THE ARCHITECTURAL DESIGNER AND THEIR DIGITAL MEDIA

An investigation into the extent to which it is advantageous to include digital media as part of
the designers’ ‘toolset’ in the early stages of design

VOLUME 1

A thesis submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

Sarah Benton

4th October 2008
ABSTRACT

My research investigates the relationship between the architectural designer and the use that he or she makes of digital media as part of the design process. My principal research question is: what is the advantage of including digital media as part of the designers’ ‘toolset’ in the early stages of design? The context is a highly successful and high profile mid-sized Australian architectural practice. The study considers the nature of architectural designing as a creative activity and the extent to which advantages could be gained by including digital media as part of the designers’ toolset in the early stages of design.

Designers seem to be polarised between championing the role of digital media as part of their design processes and downright rejecting it. One such extreme position is a view that this media has either ‘no place’ (Martens et al. 2007:n.p; Sanders 1996:4-5) within architectural design and is thus seen as ‘just another tool’ filling at best an ancillary and service role in the design process (Kvan, Mark et al. 2004:n.p). This view suggests therefore that designing with digital media has hardly advanced (Corrigan 2003:86). An opposing view is that digital media can take a more fundamental place to advance design methods (Rahim 2006:1), even revolutionarily improve the design process beyond ‘question and debate’ (Winner 1986:6 in Steele 2001:13), resulting in a ‘new architecture’ (Lindsey 2001:12) and encouraging significant change in designing through semi-automated generation of design and interconnected ways of communicating (Lindsey 2001:12).

My research has been positioned within a highly successful mid-size Australian architectural practice, Terroir (Rice 2000:16-18; Jackson 2007:204-217; Marreiros 2007:6, 192-203). Prior to my research, my employers held a somewhat negative view toward the uptake of digital media, keeping digital media at least at arm’s length. I was aware of their hesitation given my experience working at the firm and the cautious questions offered by the directors whether a digital format should be integrated into the established practice (Blythe 2007a:164). Before starting this study Terroir were already studying their ideas in three dimensions using conventional media and operating across multiple physical locations. The design influences in

1 Martens, Koutamanis et al. used the phrase ‘no place’ in their presentation at the eCADDex 2007 conference (Appendix B FN Fri 28/09/2007). In their paper they argue that the relationship that academia and practice share with CAAD can best be described as ‘ambivalent’ (Martens, Koutamanis et al. 2007:524).

2 To foster the established success of the firm, prior experience working within Terroir’s ideology and design process prior to this study was a crucial aspect of this study.
Terroir were derived beyond an application of a digital technique (Terroir 2007b:np). The firm was hesitant about integrating digital media because of potential impact risks on its design processes influenced by culture, landscape and an interaction of discourse (or ‘words’ as Terroir calls it), drawings and models (Terroir 2007b; Appendix C PP Tue-Fr2-5/03/2004 Slide 10/28; Blythe 2007a:164).

Resulting from my study, I have found, however, that the more negative views (Winner 1986:6; Sanders 1996:4-5) regarding the integration of digital media into the architectural design process tend to distract from the more balanced investigation into how a designer masters an expanding architectural design practice. For this thesis I applied a variety of media to my work, and my practices as a designer continually evolved with their use on a daily basis and it has never seemed necessary to me to adopt any particular position. In other words, I was both skeptical and intrigued at the same time about integrating new digital media into our existing practices.

As a doctoral candidate I have taken a participant-observer position within Terroir where I have been employed for the past five years. During that time, I have risen from an architectural assistant employed to draft the creative director’s ideas to a key role of Design Associate. This journey saw me increasingly gain mastery in the integration of digital media for designing. This knowledge has assisted my own creative growth and the growth of the firm’s design practice in tandem.

Once I started the research, the first project studies that I undertook began to confirm a potential danger that unquestioningly introducing ambitiously sophisticated sets of digital media to established modes of design practice may inadvertently disrupt the design ideology of that practice. At worst, the unthinking application could thwart that practice from realising its aims. The evidence of a potential negative impact of integrating digital media is captured in the project work that I have undertaken in Terroir. This first project study appeared to take the practice backwards but was not ineffectual because through the ‘failures’, I reflected upon potential benefits from the adoption of digital media within the design process, for example its role in iterative designing.

My experiences in responding to my research question, what is the advantage of including digital media as part of the designers’ ‘toolset’ in the early stages of design suggests that the advantage of digital media is not a question of whether or not to integrate the tools. The question is more an issue of how a designer masters an expanding design process through an approach that includes ideas, conventional media and digital media. As I will demonstrate in my thesis, digital media can
generate and communicate design but it does not automatically result in advances to an architect's ideas. In turn, an architect's ideas can benefit from the design generated and communicated through digital media in a collaborative architectural team environment. My thesis demonstrates the changes that occurred through the integration of digital media and, conversely, possibilities to opportunistically further improve on conventional design practice. My research suggests that mutuality exists in the relationship between the designer and their digital media. Through their co-evolution changes can occur where they are not only integrate digital media with design, but also see both media and design practice changed through their integration. I will discuss how an uptake of digital media gives grounds for a new specialised role in practice. Particularly as I specialised in designing at the front end of the design process with a variety of media, including digital, the way that I engaged with the firm around me adjusted. A new role emerged within the collaborative firm of architects, which I have called in this thesis the digital ideator. It is a role that I will demonstrate as potentially being central to digital media integrated with design practice.
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I have conducted participant observation within the architectural firm, Terroir. Terroir directors Scott Balmforth, Richard Blythe and Gerard Reinmuth, and Terroir employees, contributed to the projects and development of my research findings.

LIST OF ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AACA</td>
<td>Architects Accreditation Council of Australian</td>
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<td>AEC</td>
<td>Architecture Engineering and Construction industries</td>
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<td>AIA</td>
<td>American Institute of Architects</td>
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<tr>
<td>ARC</td>
<td>Australian Research Committee</td>
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<tr>
<td>CAAD</td>
<td>Computer Aided Architectural Design</td>
</tr>
<tr>
<td>RIBA</td>
<td>Royal Institute of British Architects</td>
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<tr>
<td>RMIT University</td>
<td>Royal Melbourne Institute of Technology</td>
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<tr>
<td>RAIA</td>
<td>Royal Australian Institute of Architects</td>
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<tr>
<td>SIAL</td>
<td>Spatial Information Architecture Laboratory (at RMIT University)</td>
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PART 1: BACKGROUND CHAPTERS

CHAPTER 1: Outline of Study
Introduces my primary question, theoretical framework of this study and introduces the various parties involved.

CHAPTER 2: Definition of terms
Overviews a series of terms that I use throughout this thesis

CHAPTER 3: Research Design
Reviews my research methodology for this postgraduate research in embedded practice

CHAPTER 4: Review of Available Literature
Presents a review of available literature. Surveys some of the key foundational influences of this study

PART 2: EMBEDDED PRACTICE RESEARCH

CHAPTER 5: Parametric Designing
Examines parametric software CATIA in an attempt to use the software as design media

CHAPTER 6: Iterative Designing
Examines animation software in an attempt to use the software as design media

CHAPTER 7: Interactive Designing
Explores various digital media integration and how they can be advantageous in designing in the early stages

CHAPTER 8: Integrating Digital Media
Overarching interpretations, reflections and summations of my experiences in integrating digital media into the early stages of design in a mid sized architectural design practice

CHAPTER 9: Practicing Digital Designing
Explores changes to the role of the designer and discusses a new role in practice offered by the possibilities afforded by integrating digital media

Summation : Towards Symbiotic Designing
propose conclusions to this study with reflections upon the extent of advance in integration of digital media
CHAPTER 1 OUTLINE OF THE STUDY

My research investigates the relationship between the architectural designer and the use that he or she makes of digital media as part of the design process. My principal research question is: what is the advantage of including digital media as part of the designers’ ‘toolset’ in the early stages of design? The context is a highly successful and high profile mid-sized Australian architectural practice. The study considers the nature of architectural designing as a creative activity and the extent to which advantages could be gained by including digital media as part of the designers’ toolset in the early stages of design.

Designers seem to be polarised between championing the role of digital media as part of their design processes and downright rejecting it. One such extreme position is a view that this media has either ‘no place’ (Martens et al. 2007:np; Sanders 1996:4-5) within architectural design and is thus seen as ‘just another tool’ filling at best an ancillary and service role in the design process (Kvan, Mark et al. 2004:np). This view suggests therefore that designing with digital media has hardly advanced (Corrigan 2003:86). An opposing view is that digital media can take a more fundamental place to advance design methods (Rahim 2006:1), even revolutionarily improve the design process beyond ‘question and debate’ (Winner 1986:6 in Steele 2001:13), resulting in a ‘new architecture’ (Lindsey 2001:12) and encouraging significant change in designing through semi-automated generation of design and interconnected ways of communicating (Lindsey 2001:12).

My study has found, however, that the more negative views that suggest that architects are 'technophobic' ignorant' or cheap' (Sanders 1996:4-5) regarding the integration of digital media into the architectural design process tend to distract from the more balanced investigation into how a designer masters an expanding architectural design practice. In my research on the application of a variety of digital media to design work, I observed that my practices as a designer continually evolved with daily use of this media. During this study, however, I avoided adopting any particular position about the usefulness or otherwise of digital media, and was both sceptical and intrigued about integrating new digital media into our existing practices.

3 Martens, Koutamanis et al. used the phrase ‘no place’ in their presentation at the eCADDe 2007 conference (Appendix B FN Fri 28/09/2007). In their paper they argue that the relationship that academia and practice share with CAAD can best be described as ‘ambivalent’ (Martens, Koutamanis et al. 2007:524).
My research has been undertaken within a highly successful mid-size Australian architectural firm, Terroir. The firm has been recognised for its remotely operated design process and the resulting completed projects located primarily in Tasmania (Rice 2000:16-18; Jackson 2007:204-217; Marreiros 2007:6, 192-203)\(^4\). Undertaking postgraduate study through action-research participant observation assisted me in identifying and investigating some dilemmas in design practice. The benefits of basing my research in an architectural firm permitted a real-time expose of design practice as opposed to a theoretical or distanced study in a purely academic environment. I participated in a range of project studies in Terroir, including international competitions that achieved highly successful results and the conception to construction of innovative designs that were published in architectural publications. These project studies will be described and analysed in Part 2 of my thesis.

Prior to my research, my employers held a somewhat negative view toward the uptake of digital media, keeping digital media at least at arm’s length. I was aware of their hesitation given my experience working at the firm and the cautious questions offered by the directors whether a digital format should be integrated into the established practice (Blythe 2007a:164). Before starting this study Terroir were already studying their ideas in three dimensions using conventional media and operating across multiple physical locations. The design influences in Terroir were derived from an application of a digital technique (Terroir 2007b:np). The firm was hesitant about integrating digital media because of potential impact risks on its design processes influenced by culture, landscape and an interaction of discourse (or ‘words’ as Terroir calls it), drawings and models. In Terroir, design practice ‘began as, and is sustained through, conversation’ (Appendix C FN Fri-Sat 21-22/10/2005), and includes ‘an elegant system of marks’ (PP Tue-Fr2-5/03/2004 Slide 1/28), and ‘the model emerged at an early stage as a tool for giving material form to primary ideas emerging from that discussion’ (Blythe 2007a:164).

The outcomes of my research benefited the firm as a whole. The firm expanded its existing toolset with new digitally supportive media and gained knowledge about the digital practice of architectural design.

\(^4\) Having worked with Terroir prior to this study was a crucial aspect of this study. Understanding the particularities of the firm was an important element in integrating digital media and analysing the shifts and changes resulting as a part of my practice fieldwork.
Background Motivation for My Research

This section describes my relationship with my industry partner firm, the role that I hold in the firm and the motivation that sparked my investigation into the use of digital media in design. I will also outline the initial component questions that I consider later in this thesis.

My role as a research candidate was to be an ‘explicitly independent participant-observer’ researcher whose raison d’etre was to criticise rather than conform’ (Maher, Nelson et al. 2006:np)5. My candidacy began on the 1 March 2005. Before then, I had assisted the creative directors at Terroir in architectural design. After this date, I designed within an academic framework. I immersed myself fully within the academic research position, while maintaining my pivotal position as senior designer. This dualistic position ensured a connection to the architectural design in a practice context. Operating alongside the creative directors of Terroir provided me with a privileged view into the directors’ main interests, including the paramount role of the architectural ‘idea’. This privileged view afforded me the opportunity to exert an influence on the way that digital media is applied into the design practice of Terroir. My mode of research established a partnership between me as the candidate, Terroir and Royal Melbourne Institute of Technology (RMIT University). My postgraduate research was hosted by Spatial Information Architecture Laboratory (SIAL) at RMIT University. At the architectural firm Terroir, I both fully practiced architecture and operated as a research observer and participant provocateur. This thesis is the result of my participant observations.

Before working with Terroir, I completed my undergraduate studies, and over a three-year period was employed in several mid-sized firms in assistant architectural designer roles. I joined my industry partner firm, Terroir, in 2002, and shortly was established in a key designer role. I was involved in the design and documentation of most of the firm’s key projects and developed the practice of computer-aided drawing from 2003 until starting this research. This experience in design, practice and digital media provided insights into the challenges, and began to suggest a possible research topic. The research topic arose out of the limitations in meshing these three fields. At this stage, the directors and I became aware that SIAL was offering a new postgraduate research program. The program presented an opportunity in which to investigate the topic in a highly supportive and analytical way.

5 Andrew Maher, Inger Mewburn and Anitra Neilsen have published several articles discussing and comparing collectively the observations and experiences of four ‘embedded’ candidates in their respective industry partner engineering and architectural firms. These investigations formed part of an overarching project assessing the benefits and implications of the SIAL program itself. Some of these papers are noted in the appendix (Volume 2) of my thesis.
At the beginning of my research, I was familiar with the conventional practices of Terroir and that my own undergraduate architectural training included many conventional media explorations. From the outset, I was aware of the value that the directors placed on existing conventionally based design techniques of words, drawings and physical modelling. I was aware that my findings in the new digital techniques would be critiqued by the firm for its consequences, good and bad, within established effective design practice.

At the start of my research, Terroir’s design process involved the integration of three traditional components: first, words conveyed through face-to-face conversation and email discussion; second, hand drawing and CAAD drafting; and third, three dimensional physical models (Appendix C PP Tue-Fr2-5/03/2004 Slide 10/28; Blythe 2007a:164). These components were conventional in the sense that they were highly manual. The process did not engage in generative computation in the early stages of design or surpass the typical and standard production uses of digital media by some other architectural firms. That is, my firm’s internal design work processes successfully used conventional, familiar, and proven, if not unenterprising, architectural media and illustration techniques. Charles Rice, a Sydney based academic, described the firm’s process in a journal publication as, Terroir uses ‘initial diagrammatical sketches to architectonic models’ within an email-based dialogue between the three directors in a process that ‘renders concepts and ideas quite transmissible between them’ (Rice 2000:16-18). More recently Jackson and Marreiros have included in-progress and completed projects by Terroir in publications showcasing high-quality Australian architecture (Jackson 2007:204-217; Marreiros 2007:6,192-203).

I quickly related to the firm’s ideology and my contributions to it, but my ability with digital media led me to consider a research application to the SIAL’s embedded practice program. My initial aim for my study was to expand the toolset of an architectural designer without forgoing

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6 I completed my first architectural university degree in 1998 and my second architectural university degree in 2001. In 1998 digital media was rarely used in architectural education. Teachings in its use in architectural practice were minimal. By 2001, digital media was only beginning to be used by students in design. Communication courses during my education were primarily focused on conventional media, including hand drawing, drafting and physical models.

