19th century that we are interested in here.

There are two things to notice regarding how type and diagram function together: The first is the critical role of architecture's graphic realm in which reasoning occurs:

"since nothing can enter architecture without having been first converted into graphic form, the actual mechanism of graphic conversion is fundamental."²³

That is, the drawing in architecture is critical – which is simply to reference central writing in architecture, from Colin Rowe through to Stan Allen and Robin Evans.²⁴

The second thing to notice is that the diagram relies on a condition of dispute where dispute is generative of material possibility. *It is these disputes that we need to make evident and clarify in the M.Arch design studio such that we can see where and how architecture's capacity to conditionally act with autonomy is.²*

RETURNING TO UTS

The general condition of a School of Architecture in Australia is that it has a single professional practice subject or stream, the role of which is to impart the knowledge required to pass a professional practice exam – which is about the role of the architect as a member of a profession as it is currently constituted.

However reasonably unique at UTS is practice teaching built on a suite of subjects that are far more projective in nature than the core architectural practice subject itself – the role of the architect in the city; the role of the architect as advocate; and the future constitution of the profession itself as a reflective event. What this allows us to do is to imagine the profession not purely in vocational terms, but as a far broader set of understandings. It continually demands that we ask how we conceive of the field, what, as we stated at the outset, is always being presented as an open question 'what is the city' and who are we to ask. What this condition does is allows us to imagine a far thicker mode of enquiry around specific diagrammatic conditions and their formations of dispute.

In the last year we have gone some way to experimenting with this in two ways. The first was to organize one of the practice subjects (The City) around the complexity of problem presented by Sydney's Barangaroo redevelopment: guest lectures, seminar discussions and Assessment tasks then involved exploring different aspects of the political, legislative, procurement, financial, development pressures and community engagement processes of bringing about a project such as this. The result for the students of this multi-perspectival approach to Barangaroo was a significant depth of knowledge about the types of problems that come to bear on a project such as this that would rarely be possible in the "unit" studio format. In fact, a small esquisse aimed with reorganising the site which formed one of the assessment tasks was attacked with a sophistication that we had rarely witnessed in semester long explorations of this site in the studio format.

This year we are experimenting with the Metropolis Project, a whole school thematic that was set up around the idea of the city. Involving to various degrees the M.Arch design studios, this has provided content direction for the lunchtime and public lecture series, public debates, bolt on elective programs and a final publication of research into the subject, all of which has contributed obvious gains for the school in terms of an enlivened school culture and engagement - and for students involved in a cross section of these different activities who can start to enter into a sophisticated dialogue about the topic - even when it can be seen that the concept of 'Metropolis' is too broad as it stands to achieve what we are proposing here. However this experiment has indicated to us where a productive vein of organization may lie.

So some examples of what we mean when we speak about a diagrammatic

condition as meta-category organizing the M.Arch program: we might speak of a general condition of dispute around education: urban distribution versus concentration versus a campus model; relationships to housing and transport; the type and form of the classroom. Domesticity: disputes around the relationship of work home leisure and transport; the scale and density of development; disputes around light, air, access to views; disputes around the collective versus the individual. Others might be the workplace neighbourhood; bio-medical research; innovation environments; health.

Once this is understood, one can then also equally imagine a new and far more focused role for the teaching of history and theory, the public lecture series in the school, theory and computational elective subjects, to feed into this complex environment of dispute that we set up each semester specific to a diagrammatic condition. The result would be a deep cross sectional exploration of sites where architecture acts such that the depth of understanding required for architecture to genuinely innovate in these domains would start to be apparent.

CONCLUSION

Returning then to our opening and original question, it is the Masters of Architecture design studios or their equivalent that have in recent history provided a key site for experimentation in the field of architecture, feeding back to the discipline and the profession new insights. In response to ongoing changes in both the practice of architecture, and changes in terms of architecture's field of operation - the global economic, political and cultural context of its production - this insight and clarification in terms of disciplinary agency is acutely required as is a refined cultivation of a terrain of judgment such that we can see where real transformation occurs, as opposed to the churn of novelty. Contrary to 'alternate modes of practice' that, in critiquing the profession hold an implicit call to abandon the discipline of architecture, we believe instead that there is needed a return to architecture's core material and spatial skill set redirected relative to the animating diagrammatic conditions of urbanism: domesticity; the neighbourhood; health; research; the workplace; education, the cultural building and so on. For urbanism has relied on architecture's organisational and material experimentation, via the institutional materialisation of these conditions, to build the city since the late 19th century. It is via a deep engagement with these conditions that we can start to understand both

where the agency of architecture lies and how that form of agency works.

Such a call is not a return to the functionalist diagram of the mid 20th century. Nor is it about functionalist notions of program. We are not calling for a pedagogic adjustment of individual studios; this is not about homogenizing the design studio pedagogy and its diversity of approach. It is instead about consolidating an understanding of architecture's field of effect and the problem fields that it is called to work on. Our thesis is that a meta-framing of all curricula in the graduate school in terms of a single diagrammatic condition will bring us faster to an evaluative terrain that will refine a capacity to distinguish novelty from real change, allowing us to clarify our contribution to disciplinary specific knowledge, and to the discipline and profession of architecture with all of the attendant contemporary complexities that it faces.