7 As I will discuss later in my thesis, in 2000 architectural firms were already using computer drafting for the production of two-dimensional documentation of designs and using rendering and simulation media for presentation of design. By 2004, the same year that I was beginning to question the established practices in Terroir, increased explorations into digital media were being presented in academic and architectural publications (Liu 2003:7). My research addresses these changes and captures in real time the developments and implications of digital media that occurred in Terroir.
the established practice, the ideology and the design processes that had attracted positive
attention by other practitioners and academics. I recognised at an early stage of my study that,
due to my role as principal designer and my regard for Terroir’s established practices, I naturally
privileged the established ideology and culture of the firm over any new digital techniques that I
introduced. My decision to privilege the practices was essential to maintain the integrity of the
firm’s design process. I also recognised the opportunity and authority to be an agent
provocateur with the new digital media that I introduced as a part of this postgraduate study. I
realised that the integration of new digital media would catalyse a wide range of reactions at
Terroir. At different times, these new developments were thoroughly analysed against the
established practices of Terroir, by the methods that I discuss in Chapter 3 Research Design. The
outcome of the analysis forms the body of discussion within this thesis.

I was aware that the firm was changing, particularly in response to its rapid increase in size in
2004. I suspected that the firm’s growth in that year had changed the governing ideological,
philosophical and cultural values of the firm, and that the tacit knowledge of the values held by
the firm’s employees was in jeopardy of being undocumented and hence lost to subsequent
undertakings. I believed that a higher understanding and dissemination of the values back to the
office was necessary8. The original core value of the firm is discourse (or ‘words’), which
involves rigorous debate. Debate not only is a feature of the design process but also extends
into any area, from design to administration. In Terroir, a debate is validated against how a
change may affect established principles. An awareness of this approach was ingrained in the
long-standing staff of the firm but not easily transferred to new employees. I was aware that I
could use my research to disseminate values of established practice, insights into the
implications of new digital techniques and the way the new techniques can integrate with the
established effective practices.

Initial Component Questions of Primary Research Question
To address my primary question, I formulated a series of component questions, which came
from my experience in meshing three fields: designing in the early stages, architectural practice

8 My suspicions concerning tacit knowledge in practice corresponded with the basis of the embedded practice
program. Maher, Nelson et al. discuss the limitations of tacit knowledge in practice where lessons learned on projects
are rarely channelled into and/or inform formal office systems (Maher, Nelson et al. 2006np). Maher, Nelson et al.
were instrumental in constructing the outline for the embedded practice program.
and integrating digital media. I have classified these questions into two different groups: practice and culture.

The first group is an account of practice, which covers practical implications of integrating digital media into the firm’s established design practice. Questions included:

- Does mapping new digitally supportive media contribute beyond merely being production and automating devices in the early stages of design?
- How do digital media expand conventional design processes of drafting and models beyond a focus on form?
- How do conventional media mesh with the new digital media and foster design, which is understood as a conversation?
- Would the practical shifts that occur in Terroir’s practice be relevant to other practices, and can my project studies offer an understanding of the relationship between technology and creativity?

The second group of questions centres on the cultural implications of integrating digital media into the established organisation of Terroir. The questions include:

- What are the implications of integrating new digital media into Terroir on the role that I hold within the practice?
- What are the shifts in the culture of Terroir through integrating new digital media?

Organisation of This Thesis
My thesis is set out in two parts. The first part provides a context and a review of existing knowledge about the integration of digital media into the early stages of architectural design and issues surrounding integration of digital media. The second part presents my own practice fieldwork with a view to investigating the implications of integrating new digital media into the firm’s existing design processes.

Chapter Organisation
Part 1 includes Chapters 1-4. Chapter 1 introduces the study. Chapter 2 introduces a glossary of terms. Chapter 3 details my method of research. Chapter 4 reviews the surrounding available published literature relevant to my topic.

Part 2 includes Chapters 5-10. Chapters 5-7 explore various digital media integration in design in the early stages. Chapter 8 explores overarching interpretations, reflections and summations of
my experiences in integrating digital media into the early stages of design. Chapter 9 describes the potential for a new role in design practice.

**Initial Research Results after Commencing the Research**

My research results are described in Part 2, Chapters 5-9. Chapter 5 discusses my first direction in this research, namely to investigate new digital supportive parametric computer-aided architectural design (CAAD) media, in particular the software CATIA™, and to attempt to use this parametric software as a design medium within Terroir. SIAL has considerable experience in using the software CATIA™, a program intended to facilitate extremely complicated aeronautical and ship building designs (Holzer, Tang et al. 2005; Burry 1999; Burry, Felicetti et al. 2004). For example, Dominik Holzer used CATIA™ in his Masters research hosted by SIAL to assist him to consider interactions between engineer and architect and 'design through a protocol of declared parameters' (Holzer 2006:2). CATIA™ is promoted as having the ability to facilitate the manipulation of form and enabling the generation of quick visual iterations of the form, thereby assisting an operative approach to designing (Dassault Systemes 2007:2). This concept of the software was of particular interest to me, as it complemented Terroir’s own ‘iterative’ design process (Appendix C PP 18/08/04 Slide 27/184; Blythe 2007a:164).

The outcome my first research direction into the firm’s projects revealed problems and positives. Despite the parametric concept of the software offering an ideal development for the design process, integrating ambitiously sophisticated sets of digital media into the established mode of design practice inadvertently hindered the design ideology of the practice. However, although the integration thwarted the practice from realising the aims set by the team, this first project study was not ineffectual, because through the ‘failures’, I was guided toward undertaking a new project study in the firm. In this next study, detailed in Chapter 6, I demonstrated clear benefits from the adoption of digital media for generative uses within the design process; in this case, its role in iterative designing.

**Other Research Results**

Reviewing the outcomes of my practice fieldwork undertaken in the first year of my research, I also produced a number of associated results, with positive outcomes for the firm’s design practice, over the following two years of the study. These associated results came about through my participant observation role in the practice and from my review of the available literature. As
shown in Chapter 7, the project studies offered insights into the existing literature. These insights addressed the questions that I had set out to investigate.

Researchers of integrating digital media have suggested that advantages can be achieved for designing through a ‘plurality’ of digital and conventional techniques employed from the start of a project (Benjamin 2004:54). Digital media can also be advantageous when they are used not as a simple application or mapped as digitally supportive tools, but more in their potential to actively assist the architect unfold new ways of seeing a design through the digital-assisted customisation and integration of design elements (Erdman 2004:73). An amalgamation of digital media and design methods assisted me as a designer at Terroir. These digital media helped to mediate the conflicting influences of ideology, site, and clients within the design process. The firm’s approach to design evolved from being suspicious about digital media to embracing a mode of operation that could be hybrid and interconnected in the early stages of the design process. The distinctions between digital and traditional media blurred, and resulted in an interactive process of design, or ‘mediation’, as discussed in Chapter 7.

Chapters 5-7 explore various digital media integration in design in the early stages, and form the basis for Chapter 8. In these chapters, I explore overarching interpretations, reflections and summations of my experiences in integrating digital media into the early stages of design. I also consider how much the designer’s processes can be changed by the digital media itself and, conversely, the extent to which designers opportunistically further improve on conventional design practice. I conclude Chapter 8 by discussing two key research findings. These two findings are: first, that a designer’s practice and new digital media can be ‘enmeshed with the complex constellation, that is, the role of the designer is enmeshed to the technology’ (Coyne, McLaughlin et al. 1996:5) in a mutual relationship; and, second, that the relationship is co-evolving in a progressive journey. The term mutuality refers to the ‘same specific relationship to each other’ or to an ‘activity that is done by two or more subjects equally’ (Oxford Dictionary 2001:588). In this thesis I refer to mutuality to highlight the positive relationship that can exist between the architectural designer and their digital media. I use the term to suggest that the relationship between the designer and their digital media can be productive and that more can result from an interaction with digital media than merely a service to the profession. An architect’s idea can benefit from generative and communicative engagements with new digitally supportive media, as demonstrated in Part 2 of my thesis. This mutual relationship directly engages my primary question, as the advantage of digital media is not an issue of whether to integrate the tools; rather, how a designer masters an expanding design process through an approach that includes ideas, conventional media and digital media. In addition, due to the mutuality there is a co-
between designer and the integration of digital media. As a result, changes can occur where we are not only integrating digital media but also are changed through their integration.

The findings of the previous chapters lead into Chapter 9 and the collaborative impact of the integration of digital media into designing. The introduction of media changed the way Terroir practiced its architectural design, but not in the way I hypothesised at the onset of this research project. Since the start of my research, the organisation of the practice evolved in unanticipated ways. The firm had been established as a collaborative design practice operating over multiple Australian locations. Parallel to other leading firms, Terroir’s primary focus was always upon its ideology and design process in the early stages. Historically Terroir’s creative directors conversed about architecture and design, drew sketches and made models of their designs as their means of communicating the idea of the building to employees of the firm (Blythe 2007a:164). Following a series of conducted trials, today they do not need such sketches and models because they can generate, design develop and document through working with a digitally literate architectural designer. My own experience and understanding of the realities of architectural practice and the capabilities of many digital and traditional techniques offers a productive model of the digitally literate architectural designer within a firm. In response to this mode of practice, I have forged a distinctive specialist role, integrating digital media to assist in the collective design process in the early stages of projects. The role requires thinking and doing, it mediates between poetics, art and style, with interests in technique, craftsmanship, collaboration and pragmatics. It also mediates between the forces of documentation and collaboration and the forces of time and productivity. In turn, the creative directors can steer the digital media through me to formalise and develop creative suggestions into and through a range of tools, both traditional and digital. These creative suggestions can offer results from generative structures through to perspective presentation views.

In the final chapter on practice fieldwork, I discuss how the uptake of digital media may evolve the way a firm of architects practises and works. I track how change has occurred in the way the subject firm designs through the application of new digital media. In addition, I track how change occurs because of a practical need to respond to the larger, and unavoidable, influence of the increasing profile of digital media in our society. Chapter 9 concludes with discussion about my final key finding of my research—how an uptake of digital media gives grounds for a new specialised role in practice. In particular, the way I engaged with the subject firm around me adjusted as I specialised in designing at the front end of the design process with a variety of media, including digital. My new role emerged within the firm of architects, which I have called in this thesis the digital ideator. This role provides mediation between the tools that are used,
design practices and members of a firm. The role becomes pivotal and acts as a bridge across a traditionally large divide between the creative directors that design and the team that implements design ideas. A basis for my suggestion for this new role is that the problem of a divided approach to architectural design practice is that it can be limiting (Cuff 1991:49). In response to these limitations, I suggest that design knowledge can be more advantageously achieved by working up a design in a process that avoids unnecessary separations in the team and by the way that digital media is integrated in the work practice.

The impact of including digital media in the early stages of design in a mid-sized architectural practice results from a mutuality that exists in the relationship between the designer and her or his digital media. Through the co-evolution of designer and their digital media, change occurs to the designer's practice. This progressive journey may result in a new role for digital media in a firm. Generative, communicative and collaborative advantages exist for those firms where the digital media is integrated as part of a shared design practice of architectural designers working together.

**Details of the University Program and the Architectural Firm Involved**

This research is the outcome of an interaction between three parties: a university's postgraduate research program, the associated industry partner's involvement, and me as the candidate. The background motivation for my research is based on the questions that I saw in my own role as a practicing architectural designer whose toolset is increasingly engaged in advancing digital media. I now detail the background of the other two parties, RMIT University and my industry partner firm, Terroir.
Figure 1: The three aspects of this participant observation study.
I have redrawn this figure based on a slide used by Mark Burry in a lecture at the RAIA Conference 2006 on 21 April 2006 describing participant observation study.

Participant Observation Postgraduate Research within Architectural Practice

My research is part of a program within SIAL, which is a resource within the School of Architecture and Design at RMIT University.

RMIT University was established as Royal Melbourne Institute of Technology in 1887. The university is one of Australia’s original and leading educational institutions and is the fourth oldest in Australia. RMIT University is an innovative, global university, with its main campus located in the City of Melbourne. The university, one of the largest in Australia, has an international reputation for excellence in work-relevant education and high-quality research (RMIT University 2007b:np).

SIAL is a ‘facility for innovation in trans-disciplinary design research and education’ within RMIT University (RMIT University 2007a:np). As a part of its innovation agenda, SIAL is concerned with the ‘integration of technical, theoretical and social concerns’ (RMIT University 2007a:np). SIAL resources provide ‘high-end computing, modelling, communication tool and traditional production techniques support’ (RMIT University 2007a:np). Researchers affiliated with SIAL are engaged in a variety of projects. The studies commonly question the ‘artificial distinctions between the physical and virtual, digital and analogue, scientific and artistic, instrumental and philosophical’ (RMIT University 2007a:np). To date SIAL has supported distinctive investigations into a broad range of software and hardware: the associated investigations relate to social and cultural studies. SIAL provides me with the support to
investigate digital media in the early stages of design and undertake my research into a ‘spatial perspective’ within an architectural firm at a postgraduate level (RMIT University 2007a:np).

My research was funded by an Australian Research Committee (ARC) grant awarded to SIAL at RMIT University, titled ‘Embedded research within an architectural practice’ (RMIT University 2005a:np). The program proposed to ‘embed’ postgraduate students in architectural practices (Maher and Mewburn 2007:252). SIAL conceptualised the program in 2003, and initiated it in 2005, and is based on prior involvement in practice-based research (Maher, Nelson et al. 2006:np; Maher and Mewburn 2007:252). Researchers associated with SIAL observed that research could be an integral component of design practice. However, the opportunities for in-depth investigations in practice were generally limited by the ‘day-to-day pressures of production schedules’ (Maher and Mewburn 2007:252). SIAL also found that architecture and structural design practices undertake research usually on a per project basis, but are unlikely to sustain dedicated research and development to capture what is known formally as ‘tacit’ or inexplicit disciplinary knowledge (Maher, Nelson et al. 2006:np; RMIT University 2005a:np). The premise of SIAL’s ‘embedded’ program is that research candidates closely linked to practice are better able to disseminate current research outcomes directly into practice (RMIT University 2005a:np). My research contributes knowledge to SIAL’s observations and aims to capture and document aspects of tacit and new knowledge gained through collaborative work.

SIAL’s aims for this program are explained on their website (RMIT University 2005a:np):

- The first aim in this embedded research program is to investigate different routes to design practice innovation in different and unique practice contexts through project-based research. I am one of four candidates in differing practices investigating the theme of research in practice.
- SIAL’s second aim is to create a better understanding of the factors that lead to change and innovation in architectural design practice.
- SIAL’s third aim is to initiate a forum composed of key members of each of the participating practices for dialogue, leading to new areas of research and development.

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9 Little literature exists on the embedded researcher in architectural practice program. SIAL’s clear aims and the contextual issues are visible from their website. Further information is described in publications by Andrew Maher, Inger Mewburn and Anitra Nelson. SIAL associates believe that this ‘embedded’ program, which supports participant observation-based research in practice, is unique in an international context (Maher and Mewburn 2007:252).
that will help maintain the competitive position of Australian architectural design and its role in the construction industry in the world market.

Together with SIAL, through the direct and continuous involvement of PhD scholars, candidates explore how the processes of the architectural firms in which they are embedded could be mapped onto new digitally supported and supportive ways of working (RMIT University 2005a:np). The individual candidates are responsible for selecting research topics specific to issues encountered in their own particular industry partner practices and that are relevant to the broader industry.

The first research in practice program initiated in 2005 at SIAL included four leading Australian architectural and engineering practices as industry partners. The Industry Partners included: Arup (Melbourne), Black Koslof Knott (Melbourne), McGauran Giannini Soon (Melbourne) and Terroir (Sydney/Hobart) (RMIT University 2005a:np; RMIT University 2005b:np).

**Terroir: Detailed Account of the Firm and Its Established Design Process**

This section covers the background and characteristics of my industry partner firm, Terroir. Understanding the particularities of this ‘idea-focused’ research-based firm (Coxe, Hartung et al. c1987:52-53) was an important element in integrating digital media and analysing the resultant shifts and changes as a part of my practice fieldwork.

The practice was formed in response to the interests of the three creative directors. Gerard Reinmuth is partner-in-charge of the Sydney office, and Scott Balmforth is partner-in charge in Hobart. The third creative director, Richard Blythe, combines a role as an academic—formally as Deputy Head of the School of Architecture at the University of Tasmania, and from 2007 as Head of the School of Architecture and Design at RMIT University—with strategic project-by-project involvement across both offices (Terroir 2007a:np). As the directors mentioned in a 2006 radio interview:

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10 This section concerning Terroir is based on the various publications available on Terroir as a firm and their projects and published by Terroir directors. A detailed list of these references is provided in the Appendix (Volume 2). The Terroir directors prolifically publish and present their architectural projects as a part of their firm’s research-based philosophy.
a series of conversations evolved about the idea of combining academia and practice...about operating in two places...and seeing the opportunity of having two offices in a way of exploring that idea (The Architects on RRR 2006:np).

The directors all have deep roots in Tasmania, from where they all originate. They explain their mode of practice as a ‘multiplicity’ and a ‘cosmopolitan’ approach (Blythe, Reinmuth et al. 2005a). The cosmopolitan approach includes a layered architectural ideology and the multiple locations of the firm (Blythe, Reinmuth et al. 2005:52-53).

The directors chose the elusive-meaning French word ‘terroir’ to name the firm. The term is taken from wine making and is used to describe unique qualities attributable to the earth, or place, of origin of wine species (Terroir 2007b:np). The word is elusive in English, as it has no direct translation from its French origins. The directors feel the term captures critical elements of the way the firm designs buildings. The directors’ interest in this definition is ‘in its reconciliation with the disparate and dispersed nature of contemporary sites’ (Blythe 2007c:15). These sentiments are because the term ‘terroir’, by definition, not only summarises the qualities of a place, it attributes value to a place’s characteristics as a function of human intervention at that place (Terroir 2007b:np).

From the beginning, the directors of Terroir aspired to create and deliver architecture of exceptional quality that builds upon the firm’s Tasmanian origin (The Architects on RRR 2006:np; Harrison et al. 2006:np). They developed an architectural language and ideology that draws on their Tasmanian history and Tasmania’s dramatic landscape. The firm’s architectural ideology is understood as an intersection and manipulation of three ingredients: culture, landscape and building (Terroir 2007b; Appendix C FN Thu 02/06/2005). The directors are interested in investigating how the ambiguous threshold between these three ingredients can be maintained as an almost indefinable aspect of the firm’s architectural designs (Terroir 2007b:np). Specific architectural projects become ‘approximations’ of a ‘terroir’ for any new site, and the resulting built forms ‘acknowledge their context’ (Terroir 2007b:np).

Terroir as a design firm has never been considered as a singular pursuit. Martyn Hook of another Australian architectural trio, Iredale, Pederson and Hook, suggested that triumvirates are leading the way in new research-led firms in Australia (van Schaiik 2005:68). Other Australian triumvirates firms include BKK in Melbourne, B3 in Brisbane and Miramar in Sydney. A tendency in the trio firms is ‘to have one member rooted in academia, one as spokesperson and the other focused in construction’ (van Schaiik 2005:68). Terroir takes on the form of a trio but
all directors overlap and integrate across these roles in their practice across the multiple locations of Hobart and Sydney (van Schaik 2005:68). This overlapping mode of practice facilitated the emergence of my role and the way that I use digital media in their practice, as discussed in Chapter 9.

Figure 2: The three areas of architectural practice organisation.
This diagram interprets van Schaik’s suggestion of the tendency in architectural practice organisation to have one member rooted in academia, one as spokesperson and the other focused in construction (van Schaik 2005:68).

Figure 3: Terroir architectural practice organisation.
To distinguish the difference in Terroir, this diagram represents how the Terroir directors each contribute to the differing aspects of architectural practice.

The directors operate as a single entity. Terroir staff, assisting the directors, ‘share work freely between the two office locations according to their availability and special skills’ (Terroir 2007:np). During 2004-2005, the practice experienced rapid growth, to twenty-five employees over the two office locations, after winning a large hotel project. This expansion and the demands of the new project witnessed the directors delegating many tasks that they would
normally have undertaken—project management, for example, to team leaders who, in turn, direct teams of architectural assistants.

The designs in the early stages of projects continue to be kept closely between the directors (Appendix C FN Tue 07/02/2006). Team leaders and key employees are invited into the ‘inner’ design circle shared between the directors. As the practice expands, and new skills emerge through an uptake of tools, delegation of design is beginning to be shared with key staff. By adhering through familiarity to the established ideology and design process, the staff of Terroir maintains a ‘consistency and approach across all projects’ (Terroir 2007b:np). The changes that have occurred to Terroir’s organisation are discussed later in this thesis.

three different locations

Gerard
Scott
Richard
Sydney
Hobart
Peugeot

...how three draw...
...how sixteen draw...

Figure 4: Terroir design practices.
The above notations are taken from Terroir directors’ PowerPoint presentations, as detailed in Appendix C. Their visualisations, alongside verbal presentations, about the organisation have been used in lectures to explain the design process in Terroir since 2003 (Appendix C PP 11/2004 Slide 2/35; Appendix C PP Tue-Fr 2-5/03/2004 Slide 6/28).
Figure 5: Terroir's circles of design.

The above diagram represents the design team organisation at Terroir. Team leaders and key employees are invited into the 'inner' design circle shared between the directors.

Figure 6: Terroir design practice organisation.

The above diagram, based on the American Institute of Architects’ diagrams of an architectural studio office organisation (AIA 1998:5), illustrates the Terroir organisation as essentially a studio format with layers of hierarchies from creative directors, key staff to other staff architectural assistants.
Terroir's reference base for their architectural design is a diverse and ideologically contrary field of influence. Terroir draws influence from a variety of past, present and future architectural styles (Terroir 2007b:np). Terroir’s architectural influences include deconstruction, functionalism, modernism, post-modernism and phenomenology. Other interests of Terroir branch into fields of philosophy and art, including the land art of Michael Heizer, Carl Andre or Walter de Maria. Terroir fosters the belief that artistic influences should enhance architectural design (Terroir 2007b:np).

Terroir’s design is driven by three ingredients: culture, landscape and building, which are made manifest through an established collaborative dialogue and a diagrammatic11 design process (Terroir 2007b:np). From an early stage, the firm’s designs resulted from a design process that drew from an interaction of words, drawings and models (Appendix C PP Tue-Fr2-5/03/2004 Slide 10/28; Blythe 2007a:164). Implications of the new digital media are discussed in later chapters against the backdrop of these three processes.

The principal driver of the practice has always been a ‘conversation about architecture and its possible intention’ (The Architects on RRR 2006:np; Harrison et al. 2006:np). The very nature of the firm’s collaborative approach, instigated by the establishment of three creatively contributing directors, defines the design practice as one where the notion of ‘discourse’ is central to the work (Terroir 2007b:np). Verbal ‘ideas’12 that are generated through dialogue are considered to be of primary importance. Terroir regards its design process as an intellectual, literary and observational process (Terroir 2007b:np).

Terroir directors have made their own investigations into the ideology and process of design of the firm. Two directors completed Masters studies at RMIT University in 2007 and the third director is expected to complete PhD research at RMIT University in 2008. The core of their

11 On the firm’s developing ideology, the directors note that their design process involves discourse and the search for a key ‘diagram’. As discussed in the following pages, the diagram is used ‘stripped of detail to assist the design team in visualizing the ‘pure’ manifestation of ideas that emerge through the discourse’ (Terroir 2007b:np).
12 At one point in my research I suggested that Terroir’s designs, through its collaborative process, result in ‘stories’. However, Terroir advised against using the term ‘story’, as the term aligned Terroir’s design process as a narrative applied to a project. Hedjuk was given as an example of this approach (Shkapich 1985; Libeskind 1985:10-11). The term ‘story’ was countered through examination of Terroir’s design process by other researchers including Marcelo Stamm of the University of Tasmania (Stamm 2007:112-113). The expanded description resulting from Stamm’s research and my discussions with Terroir directors explained that the process was a layering of multiple ideas that was merely referred to, through familiarity of the design team, as a ‘story’.

29
three research projects centre around different aspects of Terroir’s design ideology, characteristics, organisation and management. Resulting from their studies are explanations of Terroir’s design process. In their PowerPoint presentations to university audiences, Terroir directors suggested that many ‘ideas’ are generated at the start of the Terroir design process, and over the process of reviewing, discussing and distilling them, through debate, ideas are rejected and a singular architectural proposal emerges (Appendix C PP Fri-Sat 21-22/10/2005 Slide 8/51).

![Terroir's diagram of the design process.](image)

*Figure 7: Terroir’s diagram of the design process.*

Richard Blythe, director at Terroir has used this diagram in a PowerPoint lecture, as detailed in Appendix C. The diagram describes how ideas can expand and become multifaceted over time and how, in Terroir, the design team selects and coordinates from these numerous ideas to refine and coalesce a single project’s proposition. (Appendix C PP Fri-Sat 21-22/10/2005 Slide 8/51)

The Terroir design process has always involved rigorous debate and distillation, the first technique of their design process. Discourse is used in debate to result in ‘ideas’ about and around the specific architectural projects. An idea is a ‘thought or suggestion about a possible course of action’ (Oxford Dictionary 2001:442). The term can also define a mental impression or belief. The term’s origin derives from the Greek notion of form or pattern (Oxford Dictionary 2001:442). In this thesis, I have used the term ‘idea’, as opposed to concept or design driver, for the two reasons. First, as Terroir suggests, a driver of the firm’s design are ‘ideas that result from conversation about architecture and its possible intention’ (The Architects on RRR
Terroir’s ‘ideas’ ‘may be histories, they may be stories, they could be maps or even site plans’ (Stamm 2007:112; Benjamin 2006:81). Terroir understands their architectural design not as the representation of an idea but as ‘ideas’ that are used productively and/or operatively to open up possibilities (Balmforth, Benjamin et al. 2007:50-51).

Second, in examining contemporary practice, Coxe has distinguished types of architectural firms as ideas, service or delivery focused (Coxe, Hartung et al. c1987:52-53). My industry partner firm fits into the ideas-focused category.

This rigorous design process is used to result in a justifiable and robust ‘idea’ for the project. Marcelo Stamm of the University of Tasmania explains the Terroir design process as follows:

… Terroir design history starts with sites and places which ‘occur within narratives [which] may be histories, they may be stories, they could be maps or even site plans’ (Benjamin 2006:81). It responds to these constructs of ideological and logical space by creating analytic constellations of problems, questions and people. The aim is to explore the potentialities of the situation, firstly through an analytic process … strikingly, this process exhausts itself, though not in the sense of an exhaustive analysis and articulation of all possibilities. The leap from options and potentialities to the actual design and manifest object is not explained in terms of an optimal or adequate option. In fact, the phase that precedes the actualisation is a moment of crisis’ (Stamm 2007:112-113)

Despite its tenacity, the rigorous design process in Terroir is complemented by a sense of play. In an interview, Gerard Reinmuth, a director of Terroir, noted that what made a good architect in his opinion was ‘tenacity, tenacity, tenacity … and humour. Architecture is just not funny enough’ (Specifier 2002:96). The aim in Terroir is to maintain a rigorous and balanced design ideology, ‘with flair and restraint in balance’, to ensure that the ‘architecture emerges as a fresh and vital statement’ (Specifier 2002:96).

This discourse is augmented by the second technique of formalisation. For Terroir, the formalisation process in the early stages centres on the search for the key diagram. The diagram is derived through drawing and/or drafting and provides a bridge between the priori idea to the building form (Terroir 2007b:np). The diagram becomes ‘a means of describing the formal territory and the sculptural and spatial dialogue between the building and its context’ (Terroir 2007b:np).
Figure 8: Terroir’s design processes.

The above visual notations are taken from Terroir directors’ PowerPoint presentations, as detailed in Appendix C, and used to help explain their design process in lectures (Appendix C PP Tue-Fr 2-5/03/2004 Slide 1/28; Appendix C PP Tue-Fr 2-5/03/2004 Slide 10/28; Appendix C PP 18/08/04 Slide 27/184).

The third technique in the design process is the physical model. The model was acknowledged early on in the history of Terroir as a key component in understanding and developing the design (Blythe 2007:164).

The reality of an architectural practice with multiple directors, multiple ideas, and multiple locations led the firm down the very pragmatic path of early digitalisation of the practice (Appendix L FN Fri 03/11/2006A). The early digitalisation was due to the firm’s disparate locations and the discursive and multiple authored nature of the design process. The directors initially communicated over the Internet by email to agree on architectural ideas and designs. Designs were developed and procured with the assistance of digital cameras to capture the developments of models and on-site works.

The firm’s design processes were facilitated and developed in response to digital conditions. Without the digital media of telephone and email\(^{13}\), the practice could not have existed in the way it has evolved. A generation ago this approach to working at Terroir—a mid-sized collaborative practice operating over several remote locations—would not have been as effective. The previous modes of practice would have been limited by bulky conglomerations of offices and intermittent and prolonged communications.

\(^{13}\) Initially, in 1999, facsimile machines were used by the creative directors to communicate between disparate locations. By 2002, email had replaced fax in the design process and was increasingly being used for most external communications and nearly all internal communications, even within the same physical office location.
The multiplicity in both project and collaborative contexts, and the deployment of digital media to enable this multiplicity, has assisted in the completion of a body of work over the past eight years. The directors recognise that due to constraints on procurement, including budget constraints and client briefs, the projects have been delivered using conventional forms of contract, documentation and construction (Appendix L FN Fri 03/11/2006A). Their use of conventional process and their recognised body of work suggest that these constraints have not restrained the work necessarily and that Terroir has not stood as a vanguard in new delivery methods (Appendix L FN Fri 03/11/2006A). The firm’s focus is on innovative design process, not delivery.

Given this focus, the directors supported my application for the SIAL program to investigate the implications of integrating new digitally supportive media into the established practices at Terroir. The directors and I believed that postgraduate research could lead to a greater understanding of what I do, and the specific role that I have carved out, in the firm. Through my appointment and this resulting thesis detailing practices, the directors have also achieved an expansion of knowledge about themselves and the way the firm designs.
CHAPTER 2 DEFINITION OF TERMS

This chapter defines the terms used in this thesis. These definitions are more than a glossary of terms and as a collection should be read as a preliminary chapter. The chapter sets out some core values that inform my thesis. The definitions set out a preliminary map of my readings and influences. The definitions provide an explanation of my understanding of each term based on available literature and qualified by my own experience. This chapter covers a number of terms that are used regularly through available literature, sometimes quite ambiguously. For example, *digital tool* can often interchange with *digital media*, but as Glanville (Glanville 1992:213) suggests these two terms can suggest different approaches or characteristics in use. Thus, this chapter forms a thorough review of terms and provides a significant contribution to the clarification of the following thesis. This chapter also indicates a history and some results of the different aspects of my evaluation.

Apart from definitions sourced from common dictionaries and encyclopaedias (for example Oxford Dictionary 2001), the following definitions are sourced through a few significant textbooks regarding digital media. These include Mitchell and McCullough (1991), Mitchell (1977) and Kalay (2004). I have also used my own experience and that of my industry partner firm, Terroir, as a reference.

**Architecture**

Architecture refers to the practice of designing and constructing buildings. The term can also refer to the style that of a building’s design and construction (Oxford Dictionary 2001:40). Architecture embraces both aesthetics and utilitarian ends. These two aspects may be distinguished but not separated and the relative weight of either aspect can vary from project to project and firm to firm (Encyclopaedia Britannica 2002:530).

**Architectural concept stage**

The activity of architectural concept stage involves designers forming plans or ideas (Oxford Dictionary 2001:174). Architectural concept stage is the earliest phase in which the design of a building is conceived. The concept stage is recognised by architectural industry bodies, including the Royal Australian Institute of Architects, as the first stage of client-architect engagement in the design process (RAIA 1998b:7).

**Architectural design**

Architectural design is the actions involved in generating the form of a building and producing plans and drawings that show the appearance and working of the building before it is
constructed. It also refers to the actual plans and drawings produced (Oxford Dictionary 2001:236).