ENDNOTES

- 1 Alejandro Zaera-Polo, "The Politics of the Envelope: A Political Critique of Materialism," *Volume 17*(2009).
- 2 See Anthony Burke and Gerard Reinmuth, eds., *Formations* (Canberra: Australian Institute of Architects., 2012). This publication was released on the occasion of the 2012 Australian Pavilion at the Venice Architecture biennale, curated by Reinmuth and Burke.
- 3 Hyungmin Pai, *The Portfolio and the Diagram: Architecture, Discourse and Modernity in America* (London: The MIT Press, 2002).
- 4 Stanford Anderson, "On Criticism," *Places 4*, no. 1 (1987).
- 5 (ibid. And S Anderson, "The Profession and Discipline of Architecture: Practice and Education," in *The Discipline of Architecture*, ed. Adrezei Piotrowski and Julia W Robinson (Minneapolis: University of Minnesota Press, 2001). In Pai)
- 6 Our Italics. The full quote reads "the five points collaborate..... to erase the privileged status of the ground that architecture before it so strived to reinforce, transforming it into but one datum among many, including roof-top and floor plan..... *It works for me and on me, but I can understand why others just see a nice looking house*" Jeffrey Kipnis, "Re-Originating Diagrams," in Peter Eisenman: Feints, ed. Silvio Cassara (Milan: Skira Editore S.p.A, 2006). p194

- 7 Pai, *The Portfolio and the Diagram: Architecture, Discourse and Modernity in America*.
- 8 Irene Sunwoo, "From the 'Well-Laid Table' to the 'Market Place:' The Architectural Association Unit System," *Journal of Architectural Education* 65, no. 2 (2012).
- 9 Stan Allen, "The Future That Is Now " in *Architecture School: Three Centuries of Educating Architects in North America*, ed. J Ockman and Rebecca Williamson (Cambridge: MIT Press, 2011).
- 10 Alejandro Zaera-Polo, "A Scientific Autobiography," in *The New Architectural Pragmatism* ed. William S Saunders (Cambridge: MIT Press, 2007). P6
- 11 Pai, *The Portfolio and the Diagram: Architecture, Discourse and Modernity in America*.
- 12 Sydney South Central was co-funded by UTS FMU and UTS DVC (Resources) Patrick Wood in partnership with the Sydney Harbor Foreshore Authority. It involved a number of additional tutors: David Neustein, Prof. Richard Goodwin, Billy Feuerman and Matt Chan. In addition, there were contributions from The Committee for Sydney, UTS, Sydney Harbor Foreshore Authority, TAFE, the Powerhouse Museum, Events NSW, Infrastructure NSW, the City of Sydney and Frasers Property. The studio ran for 4 weeks as a 12cpt winter intensive in 2012.
- 13 Kipnis, "Re-Originating Diagrams." p194
- 14 To clarify definitions of political: There are several ways that we're using this term 'political' here and in the context of these questions. One definition is political understood as action in the realm of decision making within democratic governance where to speak of the political is to indicate participation in a realm of decision-making, a process that exists as part of a constellation of mechanisms of democratic government within liberal democracy and which the profession of architecture has a unique relationship. These are the formal planning processes, legislative and regulatory framings, legal and organizational systems in addition to the informal consultation processes, media broadcasts and public opinion forming responsibilities that we understand we must engage with in the production and procurement of both architecture and education.

The other definition of the political is quite different. Here 'political' is understood as 'an operation in a domain in which action places the subject itself in question '(Lawrence Barth, "The Complication of Type," in *Typological Formations: Renewable Building Types and the City*, ed. Christopher C.M Lee, Sam Jacoby, and AA Diploma 6, Aa Agendas

(London: Architectural Association, 2007).) – and here, in the context of this paper we will say that such a domain of action and experimentation are those discursive formations toward which architecture's skill set is called: urbanism, education, medical research or domesticity for example. To use the term 'political' here, is to speak about architecture's relationship to knowledge, or put another way, architecture's relationship to its outside. See M Foucault, *The Archaeology of Knowledge*, ed. R.D Laing, trans. A.M Sheridan Smith, *World of Man: A Library of Theory and Research in the Human Sciences* (London: Tavistock Publications Limited, 1972).