**Architectural designer**

The architectural designer is the person who undertakes the architectural design (Oxford Dictionary 2001:236).

**CAAD**

This abbreviation stands for Computer Aided Architectural Drafting. CAAD refers to computer-based programs used for drafting, visualising and testing in an architectural designer’s design process. CAAD covers digital programs available for architectural design, as opposed to CAD, which defines Computer Aided Drafting available for other industries such as engineering and manufacturing. CAAD used in architectural designing started by mimicking conventional tasks and skills. The digitised tools facilitated the ‘solving of discrete mathematical or data manipulation problems’ (Kvan, Mark et al. 2004:np). CAAD has grown from a minority activity used by a ‘few academics to a multi-billion dollar international industry’ (Maver 1995:1).

**Co-evolution**

Co-evolution refers to a process by which different kinds of organisms develop from earlier forms in response to one another because of their interaction (Oxford Dictionary 2001:305). As I will discuss in more detail in Chapter 8, in addition to one of my key findings, mutuality between architectural designer and their digital media, is another finding of co-evolution occurring between these two parties. From the start of my study, my aim has been to understand not only the implications of the digital media in practice but also the factors that lead to change and innovation in practice. I use the organic term co-evolution to describe the characteristics of change that have occurred to Terroir’s design practice through my research. I use the term to emphasis that the nature of change between the relationship between the designer and their digital media are ‘living’, they are not fixed but will continue to evolve and expand with continued practice and investigation.

**Concept**

The term concept defines an ‘abstract idea’ (Oxford Dictionary 2001:174). In philosophy, the term defines an idea or mental picture of a group or class of objects formed by combining their aspects. The term can often be used colloquially to refer to an idea or invention to help sell or publicise a commodity (Australian Concise Dictionary 2004:284). Concept and idea are closely related. Refer to ‘idea’ as an explanation of how the terms ‘concept’ and ‘idea’ will be used in this thesis.
**Conventional media**

By conventional media, I am referring to media readily used within Australian architectural practices from drawing and physical modelling to photography, and crafts in drafting, typology and page layout. I also include some digital computer aided architectural drafting (CAAD) media that have become typical to architectural design. Ignoring these would overlook the developments that have already occurred. By conventional media, I refer to CAAD that is readily employed by the majority of architectural firms to develop and document a design and various digital media available used by architectural designers to present designs.

By the year 2000, the architectural industries, in small and big firms all over the world, were aware of many CAAD media. Most firms were generally using CAAD for plans, elevations, sections in media such as AutoCAD™, computer rendering and simulation for three-dimensional spaces using programs such as 3D Studio Max™, Form-Z™ and Maya™, computer animation and finally multimedia presentations using Premiere™. The typical view of architectural practices was that these digital media were ‘good for design presentation but not for design’ (Liu 2003:7).

**Conventional architectural illustrations**

These include hand-drawn sketches, pen and ink drawings, and watercolour renderings.

**Design**

The term design is multifaceted. The term is used in everyday conversation and holds different meanings by particular groups (Lawson 2006:3). It is used in this thesis to refer to an end product and a process (Lawson 2006:3). The term design can define a plan or drawing produced as well as the action involved in making the plan or drawing (Oxford Dictionary 2001:236). Generally, design is a highly complex activity and can require sophisticated skills (Lawson 2006:14). As I will detail further in my review of literature, I understand that a commonly used description is that design is a process of conscious decision-making.

**Design ideology**

Design ideology refers to the design principles and values of an architectural firm. It includes aspects of style and aesthetics.

**Design practice**

This term refers to the action of undertaking design. Design practice is idiosyncratic depending on the way that an architectural designer designs.
Digital media
The word media comes from the plural of the Latin word medium, means by which something is communicated or achieved. It acts as a collective noun able to cover a group of medium (Oxford Dictionary 2001:555). In this thesis, I use the term ‘digital media’ to refer collectively to the digital software and hardware that I am using in practice. I also refer to it in a collective sense however, as a designer, I am typically engaging more than one type of digital media.

I will use the term digital media to identify when the uses of digital technologies are acting ‘generatively’ (or ‘out of control’) (Glanville 1992:213). Media is an ‘extension’ of some human faculty, physical or psychic (McLuhan and Fiore 1967:26; McLuhan 1964:7). Media alters the way we think and perceive the world (McLuhan and Fiore 1967:41).

Digital media is used in this thesis to define the media that goes beyond the conventional. For example since 2000, some architectural practices explored new perspectives opportunities, liberation of form and space, parametric intelligence, and co-existence of physical and virtual collaboration. Since 2004, architectural practices have began to more commonly move toward utilising the advantages of all of the above and integrating simulation, animation and rapid proto-typing (Liu 2003:7).

‘The digital’
‘the digital’ is a concept where digital media is an ‘alien graft to the supposed body of architecture’ (Mackenzie 2004:16) which has meant that a lingering technophobia remains in both architectural practice and academia. The phrase is used to distinguish (negatively) the domain that relates to the use, investigation and knowledge in digital media (Mackenzie 2004:16).

Digital animation media
Digital animation media is used to distinguish a particular type of media, in this case animation software. Digital animation media covers the range of animation software programs that are available for architects and other computer users, for example 3D Studio Max™.

Digital architecture
The phrase ‘digital architecture’ emerged after the year 2000, prior to this year the term did not exist. (Lui 2003:7). Digital architecture is sometimes used to distinguish particular architectural practices that practice designing and constructing buildings primarily within and through digital media. Extreme views of digital architecture design and the impact of the computer in design exist (Martens, Koutamanis et al. 2007:524; Sanders 1996:4-5; Steele 2001:13). I will detail some
of these views later in this thesis. One concern in integrating digital media in design is that it results in essentially formal outcomes (Lui 2003:7; Coyne 1991:422). The formal outcomes are namely complex and previously unrealisable double curvature forms allowing new aesthetics for architecture (Lui 2003:7).

**Digital architectural designing**
Digital architectural design refers to the action of generating design proposals, or the form of the project, producing plans and drawings of architecture within digital media.

**Digital architectural visualisation**
I refer to digital architectural visualisation in this thesis to categorise the variety of digitally supported or generated images, montages, models, simulations and animations used in the early stages of designing. I use the term to distinguish from conventional architectural illustrations including hand drawn perspectives and sketches.

**Digital architectural idea visualisation**
I have coined this term to distinguish a particular type of digital visualisation created for the presentation of architectural design. It is the art of creating, for example, a two-dimensional image using digital media. The visualisation presents the attributes of a proposed architectural design in a way that best represents the ‘idea’ of the project. This visualisation has a greater level of abstraction than the conventional photo real visualisation more commonly used by architects for presentation of projects.

**Digital architectural light and shadow study rendering**
Digital architectural light and shadow study rendering is a specific type of architectural illustration. The illustration requires the creation of a three-dimensional model of a proposed building in its context. Images are then generated using light and shadow study digital media to compare the proposed architectural design to the movement of the sun.

**Digital architectural photomontage**
Digital architectural photomontage is a specific type of architectural visualisation. It is the art of creating, for example, a two-dimensional image using digital media. This visualisation presents the attributes of a proposed architectural design. The proposed building is typically mounted in front of a photograph taken of existing site conditions.

**Digital architectural rendering**
Digital architectural rendering is a specific type of digital architectural visualisation. The computer generated digital architectural rendering (or photo real visualisation) increasingly
replaces conventional architectural illustrations. They require the creation of three-dimensional models built to the right proportion and scale. Software is then used to imitate real life textures, material and colours. They are typically used for presentation, marketing and design analysis purposes (Liu 2003:7).

**Digital architectural simulation**
A digital architectural simulation is a model that imitates accurately and realistically the appearance and nature of a proposed building.

**Digital architectural walk through and fly by animations (movie)**
Digital architectural walk through and fly by animations (movie) is a specific type of architectural visualisation. The visualisation requires the creation of a three-dimensional model of a proposed building in its context. A movie file is generated by ‘walk through’ and ‘fly-by’ digital media and presents the internal or external spaces of the proposed building.

**Digital communication media**
The term digital communication media covers the range of digital communication programs that are available for architects and computer users including Wikis, Blogs and email based programs like Microsoft Outlook™.

**Digital context**
Digital context refers to the ‘new environment’ that has been created by digital media. The new setting is unburdened by the ‘laws of nature’ and has a particular quality as it is ‘viewed through pixilation’ (Binkley 1997:115).

**Digital data**
Digital data is raw instructions for interpretation by software. Digital data can be files that contain information to be processed or application files that undertake processing. The information is encoded as collections of 1s and 0s, which represent real numbers, characters or are instructions to perform certain operations. Depending on the data’s structure, the data can represents holistically complex things such as sound files, image files, geometry files (Mitchell and McCullough 1991:1-3; Mitchell 1977:5-6)

**Digital design**
Similar to digital architectural design, digital design refers to the action of generating design proposals with digital media. As I will demonstrate later in Chapter 7, design often and can involve a variety of media, both conventional and digital. Thus, terms such as digital design, or digital architecture, that have emerged in the architectural and design industry since 2000 (Lui
may evolve to respond to new design practices. In later chapters I use the term design to acknowledge the hybridity of my design toolset.

**Digital distortions**
As digital media is not physical, aspects of aesthetics, scale and proportion can be distorted. Viewing a digitally modelled object on a computer screen, and not viewing the physical three-dimensionality of the object, can give a misleading account. This can be rectified by using multiple views of digitally modelled objects, fly around movies and creating physical models of the digital object.

**Digital domain**
The digital domain includes the use, investigation and knowledge in digital media.

**Digital drafting file**
For a detailed description refer to (Mitchell and McCullough 1991:99) and (Mitchell 1977:14-18). Digital drafting files differ from image files. Where an image file is created by pixilation the drafting file is based on a raster format. I refer to digital drafting file to define a file that contains only two-dimensional information. The architectural industry, in small and big firms all over the world, commonly use computer drafting for plans, elevations, sections using programs such as AutoCAD™, Microstation™, ArchiCAD™. These programs produce a particular file format. The industry standard is .dwg, which can typically relate to files and interchange with files generated by engineers. Several digital drafting files can be linked (termed x-ref in AutoCAD™) to result in a large drawing in a minimal file size. As Espinosa-Aguilar suggests linking and externalizing data significantly reduces drawing size (Espinosa-Aguilar 2008:np). The linked files accommodate teamwork and computer hardware with limited capacity.

**Digital drafting system**
Is the software package that create digital drafting files. For example AutoCAD™, Microstation™, ArchiCAD™.

**Digital model file**
Digital model file is a type of digital data that contains the raw instructions for interpretation by modelling software such as AutoCAD™ or 3D Studio Max™.

**digital ideator**
Refer to ‘Ideation’ for further explanation of the term. In my industry partner firm, Terroir, ideation staff perform common designer tasks within the practice in collaboration with directors. They prioritise and guard the firm’s ‘ideas’ against utilitarian and pragmatic factors.
The ideator also works with other employees within the practice taking into account their inputs (Appendix C FN Fri 08/09/2006; Appendix C FN 11/2006).

The digital ideator is not a position, but an additional role. Identifying and outlining the digital ideator’s role as an extension of practice is a key finding of my research, further described in Chapter 9. The term is used in this thesis to distinguish additional characteristics and responsibilities resulting from prioritising ‘ideas’ that may result from a variety of sources, expanding a ‘toolset’ of a designer within an existing firm. The role is undertaken by architectural designers who perform the ideation design tasks, have skills in architectural design and have skills in a variety of media, in particular digital media. Through a process of ideation, the digital ideator works up a design for an architectural project alongside other creative directors.

**Digital image file**

These differ from drafting files. Digital images are data files that explain variations of light intensity across a visual field which when interpreted by the appropriate software plot an approximation of an image. In bitmaps, these are stored as an array of integers where each integer specifies intensity. A single square is called a pixel (for picture element). These come together in a raster grid or a single line is called a raster line (Mitchell and McCullough 1991:73). The sophistication of contemporary image software means that a designer rarely engages with the raw integer. Low resolution or the translation through media can produce blurring or distortion in a digital image. The distortions can result in a difference in appearance from the original traditional image. These distortions in digital imagery can be unnoticeable, so the image-processing software can efficiently substitute for traditional techniques of painting and photography and extend the traditional practices in interesting ways (Mitchell and McCullough 1991:96). Mitchell and McCullough note that digital images have their limitations when they are just numerical equivalents of scanned photographs or paintings (Mitchell and McCullough 1991:96-97). The substitution is a representation of merely a sample taken from a particular viewpoint at finite spatial and tonal resolution. They are also limited in showing indefinitely fine resolution, show objects from only the viewpoint of the original and provide limited manipulative operations depending on the knowledge of the internal structure of the manipulated object.

**Digital information**

Digital information is a sequence of 1s and 0s. See digital data. The term ‘digital information’ is used in reference to architectural design and refers to processed facts and knowledge about a proposed project that can be used in digital software, for example coordinates.
Digital model

Where digital drafting file defined a file that contains only two-dimensional information, a digital model is a drafting file that contains information regarding a three-dimensional object. Several digital model files can be linked (termed x-ref in AutoCAD™) to result in a large modelled area in a minimal file size. The linked files accommodate teamwork and computer hardware with limited capacity.

Digital montage

I have used the term digital montage in this thesis to define a technique of making digital visualisations, which includes putting together samples from other digital images and/or renderings (Oxford Dictionary 2001:578). Rather than being a rendering, which typically results in realistically simulating an image of the design through software, the montage is more abstract. To create a montage the designer may move through different media from 3D Studio Max™ to Photoshop™. The rendering involves setting up a model, lighting and materials and, through automation, the software generates an image. In a montage, the designer may draw on a hybrid of techniques, which provide a greater manual control over the qualities and transparency of an image throughout the creation of the image.

Digital parametric CAAD media

Digital parametric media is used to distinguish a particular type of media, in this case parametric software. Digital parametric media covers the ranges of digital programs that have parametric intelligence are available for architects and computer users including CATIA™, 3D Studio Max™ and Maya. In conventional Cartesian CAAD media, such as those referred to under digital drafting system, objects modelled are static. Parametric CAAD media allows changes to the aspects of the object. This facilitates flexibility.

Digital practice

Refer to ‘digital architecture’. Digital practice refers to an architectural design practice that adventurously engages in the use of digital media in their daily design, and any other, practice. The term refers to a firm, which operates beyond the convention of the architectural industry.

Digital revolution

Several points in history have significantly affected economic, social and cultural life and have equally affected the practice of architectural design (Mitchell and McCullough 1991:1-3). The first was the agricultural revolution, beginning circa 8000-4000BC, which saw the invention of the wheel and plough. The second was the industrial revolution, in the nineteenth century, which as a revolution occurred much faster. The industrial revolution largely replaced human
and animal power with machine power. The third was the digital revolution, in the twentieth century, which again occurred faster than the industrial revolution and saw advancements in electronics replacing human brainpower with information processing machines (Mitchell and McCullough 1991:1-3).

Changes brought by the computer to architecture are one part of the digital revolution, which has caused social upheaval. The digital revolution is comparable to the shifts that occurred in response to the industrial revolution. ‘Revolution’ refers to the significant pace of change that society experiences. In the digital revolution, the change includes connection to the Internet, increasing availability to computer hardware and the capability of computer software (Mitchell and McCullough 1991:1-3). In terms of the digital revolution, there is relatively little critique about its potentially unwanted implications. Steele suggests that this is partly due to the rapidity of transformation where it is more exciting and meaningful to participate in the revolution than critique it (Steele 2001:8). The implications of the digital revolution are due to this speed of transformation as the changes are hard to guess or chart. Hence, this thesis contributes to capturing and understanding such changes.

**Digital tool**

A digital tool is a digital device that is used to carry out a particular function (Oxford Dictionary 2001:958). In my thesis, I will make a distinction between digital media and digital tool. Glanville distinguishes types of computer support for designing as either ‘tool’ (restricting, computing is obeying our commands, not participating or informing) or ‘media’ (out of control, computing is participating and informing without obeying) (Glanville 1992:213). I continue along this notion in this thesis. I will use the term digital media to identify when the uses of digital technologies are acting generatively. I will use the term digital tool to define when the uses of digital technologies are restrictive or not informing.

**Digital toy**

A digital toy is the use of a digital media that provides amusement, diversion and an outcome that is viewed as having little professional value and responsibility or as offering real service or function in professional work but is prized as having special reason (Oxford Dictionary 2001:963). Helen Castle suggests that digital technologies can act as sophisticated design ‘toys’ to create morphological shifts in architectural form through movement in reaction to, or in sympathy with, external forces or even ideologies useful in conceptualisation of architecture (Castle 2001:5). A digital toy is discussed in Chapter 6, where animation technology provides amusement and diversion during the design process.
**Digital visualisation media**
The term digital visualisation media covers the range of media available that creates still or moving digital files that illustrate a digitally modelled object (Oxford Dictionary 2001:1022). In Chapter 8, I will provide, categorise and compare a table of available visualisation media (UTS 2007:np; USYD 2008:np; Liu 2003:7).

**Digitally derived architectural variable**
A digitally derived architectural variable is a subset of digital architecture design. The term defines an aspect of the design which is likely to change, or is able to be changed, is obtained from, arises or originates from either the use of digital media or generated from computation (Oxford Dictionary 2001:234,1012)

**Digitally conveyed architectural solutions**
A digitally conveyed architectural solution is a subset of digital architecture design. The term defines the communication of the proposed design via the use of digital media (Oxford Dictionary 2001:187)

**Digitally generate**
Digitally generate refers to a process in which a variety of potential solutions are produced using digital media to facilitate, typically complicated, computation (Mitchell 1977:29). This term refers to generative systems used in architectural design, which include the use of algorithms or complicated programming. Generative systems can be traced back at least as far as Leonardo da Vinci (Mitchell 1977:35).

Predating contemporary digital architects and the use of digitally supportive media in architectural design is a mindset of mathematics and other computational ideas as drivers of architectural design. A proto-computing paradigm existed prior to the notion of ‘Digital Architecture’ that included Antoni Gaudí and Frei Otto (Scrivert 2006:27). These proto-computing paradigm architectural designers are commonly used as precedence for contemporary digital architectures (Scrivert 2006:27).

**Digitally supported and supportive ways of working**
My university refers to this term in the proposed program for this research (RMIT University 2005a:np). The term refers to the use of digital media in architectural practice to provide support for the various tasks, from conceptualisation to production to communication.

**Hardware**
Hardware is the physical manifestation of the computer itself. This box contains a processor, internal memory, disk drive, keyboard, mouse and monitor. The term hardware also
encompasses the components that can be attached to/for this base system from printers and scanners to complex servers and networks cables (Mitchell and McCullough 1991:10; Mitchell 1977:3-5; Kalay 2004:36-37).

**Idea**

An idea is a thought or suggestion about a possible course of action. It can also refer to an aim or purpose (Oxford Dictionary 2001:442). In architectural design, the term concept is often used to describe the driver of design in the early stages. Concept can be used to help sell or publicise a commodity (Australian Concise Dictionary 2004:284). Terroir directors’ believe that the early stages of design may not primarily be driven to produce commodity, rather the term ‘idea’ is used to refer to their style of design practice, influenced primarily by site, story and client brief (Appendix C FN Tue 07/02/2006). Therefore, I will refer to ‘idea’ in this thesis for the following reasons. Firstly, the driver of Terroir has always been the conversation about architecture and its possible intention (The Architects on RRR, Harrison et al. 2006:np). Terroir’s ‘ideas’ ‘may be histories, they may be stories, they could be maps or even site plans’ (Stamm 2007:112; Benjamin 2006:81). Terroir sees their architectural design not as the representation of an idea but as ‘ideas’ used productively and/or operatively to open up possibilities (Balmforth, Benjamin et al. 2007:50-51). Secondly, Coxe has distinguished types of architectural firms as ideas, service or delivery focused (Coxe, Hartung et al. c1987:52-53). My industry partner firm fits into the ideas-focused category.

**Ideation**

In psychology, ideate or ideation means imagine, to conceive and/or form ideas. The term derives from the Latin term *ideare* meaning 'form an idea' (Australian Concise Dictionary 2004:693). In architectural design, ideation occurs in the design process however, it is not often acknowledged or recognised in practice notes. It is not a common term and it is rarely used in available literature. Ideation is the very earliest steps in designing. In ideation, designers communicate with themselves, or with their teams, to put together ideas and begin to find a form for an architectural design. Brady suggests ideation conveys an idea by association, or metaphor, to transmit and register the essential elements of the thing described (Brady 2003:187). She also suggests that ideation is a process of identifying and conveying concepts as ideograms, for example a diagram of an idea (Brady 2003:188). Furthermore, ideation is a poetic device that links concepts or words and the basic elements of visual forms (Brady 2003:188). It is used in this thesis to highlight a particular approach to the typical process of conceptualisation. It is used to distinguish that the design process that is referred to in this thesis is driven by ideas, over pragmatics or utilitarian uses.
Embedded practice
This term refers to the participant observer position that I take as a postgraduate research candidate undertaking the SIAL ‘embedded in architectural practice’ program. SIAL coined the term ‘embedded practice’ in their outline for the research program (Maher, Nelson et al. 2006:np; Maher and Mewburn 2007:252).

Industry partner
In this research, an industry partner refers to the participating architectural firm within which the postgraduate research candidate is ‘embedded’.

Mid-sized Australian architectural practice
There are several modes to Australian architectural design practice. These include small, mid and large scale. As described by Shadbolt, Kolleeny and Linn, a typical small architectural practice may have 1 or 2 registered architects and up to 10 assistants. A large architectural practice may have several principal architects, several senior associates or partners and may employ 50-200 assistants. A mid sized practice fits in between these two modes of practice. They may have 1 or more principal architects and employ 10-50 assistants (Shadbolt 2008; Kolleeny and Linn 2007:196).

Mutuality
The term mutuality defines having the same specific relationship to each other or refers to an activity that is done by two or more subjects equally (Oxford Dictionary 2001:588). In this thesis I refer to mutuality to highlight the positive relationship that can exist between the architectural designer and their digital media. Other researchers such as Coyne, McLaughlin et al. have suggested and described the interaction between user and their digital tools through terms such as ‘enmeshed’ (Coyne, McLaughlin et al 1996:5). I use the term mutuality in this thesis to distinguish one of my key research contributions. I use the term to suggest that the relationship between the designer and their digital media can be productive and that more can result from an interaction with digital media than merely a service to the profession. An architect’s ideas can benefit from generative and communicative engagements with new digitally supportive media, as I will demonstrate in Part 2 of my thesis.

Non-standard architecture
The term ‘Digital Architecture’ is rivalled by the term ‘Non-Standard Architecture’ (Benjamin 2004b:34). The term was used as the title for an exhibition at the Centre Georges Pompidou, Paris in 2004. Non-Standard Architecture includes digital or virtual architectural design, which exploits digital elements, deal with questions of representation (such as virtuality and
hyperspace) and highlight current modifications to the industrialization of architecture. Non-Standard Architecture refers to design with primarily mathematics basis and that draws on fractal and catastrophe theory and artificial intelligence (designboom 2005). From my review of literature, I believe that Non Standard Architectures do not typically primarily drive design in terms of site specificity or phenomenology.

‘Off the shelf’
I refer to the idiom ‘off the shelf in this thesis to define a use of digital media immediately and without any intervention. I use the idiom in relation to an activity that does not customise or integrate any additional installation, plug-in, expansion pack or product to the off the shelf digital media software. The idiom ‘off the shelf’ means ready-made, easily accessible or available as opposed to any specialisation or customisation (American Heritage Dictionary of Idioms 1997:453)

Post-digital revolution/age
Following the digital revolution, some researchers suggest that a post-digital revolution has begun. Pink for example suggests that the eighteenth century was the ‘agricultural age’, the nineteenth century was the ‘industrial age’, the twentieth century was the ‘information age’, the twenty-first century is the transition to the ‘conceptual age’ where affluence, technology and globalisation is demanding a society of creators (Pink 2005:49-50).

Practice
The term can refer to the place of work or business (Oxford Dictionary 2001:692). The term practice defines the action of doing something, rather than the theories about it (Oxford Dictionary 2001:692). The term refers to the usual way of doing something and doing something repeatedly to improve skill (Oxford Dictionary 2001:692). The term practice is used for accepted protocols and behaviours within a group of creatives and a means of identifying idiosyncrasies and rituals within that group. That is the term practice could refer to the internal culture of Terroir as well as their business.

To clarify I refer to design practice in this thesis to discuss the idiosyncrasies of Terroir. I use the term firm when I refer to the place of work or Terroir as a business.

Software
Software is the programs and databases (a set of instructions) that encode the computer hardware. Software contains architectural design knowledge in machine-processable form. It takes sophisticated software to equip the hardware of a computer to perform nontrivial design
tasks. This type of software is ‘difficult and expensive to implement for a practice and architects themselves rarely produce software’. Thereby a ‘division has occurred between those that create the software (software developers) and those that use it (architects)’ (Mitchell and McCullough 1991:5-7). Mitchell and McCullough argue that software is often created by naïve or unskilled producers unfamiliar in the skills and art of the architectural profession (Mitchell and McCullough 1991:5-6). The division will either result in a deskilling of the architect or the increase of individuals and small groups producing innovative software or using existing software in ways that would have been far beyond the capacity of the past (Mitchell and McCullough 1991:6). Ultimately, they suggest that the skills in craft and arts and the tools that are used are highly precise instruments, for example, the calligraphy pen, over time the available software will ‘improve and new crafts will emerge’ (Mitchell and McCullough 1991:7).

In Australia, reports assert that more than fifty percent of technological innovations undertaken by the Architecture Engineering and Construction (AEC) industries are driven by productivity and efficiency, where ‘the desire for efficiency/production improvements drives just over half of all innovation undertaken by the (AEC) industry’ (Manley 2004:4). Coyne suggests that developers and executives foster a pragmatic usage by producing software with these particular interests in mind. Thus, most of the focus on digital media has been relegated to delivering efficient later stages of design development and documentation process (Coyne 1991:421; Coyne, McLaughlin et al. 1996:1-2).

As Gero noted even though there is a paucity of available and suitable software, it would be ‘virtually impossible to describe in detail every application in architecture’ (Gero 1977:5). In the compendium, Computer Programs in Environmental design ‘450 programs in 13 categories existed’ (Gero 1977:5). These programs exist but can be ‘unavailable, unsuitable and limited in their transferability from one user to another’ (Gero 1977:5).

In Chapters 5-7 of this thesis, I demonstrate the use of some digitally supportive and commonly used software packages in practice. In this thesis, I use my own practice fieldwork to show how some applications of software can both thwart and advance the design of a project. These issues of software and their limitations and their impact upon practice will form a crucial part of the research.

**Traditional design process**

The traditional design process is one where the head architectural designer of an architectural practice delivers a hand drawn sketch that communicates the design of a building from which a
team of architectural assistants develop and document. The process is hierarchical with a defined flow of authority and decision making that sits primarily with the head architectural designer (Cuff 1991:76).

Virtual
Virtual refers to the concept that with the advent of the computer a new ‘space’ has been created in which activities can occur. This space exists by software and networks, within and between the hardware of computers. The new space unburdened by the laws of nature have many, including Steele, suggesting that a new virtual architecture is promoted (Steele 2001:24,26).

Summation
In this chapter, I have defined various terms relevant to my field of enquiry. Whilst this section should not be regarded as a methodology or a literature review or even research map, it has set out the current state of issues that will be addressed in the following thesis. This section drives the unfolding of my research and flags certain concepts and/or controversies that will be expanded upon in the following pages. This chapter sets out the ‘state of play’ around the ideas and practice about digital design in architecture. The definition of terms mark the point at which my research activities begin to unfold.

In the next chapter, I will detail my research activities, choices and methodologies. I will review the qualitative research methodology that I employed. In following chapters, I will present a review of literature and my own practice fieldwork.
CHAPTER 3 RESEARCH DESIGN

In this section, I will explain the governing qualitative methodology. Having established my research question, I then wanted to test it in practice. To test the question I employed various qualitative strategies for data collection. These are primarily case studies supported by architectural projects. The research design detailed in this chapter includes a discussion of an extensive email archive, discussion and diary entry database, which is intended to capture the background, current conditions, development and environmental interactions of my role as an architectural designer in a firm whose practice is increasingly engaging with digital media. The references used from these sources in this thesis are presented in Appendix B-M. This research design will also include a strategy for analysis of my experiences and will explain how my findings are formalised into arguments, which are set forth in following chapters.

The practice of Terroir guides the direction and approach to the case studies. As I described in Chapter 1, Terroir’s mode of working with digital media offers material which is worthy of investigation. For example the firm’s architectural projects and its design process is internationally recognised, the firm is an ‘idea-focused’ (Coxe, Hartung et al. c1987:52-53) research based mode of practice that complements my quest to investigate design practice. My integral role and my privileged position alongside the creative directors afford me, as the researcher, access into the inner workings of a mid-sized architectural design firm.

The mode of working at Terroir became the guiding parameters of this study and becomes part of the evidence. The choices and impact that I can make as a researcher are governed and influenced by Terroir. These conditions differ from the conditions of the research studies based in the other three architectural and engineering firms that are involved in the postgraduate embedded in practice program, which I mentioned in the previous chapter.

The research design begins with a set of questions that I have identified in response to my engagement with the firm and the available literature regarding my topic. These ideas have a practical application for architectural design and I play out, substantiate and test these questions in the practical environment presented via Terroir.

The outcomes that are discussed in future chapters are an analysis of the Terroir design practices, which I place in the context of available literature. Thus, I place the design practices in an academic and theoretical context. Terroir is not a sample that is used to generalise. The thesis is a working up of ideas that are tested in Terroir (Berg 1998:218). This research is not based on
empirical sampling. I am not arguing why the particular sample of the industry partner firm reflects why the world is like it is. I am not moving from Terroir as the sample firm to make a statement regarding the larger architectural design population and argue that the findings in the sample firm are mirrored in the larger context. Rather the research design includes action research methods (Jorgensen 1989:12-14; Berg 1998:32; Reason and Bradbury 2001:xxii-xxv) and, due to the nature of qualitative research methodology and my participant observer role, the study is essentially interpretative and based upon evidential claims (Berg 1998:218).

Testing the questions resulted in new and further areas for retesting. The findings made within Terroir are critiqued in the later chapters on their connection to the larger issues beyond an individual practice.

**General Method**

The initial strategy employed for this study was based on action research (Jorgensen 1989:12-14; Berg 1998:32; Reason and Bradbury 2001:xxii-xxv) This qualitative methodology has been defined as follows,

> ‘…action research is a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview which we believe is emerging at this historical moment. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities…’ (Reason and Bradbury 2001:xxii-xxv)

This approach was employed due to its ethnographic compatibility to my question that of what might be advantageous to include digital media as part of the designers’ ‘toolset’ in the early stages of design. This method addresses my need to bring together action and reflection, theory and practice in participation with others, in the pursuit of practical solutions to the issue.

The research undertaking was primarily my own, as the researcher and as an architectural designer, and the participation of a firm of architects of approximately 20 people split over two office locations. The participant observation position that I held afforded me the opportunity to play out, substantiate and test the conceptual inquiries in the practical environment of Terroir. My first person inquiry was supplemented with second person strategies of observation and
discussion. I observed and was involved in the architectural design project team. The outcomes of this thesis result from my analysis of the data that I collected from these tasks.