- 15 We are grateful for insights into this given to us by Ingo Kumic in a series of email conversations in early 2013.
- 16 This argument forms the basis of Tarsha Finney's doctoral work, *Repetition and Transformation: the Housing Project and the City of New York 1934-1973*. The development of these ideas was made possible through participation in a series of graduate doctoral seminars at the Architectural Association, London from 2004 - 2007 led by Professor Lawrence Barth, with Dr Katharina Borsi and Dr Pavlos Philippou.
- 17 To make this claim is to reference architectural writers and thinkers as diverse as: Colquhoun, ""Typology and Design Method"," *Arena* vol.33, no. June 1967 (1967); G.C. Argan, "On the Typology of Architecture," *Architectural Design* 33, no. December 1963 (1963); Werner Oechslin, "Premises for the Resumption of the Discussion of Typology," *Assemblage* no.1(1986); Anthony Vidler, "The Third Typology," *Oppositions* 7, no. Winter (1977); Kenneth Frampton, "Twin Parks as Typology," *Architectural Forum*, no. June 1973 (1973); Chris Lee and Sam Jacoby, eds., *Typological Formations: Renewable Building Types and the City*, vol. No. 5, *Aa Agendas* (London: Architectural Association, London, 2007); Raphael Moneo, "On Typology," *Oppositions* 13 (1978); Barth, "The Complication of Type; Christopher C.M Lee, "The Fourth Typology: Dominant Type and the Idea of the City" (TU Delft, 2012).
- 18 One might see this as the failing of notions of type belonging to some of the output of the Italian Tendenza in the 1960s, and later in the work of New Urbanism, what Vidler refers to as the Third Typology. Here type becomes an image of the city. See Anthony Vidler, "The Third Typology," in *Theorizing a New Agenda for Architecture: An Anthology of Architectural Theory 1965-1995*, ed. Kate Nesbitt (New York: Princeton Architectural Press, 1976).

Another trajectory of work on type (Barth, Moneo, Colquhoun) situates it as an instrumentality that resides in a process of reasoning.

- 19 Kipnis, "Re-Originating Diagrams."
- 20 Foucault, *The Archaeology of Knowledge*. Also see S Allen, "Diagrams Matter," *Any: Diagram Work* 23(1998); Lawrence Barth, "Diagram, Dispersal, Region," in *Landscape Urbanism: A Manual for the Machinic Landscape*, ed. Mohsen Mostafavi and Ciro Najle (London: AA Publications, 2003); G. Deleuze, *Francis Bacon, the Logic of Sensation*, trans. Daniel W Smith (Minneapolis: University of Minnesota Press, 2003); Kipnis, "Re-Originating Diagrams"; Barth, "The Complication of Type"; Lawrence Barth, "Michel Foucault," in *Key Sociological Thinkers*, ed. Rob Stone (London: Macmillan Press, 1998); Katharina Borsi, "Drawing and Dispute: The Strategies of the Berlin Block," in *The Intimate Metropolis*, ed. Lathouri, Periton, and Di Palma (London: 2008); *ibid.*
- 21 Barth, "Diagram, Dispersal, Region."
- 22 Allen, "Diagrams Matter." P17
- 23 Barth, "The Complication of Type."
- 24 Colin Rowe and Robert Slutzky, *Transparency* (Berlin: Birkhauser Verlag, 1964); Robin Evans, *Translations from Drawing to Building and Other Essays* (London: Architectural Association Publications, 1997); S Allen, *Practice: Architecture, Technique and Representation* (Amsterdam: G+B arts international, 2000). In Barth, "The Complication of Type."
- 25 In making these definitional moves between architecture as disciplinary skill set distinct from the knowledge or discursive formations to which it is called to materialize, it may sound like we are diminishing architecture's capacity to effect change by reducing its claim to knowledge. This may be so, however we will stand with Kwinter and in response to Colquhoun, with the justification that for us here, definitions such as this act as "synthetic explanatory device(s) (though no less real for that) that opens up a space through which a perceptible reality may be related to the formal system that organizes it." Sanford Kwinter, "The Genealogy of Models: The Hammer and the Song," *Any: Diagram Work* 23(1998). Whether that 'synthetic explanatory device' sits a priori or a posteriori to events is irrelevant, its role is instead instrumental for us here in terms of its ability to generate insight into the contemporary practice of architecture and the design process such that we can refine the contemporary design studio

Architecture has a specific relationship to knowledge. That might sound like an obvious statement but it's not. One of the key debates within architectural discourse over the last 60 years has been concerned with the nature of this relationship, or what we might,

following Eisenman and the post-critical writers that followed him, Somol, Whitting, Allen, refer to as Autonomy. Unlike Eisenman, or Pai, we are not arguing here for a notion of full autonomy: that is, architecture is a discursive formation. Rather we're going to base the arguments in this paper on an idea of partial or conditional-autonomy where architecture isn't the keeper of epistemological knowledge. Instead we will argue that architecture is made up of a disciplinary specific set of formal and material skills that are called in to various Discursive formations, with all of its organizational and experimental capacities, to work to materialize problems that reside external to architecture. What selects architecture in each instance is its capacity for organizational experimentation (Barth, "The Complication of Type.")— It is this capacity that we need to hone.

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Biography

Tarsha Finney is an architect and urbanist and teaches across the M.Arch design studios. She is completing a doctorate looking at the concept of the housing project in 20th century urban spatial reasoning – central to which is a clarification of architecture's disciplinary material and formal skill set and its relationship to a set of inherited discursive urban fields such as that of domesticity and of neighborhood.

Gerard Reinmuth works between his Directorship of TERROIR's Sydney and Copenhagen offices and his Professorial role at UTS. This crossover of practice and research is centred on questions around the future of the profession in a globalised interconnected world marked by ever increasing flows of capital and expertise.