The outcomes are essentially interpretative and result generally through addressing my component questions, which relate to issues in the available literature. As this study was based in a firm of architecture I influenced, and was influenced, by the directors and other employees. As Flick describes ‘interpretative’ research is appropriate for a study that includes the ‘study of social relations in a pluralistic society’ (Flick 1998:2). To assist me in making valid assessment and contribution from this qualitative research I grounded my results in the constructions of those that I studied, including my own diary notes, project studies and comments gathered from the design team in the email archive and informal discussions (Flick 1998:224-225). I interweave illustrative quotes and images through my thesis. To demonstrate reliability I include email archives, file notes and transcribed discussions in Volume 2 of this thesis as an extensive appendix. Throughout this thesis, I present positive and negative sides of the debate and my conclusions are based on these debates (Flick 1998:232). Credibility and independent assessment of this research is demonstrated through adequate time in the field, peer reviewed publications including my paper presented at the eCAADe conference in September 2007 titled ‘Mediating between Architectural Design Ideation and Development through Digital Technology’, six monthly reviews at RMIT University’s Graduate Research Conferences and inclusion of the secondary opinions of Terroir participants (Flick 1998:233; Jorgensen 1989:36).

To analyse the data that I gathered I ‘removed’ myself from the office location gradually over the last six months of the study (Jorgensen 1989:119). Dealing with the texts that I had gathered, I engaged a process of interpretation and reconstruction to consider the perspectives of the participants, the available literature and my own influence on the research process in order to make a series of conclusions (Flick 1998:30). I present these conclusions in following chapters.

I reflect on the outcomes in response to the component questions to address my primary question. The outcomes occurred in the process of the 15 projects studies. For the analysis, I used grounded theory methods (Jorgensen 1989:113). I described the issues in the architectural projects and collated them into a series of categories (Jorgensen 1989:113). I used triangulation by data (Flick 1998:229) to compare the case studies against my personal observations, diary entries, and my informal discussions with the team members. The methodology continued to refine over the course of the study. I again tested the data and my research premise (Jorgensen 1989:114). The data collected from the projects was repeatedly analysed for any common
patterns, protocols or guidelines in order to address the component questions (Jorgensen 1989:107) and wrote up the theory to result in this thesis (Jorgensen 1989:114).

**My Role as Researcher**

My role as the researcher includes both participatory and observational aspects. The research problem, the implications of the architectural designer increasingly engaging with digital media in the conceptualisation stages, is an issue that I am personally experiencing. My employment at Terroir for five years has provided awareness of this issue. On commencing employment at the firm, I was aware that the architectural designs were primarily generated through a traditional design process, where the creative directors delivered hand made sketches to an assistant (myself) who participated in design by drafting those sketches into the computer and commenting on the implications. From the commencement of this study, I held a senior designer position within the firm and took this participatory role alongside the creative directors of the firm in the design of most new and developing projects. Over the study period, I was able to not only capture, but also personally play a role in the change and expansion of this process to include digital media at a more fundamental level in the conceptual designing process.

For much of the research timeframe, I based all architectural project design and academic research within the office premises. Not only was the research based on the practices of the firm, it took place within the office locations. I augmented my employment as an architectural designer with the tasks to complete this thesis including information gathering. This dualistic position allowed an ongoing observation and engagement in all practice activities. Towards the end of the study, I separated myself from the firm to undertake focused analysis and critique of the data collected. At this point, other designers within the firm filled my design position. This time of reflection and analysis allowed a further opportunity to compare, through observation, the operation of designers with digital media in practice.

**Personal Bias**

I recognise my personal bias toward the established mode of operation and philosophy of Terroir, which had been evolving since its commencement in 1998. The reason for privileging Terroir’s established philosophy was that the firm had already achieved internationally
recognised level of excellence. As I mentioned before the established reputation of the firm gives a depth and validity to this study.

There is a synergy between the mode of operation in SIAL and Terroir, they are both intellectually rigorous and wide-ranging. Thus, Terroir as an ideas-based practice was a natural and obvious subject for the intellectual analysis that SIAL proposed through their embedded practice program. With the understanding of how the firm operated, the SIAL program presented an opportunity to fulfil the desire to test what the firm was already doing against a greater engagement with a wider range of digital media. From the outset, I wanted to test whether the value of the SIAL program would be in enabling a greater understanding of what Terroir does. I believed the program would allow the potential to overlay digital media onto this existing process with the aim of extending or amplifying its potential, as opposed to thwarting or distracting it. Opportunities to evolve a greater understanding of what I do, the specific role of the architectural designer also could be developed through the program. The program afforded an opportunity to reflect on this specific role in the context of the practice. Finally, there was the potential to expand the knowledge about the entire firm and about the way the practice designs (Appendix L FN Fri 03/11/2006A).

Establishing a Starting Position

To undertake this study I constructed and identified my own distinctive research design. As a start point, I reviewed methodology and thesis examples in other disciplines (Berg 1998; Flick 1998; Jorgensen 1989; Reason and Bradbury 2001; Edmonston 1961; Lloyd 2006). In addition, to address the need to construct a research practice and establish a start position, the advice of a social scientist employed at RMIT University was sought in the development of my methodology.

A series of assumptions were made at the start of the study and these were formed into a series of component questions. These were tested, supported and/or modified as the study progressed. I assumed that by studying the daily operations of a designer a clearly definable set of patterns could be extracted from the data collected to substantiate the argument within the overarching conceptual ideas (similar to Edmonston 1961; Lloyd 2006). I assumed that due to the nature of qualitative research methodology, my argument could be substantiated by focusing on the single individual designer (Edmonston 1961). I am aware of writings on this approach to study and am aware of its strengths and shortcomings, for example, a focused study can result in
limited applicability and validity (Jorgensen 1989:36-37). Acknowledging that aspects of designers practice are interconnected with broader influences and cannot be adequately understood without consideration of the others, the project studies were augmented with a sweeping investigation of the firm as a whole and existing available literature. As I will discuss in Chapter 4 Review of Available Literature, there is a level of ambiguity and unpredictability in the nature of creativity. Trying to capture recurring patterns (for example Alexander, Ishikawaw et al. 1977) or aptitudes (for example in Pink 2005:61) can result in stifling and hindering creativity. Thus, the main assumption of this research is that, due to ambiguity, creative practice is not easily explained and can be highly personal. Therefore, the basis of the study is not primarily empirical rather it is conceptual. I will be presenting examples of my own work and making interpretative conclusions. I also assume the insights presented in the following chapters will contribute knowledge to advance the practices of a designer generally. I aim to assist Terroir and other architectural offices through the exposé of the practicalities of a design’s process presented in this research thesis. The insights will contribute knowledge to the academy and will be valuable to other postgraduate studies embedded in architectural practice as my thesis provides a useful body of knowledge and a comparative example.

**Specific Procedures**

**Component Questions**

In addition to the background material presented in Chapter 1-3, I raised a set of component questions to investigate in this study at the commencement of the study. These were based on my intimate knowledge of being an architectural designer. The first part is the practical implications of integrating digital media into the established design practice of Terroir. Questions include:

- Does mapping new digitally supportive media contribute beyond merely being production and automating devices in the early stages of design?
- How do digital media expand conventional design processes of drafting and models beyond a focus on form?
- How do conventional media mesh with the new digital media and foster design, which is understood as a conversation?
Would the practical shifts that occur in Terroir's practice be relevant to other practices and can my project studies offer an understanding of the relationship between technology and creativity?

The second grouping of questions centres on the cultural implications of integrating digital media into the established organisation of Terroir. The questions include:

- What are the implications of integrating new digital media into Terroir on the role that I hold within the practice?
- What are the shifts in the culture of Terroir through integrating new digital media?

**Ethics Issues**
Throughout this study, I was aware of existing discussions regarding the ethics of research that involves human beings and the methodology of participant observation (Adler, Adler, and Rochford, 1986). Following RMIT University policy, I also applied to the RMIT University Human Research Ethics Committee for ethics approval to safeguard the interests of participants in this research that involved people as subjects. My application was approved on the 14th March 2006 with ‘Risk level two’ categorisation. The participants would not be exposed to physical, psychological and social risk through my research, above the everyday norm, but there could be an element of slight risk to participants, as for example, I undertook recording of personal information.

Participation for the directors and the employees of Terroir was voluntary and they remained in full control of the answers that they provided. I sought permission from the participants to use the information they supplied in informal discussions. I supplied the participants with a copy of the research material they participated in to correct, amend or abbreviate and advised that they maintained the right to withdraw their involvement at any stage. The raw data was not made available to Terroir or any other third parties and I censored the participants’ identity as requested or necessary.

**Data Collection**
The data collection included multiple sources of evidence including:

- Case studies
  Over the study timeframe, I participated in 15 architectural projects at conceptualisation stage. The case studies included Fern Tree House, Leichhardt House, Clareville House, Montpelier Retreat commercial development, Bicheno Resort, Cameron House,
Maitland City Bowling Club, George Street office high-rise, canopy and podium, Meadowbank shopping mall, Hazards Hotel- Stage 1, 2 and 3, East Darling Harbour urban design competition, Prague national library and Hobart Waterfront urban design competition.

• Participant observation
  Participant observation was captured through photographic techniques (including videotaping), historical analysis, document and textual analysis.

• Literature reviews
  These were used to develop relevant meanings and measurable attributes.

• Personal documents
  These included a written and visual diary that captured my experience. I set out a series of questions, which I answered, everyday, with varying levels of success, and added personal intuitions, hunches and impressions. The content of the diary tended to be useful in judging the course of the inquiry and developing future courses of action. Making records of what I observed helped clarify and organise thinking. This process identified the important issues that had been overlooked or neglected.

• Informal discussions
  Particularly in the third year of study, I presented the findings of the study back to the design team at Terroir. I gave presentations at universities and held informal Terroir discussions, which were recorded and transcribed. The questions and issues raised at these sessions led to the clarification of matters of importance or matters that I had overlooked. Supervisions and industry partner meetings also raised questions and resolved issues through discussion (Berg 1998:3, 5).

• Triangulation
  The collected data was compared to minimise the degree of specificity (Berg 1998:3, 5).

• Theoretical perspective overlay
  Other relevant theoretical perspectives were introduced in order to tie my analysis to both the established theory and to my own emerging grounded theory (Glaser and Strauss, 1967:3).

**Data Organisation**

As multiple sources of evidence were collected, multiple methods of organisation were employed.

- Participant observations, personal documents diaries, memorandums and other written records were stored digitally titled by date and organised by category into folders. I
include file notes in the appendix (Volume 2) of this thesis, which I refer to in the following chapters.

- The architectural projects processes were captured in the email design conversations. Terroir’s project email is organised into project folders in Microsoft Outlook™ (which acts as a database). The use of a database system facilitated the analysis of the data, as the data was searchable by date, word or subject. I include a sample of these email design conversations in the appendix (Volume 2) of this thesis. I have included emails that are directly referred to in the following chapters of this thesis and a collection of unmentioned emails to provide context.

- Architectural projects, drawings and visual visualisations were kept in Terroir’s project folders individually labelled and organised into separate folders by date and appropriate subject. Examples of these visualisations are described in the following thesis.

- Photographic techniques (including videotaping) were used to capture significant practice moments in particular design meetings. These were stored digitally titled by date and organised by category into folders. The recorded meetings are held within my research archive, as they were not immediately useful for this thesis and could not be used as they identified and involved the Terroir design team.

- Literature used to develop relevant meanings and measurable attributes were kept in an Endnote™ database. A list of references is provided in the appendix (Volume 2).

- Informal discussions were recorded and transcribed. These were stored digitally titled by date and category. The transcripts are referred to in the following thesis and the full transcripts are provided in the appendix (Volume 2).

- Historical analysis, other document and textual analysis were stored digitally titled by date and category. Some historical information is provided in this thesis to offer background and benchmarks for assessing my qualitative participant observation research.

How the Method of Gathering the Data Evolved

At the start of the study, I used the set of questions as a vague direction from which to observe the operations of practice. After several months, a number of architectural projects were completed and I had gathered a body of data through conversation and reading. I undertook an initial analysis of this data. This early analysis of data refined and focused the initial conceptual ideas. Through the success of this process, I reapplied the methodology and each time clarified the ideas and the overarching argument. The study fell into three main phases:
Phase 1
I see the first 18 months of the research as the first phase. The basic premise of this phase was the assumption that the application of digital media would lead to innovation and change. In this phase, I used my component questions and literature review to drive the projects undertaken. During this period, I indexed existing literature and participated in architectural projects to generate and capture a general knowledge.

Phase 2
After 18 months, the extensive survey of existing literature and architectural project participation resulted in a large range of focused research opportunities. I refined the extent of this study to focus particularly on the role of the architectural designer. The focus onto this role identified important issues that I needed to address before I could progress the research. I recognised that the immediate context and culture of Terroir was highly influential on the uptake and integration of digital media. I undertook a focused study into the operations of Terroir. I identified that Terroir held the ‘idea’ as a primary generator of design (Lawson 2006:46-48) and the uptake of technology needed to be integrated sensitively into existing practices, rather than radically overhaul existing practices. During this phase, I formalised my primary question and continued to undertake architectural projects to test the ideas set out in my component questions.

Phase 3
The final phase occurred in the last nine months of the three-year study period. I completely removed myself from practice in Terroir and conducted a thorough interpretative qualitative analysis and write up of my findings (Flick 1998:5-7, 178).

Analysis
A variety of methods were used to analyse the data, these included the following action research methods:

- Frequency of occurrence
  Concepts in written documents including diaries, architectural projects process and literature were analysed for frequency of occurrence. A report of the frequency with which the given concept appeared in the texts was used to suggest the magnitude of the issue. Several search-based softwares were used to analyse the frequency of occurrences. These included:
  - Using the search facility in Microsoft Outlook™ to search emails
  - ‘X1™’ desktop search software used to search through collected digital text documents
- Endnote™ to search literature/bibliography references
- Windows Explorer™ to review the visual documents created and to search their dates and titles.

- Grounded Theory
  An inductive approach was used where I ‘immersed’ (Berg 1998:230) myself in the written documents, including emails and diaries, in order to substantiate, verify or refute the conceptual ideas. I compared the documents gathered from the
  - Prague National Library case study
  - The main issues in using individual pieces of software

- Explanations
  I explained the steps that I took within the individual architectural projects in a series of project study reports. These were created to analyse the productivity of using digital media. The extrapolation resulted in the following reports:
  - Montpelier Retreat commercial development and mapping new digitally supportive parametric software
  - Fern Tree House, Hobart Waterfront urban design competition and the explanation of the operative yet superficial role of animation
  - Prague National library and the productive role of representations
  - The use of emails in Terroir and its role in the design process

- Comparison to other designers’ examples
  Other designers’ experiences documented in available literature were investigated for establishing a means of comparison to my own experience. From this cross-referencing, I compared the outcomes of my use and integration of digital media

- Office behaviour and settings
  The behaviour and settings of Terroir was observed and analysed across the timeframe of the study to establish the implications of change and evolution.

Reanalysis
After analysing the data using action research methods, I reanalysed, interpreted the data, and clarified the thesis argument. Flick suggests that interpretative qualitative methods are appropriate for a study that is focused on ‘social relations’ in a ‘pluralistic society’ (Flick 1998:2). Interpretation accommodated the rapid social changes that I experienced in this study and assisted me in including the different and diverse practices resulting from the practice environment (Flick 1998:2). Flick notes that in interpretative qualitative methods the ‘perspectives of the participants and their diversity are incorporated’ (Flick 1998:5). I include
perspectives in future chapters alongside the available literature and my own influence on the research process (Jorgensen 1989:27).

To verify my findings and my argument I undertook a series of informal presentations to Terroir, presented my findings at university lectures including Transcapes November 2006 at the University of Technology Sydney (UTS) and eCADDe 2007 in September 2007, Frankfurt, Germany, completed peer reviewed publications and six monthly reviews at RMIT University’s Graduate Research Conferences (GRC). I recorded and transcribed the informal discussion sessions and used the transcriptions as a comparison to verify my conclusions.

Methods Not Used
The advice of the RMIT University sociologist that I consulted was for me to generate a general indexing survey and interview other architectural practices. The interviews were intended to look at the issues within the individual practices to see what was actually occurring on a day-to-day basis. A debate ensued between the parties involved in this study, the university, the practice and myself. The advice of Terroir directors was that a comprehensive survey of other offices and other employees in the firm would be time consuming and not relevant. Rather a focused observation and reflection on what it was that I was doing would be more conducive for my qualitative study. Due to the demands on investigating my own practice, integrating new media and my question, I decided not to undertake the indexing surveys.

Method of Reporting
I review available literature in Chapter 4 Review of Available Literature to establish history and benchmarks in the field. I then use Chapters 5-7 to describe and illustrate various problems and opportunities that can occur in using digital media in the design process, in response to my component questions, which I set out earlier. Within each of the chapters detailing my own research fieldwork, I include statements from the data that I have collected that exemplify the specific problems and opportunities (Flick 1998:5). Wherever possible, I include visualisations, which are relevant to the kinds of problems and opportunities being described. Chapter 8 Integrating Digital Media reflects upon Chapters 5-7 that are based on my own fieldwork and evaluates some of the potentialities and limitations of using digital media in the architectural designer’s practice. Chapter 9 Practicing Digital Designing analyses the changes that have occurred to the role of the designer throughout this study and integration of digital media into their process. This chapter suggests an emerging new role that manages established designing and the integration of new digital media. My concluding chapter, Summation-Reflections, Outcomes and
Conclusions, summarises the main findings of my study, evaluates the research and suggests possible future research.

**Difficulties Encountered, Language Difficulties**

Lincoln describes qualitative research as requiring intimate, close social relationships with sensitivity and integrity (Lincoln 1995 in de Laine 2000:2). Fieldwork becomes problematic when the researcher is required to cross the boundaries of conventional and sensitive topics and overlap roles and relationships. These requirements can present a qualitative researcher with a range of complex ethical and practical dilemmas (de Laine 2000:2) The main problem when undertaking qualitative research is often an issue of access (Alty and Rodman 1998 in de Laine 2000:40). For this research, I found the opposite. Having been employed by the practice for a two-year period before the study I found it more difficult to disengage, separate and create distance. I found it difficult to separate from personal relationships and critically view the architectural intention and the use of media. I found it difficult to act as a full time researcher and a full time practitioner. There was difficulty spending time away from the practice, for example going to the library, due to the demand from the practice to undertake and deliver architectural projects within the real project period. I found that it was difficult to learn new digital media, read relevant history and future literature and critically analyse it, all whilst practicing architecture. These issues were addressed and managed through constant communication with the directors and the design team. Being employed as an associate and information technology manager of the firm meant that I had to maintain responsibility for these aspects and their day-to-day operation. These additional roles demanded my time and focus. Researching cutting-edge digital media meant that I was confronted by teething difficulties, faults or downtime that affected learning the new digital media and assess whether they were relevant to the practice.

In the process of my research, new terminology was formed. I listened very hard to the words that the design team and I used (Berg 1998:225) and I aimed to understand what was meant. Due to listening hard, I became aware of the issues in paraphrasing. For example, paraphrasing can distort a message or it can identify new terms. The emerging language being used in Terroir was sometimes filled with ambiguity. This ambiguity led to a clouding of issues and resulted in frustration.

My position in the firm also offered positives for my study. I was in a privileged position to understand thoroughly how and why certain issues arose in the surrounding context of the
practice. This position provided a greater understanding in terms of the introduction of the
digital media.

With time, I came to the understanding that as a researcher the most beneficial approach was to
turn up to work everyday with the aspiration to advance some aspect of that day’s practice.
However, I had to keep in mind that this forward looking and provocative approach to work
does need to be mediated with the demand of meeting deadlines of projects and addressing
specific requests of the design team.

**Summation**

This chapter has presented the research design for my study. I have overviewed the general
approach, beginning with action research methodology to gather data and undertake an initial
analysis. Interpretation was used over the course of the study to strengthen my conclusions and
argument and take into account the pluralistic context of the study based in an architectural
practice. I presented a detail account of the methods that I used to collect, store data and
undertake my analysis. I also overviewed the methods that I did not include and problems that I
encountered. In the next chapter, I will move into a review of the available literature before
presenting my own practice fieldwork and conclusions to this study.
CHAPTER 4 REVIEW OF AVAILABLE LITERATURE

This review of available literature details the terms of my research needed to clarify the boundaries of my study. The review discusses what is known about the research topic, so as to ascertain research gaps and ambiguities.

Section 1 Analysis of terms
Revisiting my principal research-question:

What is the extent to which it might be advantageous to include digital media as part of the designers’ ‘toolset’ in the early stages of design?

Several terms within this question needed defining before I could address it. In this section, I define and provide a historical overview of these terms to provide a better understanding. The terms include the context of this research, a mid-sized Australian architectural practice, the role of the architectural designer, a general discussion on the definitions of creativity, a definition of the early stages of design and digital media.

Section 2 What is known
In this section I discuss how ‘the extent’, which is referred to in my primary question, can be covered by issues that surround my research topic and which are described in the literature, namely the fears and concerns in integrating digital media as part of the designers’ toolset. Component questions, which cover these issues, guide this discussion. I analyse what could be learned from the available literature and present my findings in terms of my component questions, discussing the possible hindrances (arguments against) and advantageous ‘uses’ (arguments for) that may result from digital media.

Section 3 Establish the gaps and ambiguities for examination in practice
The conclusion to this review of available literature ascertains ‘the extent’, the gaps and ambiguities addressed in my research. Component questions are recalled and questions addressing these gaps are detailed. In following chapters I employ the component questions to examine my practice fieldwork.
The Extent of Literature Covered in This Review

This review of literature covers the natures of creativity, design processes, architectural practice, and digital media. A variety of views of the different aspects to my research are presented. A range of literature exists in the areas of creativity, design process, architectural practice and digital media. In my literature review, I found that some works corresponded, some works opposed and some were irrelevant to my own practice fieldwork. For example, publications exist that detail other architectural designers’ or architectural firms’ use of digital media. These examples of digital media usage in other firms could be categorised under a ‘non-standard’ architecture terminology. An extensive indexing of other firms using digital media is not included in this study; rather, a sample of this work is given as a visual benchmark. Many publications on architectural designers using digital media give excellent portrayals of ideology but often fail to detail and/or extensively consider the design process and/or consider the cultural interactions that occur in a firm, including Spuybroek (2004). Some literature gives details of design process but often refers to different stages of the design process, for example design development to construction in Lindsey (2001).

This chapter includes academic studies. I found that there was limited available literature undertaken by academics based in practice and/or undertaken by a researcher/ architectural design practitioner. Many of the examples included academics observing university students or practices from afar. Their insights, however, are very useful for comparison of design practice and digital media usage, such as Coyne, McLaughlin et al. (1996), Cuff (1991) and Gero (1991, 1998). Steele (2001) provided an excellent portrayal of the issues and history of architecture and computers.

Literature such as Kalay (2004) and Mitchell (1991) was very useful for comparison and provided detail explanations, but they were highly technical and did not consider the explanation of tools against the local practice context. My thesis is a useful compendium to these textbook explanations as proof of the tools in action.

A series of philosophical publications on, or often associated with, digital technologies, such as Deleuze (1987) and Rajchman (1998), while reviewed in this thesis, are not referred to directly, as doing so would have expanded the field of enquiry from its process basis. References to artificial intelligence (AI) and to available tools and processes such as programming and scripting are also largely excluded from this study, as this would have expanded the field of enquiry and necessitated additional learning about, and integrating of, the tools in my research or design practice. Although I reviewed publications on collaboration—given its relevance to a
mid-sized firm—these studies are not included, as again, this would have expanded my field of enquiry without adding relevance to a focused study on the architectural designer and their digital media.

Thorough, credible and recent examples of digital media in architectural practice were difficult to source. Reports were included from professional bodies such as Royal Australian Institute of Architects (RAIA) and American Institute of Architects (AIA) and research groups such as Lab3000, which is a group within RMIT University that examined the design industry and innovation. Professional studies were also considered, including Manley (2004) and Salah (2002). Articles in journals, such as Baker (1998) and Service (2000), were referred to, as they provided recent indexing of architectural design practices. Follow-up research on these indexing studies could be very useful, as technology change and uptake have shifted since these examples were published.

This review of literature, which included books, conference papers, articles, reports and journal articles, was incremental to my actual participation-observational research. The review provided historical overview and background knowledge and also some support to, and comparison with, my practice fieldwork. Despite the extensive literature review, locating published information that provided comparative examples for my study was challenging. Absent from the literature were any recent publications on the sociological relationship of digital media and architectural design practice. I believe this lack of cross-referencing material indicates an emerging field of study.

Section 1 Analysis of terms

This first section details the terms within my question. It also provides a historical overview of these aspects, commencing with mid-sized Australian architectural practice, the role of the architectural designer, a general discussion on the definitions of creativity, a definition of the early stages of design and finally digital media.
Definitions of Australian Architectural Design Practice

The first term is Australian architectural design practice. This term covers modes of practice, small, mid and large. I define architectural practice and then discuss why this study is based in a mid-sized practice and what affects this mode of practice.

Architecture is the practice of designing and constructing buildings, and the term can also refer to the style of a building’s design and construction (Oxford Dictionary 2001:40). To clarify, this thesis does not cover issues of style, rather the practice of designing buildings.

Architectural design practice is one of multiplicity. Architectural professional services include planning, urban design, provision of preliminary studies, designs, models, drawings, specifications and technical documentation, coordination of technical documentation prepared by others (for example, consulting engineers and other specialist consultants), construction economics, contract administration, monitoring of construction and project management (International Union of Architects 1999:5). Thus, architectural practice is affected by many external and internal factors (Cuff 1991:72-84). External factors include councils, clients and consultants. These can generate an array of issues for the firm, but are not discussed here, as I am concentrating on the internal factors in one firm. These internal factors include ideology, office culture and the chosen media, and their interaction with each other.

I use the term architectural design practice to focus the study and highlight a relevant characteristic of my industry partner firm. Given that the driver of the architectural firm is to produce award-winning work, the role of design should be of primary importance. The reality is that this vanguard position does not drive all architectural practices. Hitchcock made this observation in the 1940s, which he called a division between ‘bureaucracy’ (Hitchcock 1947:4-5) and ‘genius’ (Hitchcock 1947:6). Hitchcock suggested that a bureaucratic firm focuses on the product of architecture. The bureaucratic firm is normally a large-scale organisation where a personal expression is absent. The strength of these firms is in ‘establishing a foolproof system that includes rapid and plan-based production, which produces buildings of high amenity’ (Hitchcock 1947:4-6). The genius firm functions as by way of a leading creative individual. The genius type of firm has a particular psychological approach and way of working at architecture, which may or may not produce masterpieces. The quality of the architecture in the genius firm depends on ‘overall impact, similar to the way a piece of art would depend on impact’ (Hitchcock 1947:6).
Coxe continued this observation, suggesting that firms could be divided into delivery, service or idea focus practices (Coxe, Hartung et al. c1987:11; Allinson 1993:329). Architectural firms can be driven by various interests, be that delivering commercial architectural buildings as a service or driven by an interest in personal philosophies. As Coxe suggests, decisions about what a firm will do ‘invariably flow from how the principals see their profession and their personal places in it’ (Coxe, Hartung et al. c1987:28). In his critique of current architectural practice (Service 2000:85), Service’s observations suggested that larger architectural firms could be typecast as delivery focused, as their larger resource base accommodates a delivery of architecture. In contrast, small firms are more commonly ideas-focused, as they have greater opportunity to provide unique innovative solutions without the economic pressures of a larger firm. My experience is that a mid-sized firm could have the opportunities of either large or small modes of practice.

**Figure 9: The three approaches to architectural practice.**

This figure is sourced from Coxe, Hartung et al. (c1987:52-53).
The important thing, that Coxe suggests, is that an architectural firm needs to identify what the drivers of the firm are, as ‘the drivers largely influence how and why they (a firm) structure their technologies and how and why they structure other aspects of the practice’ (Allinson 1993:331).

At Terroir, the directors have clearly identified that the driver of the firm is an idea focus. Terroir sees their architectural design not as the representation of an idea but as ‘ideas’ used productively and/or operatively to open up possibilities (Balmforth, Benjamin et al. 2007:50-51).

From experience in working in the firm, I am aware that Terroir also works towards delivering the buildings on time and budget.

There are several modes to Australian architectural design practice. These include small, mid and large scale. As described by Shadbolt, Kolleeny and Linn, a typical small architectural practice may have one or two registered architects and up to ten assistants. A large architectural practice may have several principal architects, several senior associates or partners and may employ fifty to more than two-hundred assistants. A mid-sized practice fits in between these two modes of practice. They may have one or more principal architects and employ ten to fifty assistants (Shadbolt 2008; Kolleeny and Linn 2007:196).
Terroir experienced rapid growth from small scale just before the commencement of this study, moving the firm to the mid-sized scale. The size of the practice is not a major influence on the research outcome of this thesis. Terroir’s mode of collaborative practice and ideology complements, and is more important to, my research. This thesis addresses a mode of practice that includes several principal architects and a team of assistants. A focus of this study is using and integrating digital media into collaborative processes and how multiple contributors undertake design in the context of multiple influences. This study challenges, and is influenced by, the context of Terroir as an idea-focused firm (Coxe, Hartung et al. c1987:52-53). The study discusses particular structures to ‘technologies’, which maintains the idea-focused driver.

**Definitions of the Architectural Designer Role**

An architect has a generalist role that includes ‘experience, knowledge and a personal capability to handle all stages of the design and construction of projects’ (RAIA 1998b:6). An architect mediates between being an ‘artist’, to give delight to a design, and a ‘scientist’, managing technological issues such as efficiency in planning (International Union of Architects 1999:4).

To some extent, an architect also needs to be a ‘businessperson, advertiser, author-journalist, educator and psychologist’ (MacKinnon 1965:274 in Blau c1984:7).

The main roles of an architect can be divided into spokesperson, construction manager and designer, who variously cover aspects of theory and even engage in academia (van Schaik 2005:68).
Alternatively, roles of architectural practice, which could be covered either by individuals acting as generalists or by several employees acting in several specialised positions in an architectural firm, can be divided into ‘grinders’, ‘finders’ and ‘minders’ (Allinson 1993:334).

<table>
<thead>
<tr>
<th>Grinders</th>
<th>Finders</th>
<th>Minders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professionals par excellence.</td>
<td>Senior organisational people that are</td>
<td>In-between role</td>
</tr>
<tr>
<td>Prefer working on what they were</td>
<td>entrepreneurial, extrovert, and have a marketing</td>
<td>Maintain and build relationships with clients and other key people.</td>
</tr>
<tr>
<td>trained to do, avoiding difficulties and</td>
<td>viewpoint</td>
<td>Usually create the links that the organisation needs between grinders and finders.</td>
</tr>
<tr>
<td>distractions of clients, etc.</td>
<td>Look for future clients and keep the grinders satisfied</td>
<td></td>
</tr>
</tbody>
</table>

Figure 12: Roles in architectural practice.

Figure 13 has been taken from Allinson’s publication to detail the different roles that can occur in an architectural practice (Allinson 1993:334).

Due to the mid-sized practice context of my study, and given the need to focus this research to a topic, this research is a concentrated study on the specific role of the architectural designer. This focus is opposed to the other roles in practice, for example project management or delivering architectural design. The following pages recall definitions of an architectural designer’s role and explore the changes that have occurred to the role over time.

The architectural designer designs architectural propositions by ‘combining different types of media and drawing on the available material about a project, which may or may not be provided by the architectural firm’ (Architects Accreditation Council of Australia 2003:7). The architectural designer is required to act professionally, creating designs that are ‘capable of realisation, through the exercise of knowledge, imagination, judgement and professional responsibility’ (Architects Accreditation Council of Australia 2003:7).

The architectural designer’s role can be revered over any other architectural task (Cuff 1991:49). As Cuff observes, whether large or small, any office that produces award-winning work is ‘likely to attribute a particular building’s design to a single designer from the firm’ (Cuff 1991:73).

The perception and the role of the architectural designer have shifted over time (Saint 1983) from a singular and hierarchical mode of practice to a heterogeneity and acknowledgment of the
architectural team in practice. For example, particularly through the 1920s, and during the Modernist era, design was considered as singular. Some practices continue to operate their practice in a singular mode; for example, the Pritzker Prize was awarded to Australian architect Glenn Murcutt (Beck and Cooper 2002:9). In a singular mode, an architectural designer’s ideal is to control the entire design and building process (Blythe, Reinmuth et al. 2005:52). Singularity and overarching control encourages architects to consider themselves as ‘top dogs’ in the construction process and ‘creators, romantics (with) the possible chance of fame and remembrance through posterity’ (Saint 1983:6).

The privileging view sees design conceived by an individual. Ayn Rand captured this mode of practice in her fictional work ‘The Fountainhead’ (Rand 1953). Her work was based on the belief that the architect worked on architectural masterpieces in isolation. In a larger architectural firm, the singular mode of operation is highly hierarchical. Blau identified and categorised roles in architectural practice as managers (owners, partners, associates), staff designers (employees who have primarily design responsibilities) and staff architects (employees who engage in more technical professional work such as detailing, drafting and writing of specifications) (Blau 1984:36). In addition, Cuff observed that there is often a steep hierarchy maintained in offices with ‘partners and project architects making nearly all of the decisions’ (Cuff 1991:76). Cuff noted that typically in a larger practice, the design process involves a principal architectural designer conceiving ideas for the project and a team who assist to deliver them (Cuff 1991:49). I am aware of this hierarchical mode of practice from my own personal experience in mid-sized firms. In this mode of practice, an idea is delivered from a principal architectural designer to project architects who lead teams of assistant designers and/or draftspeople in the completion of documentation. The line of communication is clear. Any questions and variances of the initial idea is controlled and managed by the principal architectural designer.
Following the height of the Modernist movement, architectural design practice underwent significant shifts and saw the emergence of the Post-Modern era. Post Modernism challenged many of the differentiations and elitisms, and questioned the hierarchies established in Modernist times. The new technologies and ideals questioned ‘fixed social stabilities, the reliance on specialisations and replaced them with new scepticisms and diversities’ (Steele 2001:24). The shifts resulted in ‘heterogeneity without hierarchy’ (Steele 2001:24) As a result, the benefits of collaboration were promoted and exploited in architectural schools and practice (Saint 1983:115-137). In practice, architectural firms such as Skidmore Owings & Merrill (SOM) in Chicago were engaging in more commercial and larger high-rise developments. To handle the large projects, the size of these firms also increased. The change of scale in developments and size of the architectural firms added pressure for firms of architecture to be de-structured and reconfigured in order to operate as collaborative firms.

With the introduction of the Internet came new ideas regarding collaboration and access to information. Some firms exploited the Internet and other communication technologies to operate architectural design practice across disparate locations and with a larger variety of consultants. For example, architectural design practices, such as Greg Lynn FORM, are exploiting new digital media to redefine the conventional design office to include collaborations
that cross both geographic and professional boundaries. Teams now include a variety of specialists and consultants. As trans-disciplinary and trans-national American-based digital architectural firm Greg Lynn FORM suggests, this approach is ‘yielding unforeseen and innovative results’ (Greg Lynn FORM 2006:6). Similarly, Terroir exploited digital communication media in setting up a design practice over three disparate locations.

Currently there is contention in the industry as to the benefits and opportunities of a collective practice, in particular how a practice balances and mediates the traditional architectural approach to practice, of acting as generalist practitioners, compared with investigating, integrating and improving new and diverse specialist practices. The new ideas regarding collaboration are beginning to more readily question and dismantle the common hierarchies in conventional architectural design practices. External and internal factors are affecting the role of the architectural designer. Jim Service suggested that shifts in the industry see ‘disintegration in society’s view of architecture’ and the ‘shifts are demanding more of the current Australian profession’ (Service 2000:84-88). Service mentioned ‘lack of understanding in client base, miserable quality control, mis-direction in training and adoption of impressive CAAD systems but their negligible application’ (Service 2000:84) as signs of the disintegration and symptoms of malcontent with the architectural profession. Service suggested that, particularly in the larger firms, there will be ‘acceleration in the tendency to develop in-house specialists’ able to devote serious resources to these issues (Service 2000:84). Service’s solution to these predicaments is a more refined use of digital media within firms, rather than bringing in external service-based expertise (Service 2000:84-88). Furthermore, the singular and hierarchical approach in architectural design practice is pressured to undergo change in response to the education of students. Architectural graduates today are pursuing diverse and hybrid careers, not only in architecture but also in many spheres of creativity. In professional practices, Goad suggested that architects themselves need to understand the ‘dramatic and profound shifts that are taking place, both outside and inside the workplace, and they must ensure that they have the capacities to deal with change’ (Goad 2001:58). That is, the change may ‘not just be the architect’s role, but also the way architects work themselves and with others’ (Goad 2001:58).

Many architectural firms maintain a traditional view of architectural practice operating as generalist practitioners (Tombesi 1997:17). Cuff discussed architectural collaboration in her 1991 participant-observer study regarding the practice of architecture. She observed that design emerges through a ‘series of complex interactions between a series of interested parties’ (Cuff 1991:76). Cuff noted that ‘countless internal voices are involved in the process’, including a team of partners, project architects and draftspersons (Cuff 1991:76,151). In both Cuff and Blau’s
study, and through my own experience in Australian architectural practice, it is clear that architectural practice involves teams of people and that the hierarchies of the Modernist process remain in architectural practice, as leading architects continue to hold seniority of decision-making over teams (Cuff 1991:49; Blau 1984:36).

However, it is necessary to observe the suggestions of specialisation and increasing skill in the integration of digital media. Increasingly specialisations are emerging to manage specific sides of an overall design problem both within architectural firms and across the architecture, engineering and construction (AEC) industry (Tombesi 1997:18). Within larger architectural firms, a transformation has occurred, seeing a division of labour to cover the ‘vast number of tasks required to be managed by the architectural profession’ (Tombesi 1997:18). The increasing specialisation is matched by growth among architectural offices, suggesting that specialisation is to some extent advantageous.

However, as Cuff observes, specialisation can lead to a number of issues, including ‘loss of collaboration, de-qualification and unhappy architects left with uncreative assignments’ (Cuff 1991:49). In Blau’s study, she observed that firms with a higher percentage of technical staff, that is drafting staff or specification writers, reduce the collective influence of generalised architects who maintain a consistency in the firm’s approach (Blau 1984:33). Architects in idea-focused firms are most likely to retain all design responsibility and further ‘stratify the hierarchy’ of an architectural practice (Cuff 1991:49). As Cuff notes, further stratification can lead to ‘unravelling the professional community by increasing internal conflicts’ (Cuff 1991:49-50).

It is clear from reviewing the available literature that benefits to practice can be gained from both specialisation and generalisation. It seems that architectural firms require a balance of specialisation and generalisation, and careful consideration of both to achieve that optimal balance. It is also necessary to consider the development of in-house specialists to foster the integration of digital media. In the context of balancing specialisation with generalisation, Chapter 9, Practicing Digital Designing, presents a new ‘role’ in architectural practice that aims to mediate stratification in architectural practice and the integration of digital media into design in a practice.

From the available literature, including Cuff, Blau, Service and Goad, it is clear that shifts in the roles of the practice will result from an uptake of digital media. Part of what I am addressing in this thesis is the widespread opportunity of digital media in architectural practice. The issues of
training, negligible CAAD application and the shifts in collective practice are supporting factors for the new role in practice discussed in this thesis.

Definitions of the Early Stages of Design

This section recalls definitions of the early stages of design and details a conflict between cost, time and quality, which can occur in the process of a high-quality design.

Architectural design moves through a series of stages. The architectural bodies, including the Royal Institute of British Architects (RIBA), the AIA, and Australia’s RAIA, which closely follows the British body, set out the stages of the architectural process (Lawson 2006:35-36). The professional Practice Notes published by the RAIA describe these stages and aim to assist Australian architects through the process, manage time and ensure adequate reimbursement (RAIA 1998a; RAIA 1998b).

The various architectural industry bodies provide definitions for the staged architectural design process. The AIA established a five-stage architectural design process. Monitoring design processes in 1973, RIBA\textsuperscript{14} established four stages and, acknowledging the unpredictability of the design process, it added that the stages should be cyclical (Lawson 2006:35-36). Alongside these international examples, Australia has established its own staged architectural design process. The Australian stages include the schematic or conceptual stage, design development, contract documentation and contract administration (RAIA 1998b). This thesis refers specifically to the early stages of this process.

The Architects Accreditation Council of Australia (AACA) defines the early stage of the architectural design process as the \textit{concept design stage} (Architects Accreditation Council of Australia 2003:6). This stage includes the ‘exploration of ideas and options inspired by analysis of all the given facts, contextual issues and constraints’ and the stage is informed by ‘precedent and personal architectural philosophy’ (Architects Accreditation Council of Australia 2003:6). In the concept design stage, the designer is understood to draw from a range of ideas, facts and the

\textsuperscript{14} The Egan report (Rethinking Construction; the Report of the Construction Task Force) was commissioned by the British government in response to complaints concerning the standard of the profession at the time. Along with the staged design process, the Egan Report suggested that through best practices, the industry and clients can collectively improve performance (Egan et al. 1998).
application of judgement (Architects Accreditation Council of Australia 2003:6). In this stage, the architectural designer is expected to use their ‘knowledge and experience to produce effective solutions to answer a client’s brief’ (Architects Accreditation Council of Australia 2003:7). They are to ‘explore and illustrate the design alongside cost options appropriate to the size of the project for the client to consider’ (RAIA 1998b:7). The designs produced are expected to be based on an ‘understanding of local requirements’ (RAIA 1998b:12) and the preferred option forms the ‘basis for developing the final design’ (RAIA 1998b:12). To produce effective solutions through exploration and illustration, numerous design documents can be produced; as Sanders observes, design at its core is an ‘iterative one’ (Sanders 1996:11).

Figure 14: The contractual ‘theory’ of design and construction documentation.

This diagram, taken from Tombesi’s thesis, denotes the expanding number of official documents that result through the architectural design process (Tombesi 1997:59). By the construction document phase, the number of documents is significant. The documents are reassessed at every stage. They continue to be refined, and clarify the intention of the building idea until the building is constructed.

In some states in Australia, the client and the architect are required to sign a contractual agreement, the Client and Architect Agreement, which clarifies and defines the agreed stages of the specific project, the services to be provided and the fees to be paid. Thus, stages are unique to the specific project and fees can be charged in different ways, including percentages, lump sum or time charge (RAIA 1998a:1). Depending upon the scale of the job and the period, an architect may charge at the completion of each stage or on an agreed cash flow (RAIA 1998a:2). Typically, the largest share of a project budget, and of office time, goes into the production or the documentation stage of a project. Typically, only a small percentage goes to conceptualisation stage, and the early stages of working up a design (refer to Figure 15, Figure 16). A distinguishing feature of architecture, from other industries in construction, is the conception and production of ‘high quality design’ (Barrow 2002:103). As the RAIA mentions, there are no
easy ways to make fees cheaper for clients; if required, the architect can ‘only make the services cheaper by shortening the time spent on design or by deleting a part of the normal service’ (RAIA 1998a:3) and thus potentially restricting the quality of the design.

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<tr>
<td>Contract Documentation</td>
<td>40.0</td>
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<td>Tendering &amp; negotiating</td>
<td>2.5</td>
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<td>Contract administration</td>
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<td>- Construction</td>
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*Figure 15: RAIA examples of the percentage proportion of fee to be charged in architectural stages.*

This diagram, from an RAIA publication, suggests to architects the potential fee charges (RAIA 1998a:2).

Given the largest fees result from documentation, a conflict arises for an architectural firm in determining the balance between design, particularly in the low-fee early stages, and its production. Architectural design practice embraces both aesthetics (aspects of design) and
utilitarian (its production) aspects. These two aspects may be distinguished but not separated, and the relative weight of either aspect can vary from project to project and firm to firm (Encyclopaedia Britannica 2002:530). Good practice, leaning toward a technicality and governed by rationality, can be used to shepherd a project to completion but does not mean that it will be a ‘good’ design (Allinson 1993:xi).

The two aspects, design and production, are inexplicitly linked in practice (Pressman c1997:14), and pressure is applied on the designer to deliver ‘high quality design’ (Barrow 2002:103) as soon as possible due to limitations on payment. Based on my experience in research and practice, early stage design needs to include exploration and it can be time consuming and ambiguous. The RAIA reminds architects that ‘design services are valuable’ (RAIA Practice Services 2002:1). They remind practices that the role of design should not be undermined or forgotten against the challenges that are presented by the multiple external influences, such as clients and consultants (RAIA Practice Services 2002:1). The RAIA also note that it is unrealistic for architects to ignore the close ties between design and profitability and it is wise for architectural practices to be aware that high-quality design hangs on a firm’s ability to balance the costs of a project with design (RAIA Practice Services 2001:7). To resolve these conflicts, strategies can be employed in the middle ground; as Allison suggests, a balance can be found between the stages, one that ‘eschews certainties and accepts ambiguities’, can accept architecture as a design discipline, but also results in delivering buildings (Allinson 1997:6).

From my own experience in my research, I am aware of time and cost pressures in exploring and conceptualising design at the early stages and, in addition, of the pressure to research alternative design methods. The desire to deliver ‘high quality design’ (Barrow 2002:103) within the time and cost pressures of practice exerted considerable influence over my own practice fieldwork. This thesis demonstrates how I negotiated and guarded early stage design, and integrated new digital media. It discusses the demand on architectural designers’ time and how this demand supports the arguments for, and influences, a new specialised role in practice.
General Discussion on the Definitions of Creativity in Available Literature

Understanding our own cognitive model of reality is an important determinant of our ability to think creativity (Kelly 1955:46-47; Proctor 2005:2). A pertinent aspect investigated in this review of the literature is, what is creativity and what is it that I am trying to do as a designer? My attempts, and those of others, to textually define creativity are filled with ambiguities and multiple interpretations.

Creativity is a mental process involving the use of the imagination or original ideas in order to create something (Oxford Dictionary 2001:200). The etymological root of the word in English and most other European languages comes from the Latin ‘creatus’, literally to ‘have grown’. Creativity as a concept can permeate everyday conversation in an intrinsic manner, for example, ‘people or works of art or literature are often referred to as being creative’ (Proctor 2005:2). Despite the inherent understandings, there is not a commonly agreed understanding of what creativity means and how a designer is creative. There is no single, authoritative perspective or definition of creativity and no standardised measurement technique. Although the notion of creativity is intuitively referred to, the debate that surrounds the term shows that it is complex. As a result, a great deal of confusion surrounds the concept of creativity. Acknowledging that creativity is filled with ambiguity, many researchers continue to explain its nature. A vast range of different definitions and studies of creativity exist, a full discussion of which was beyond my three-year study, but some of the definitions about creativity served to strengthen, and refute, my own practice fieldwork.

Creativity results through no singular process (Dacey, Lennon et al. c1998:7). Creativity is an activity that involves cognitive and extra-cognitive factors that are not easily extricated (Dacey, Lennon et al. c1998:171). Making patterns and combining our ordinary daily pursuits can lead to creativity (Dacey, Lennon et al. c1998:7). As Gilliam suggests, creativity is the ‘process of making new connections, in ways that had not been made before, between things or ideas’ (Proctor 2005:3):

An aspect of thinking in creativity is the role of memory. Various theoretical models exist to explain this role, for example, the Cognitive Theory of Creativity (Proctor 2005:59), an area that has been the centre of debate for many years. Various schools of psychology, psychoanalytical and Gestalt all had their own perspectives on creative thinking (Dacey, Lennon et al. c1998:168; Proctor 2005:59). One thing that the schools do generally agree upon is that thinking is related
to memory and that memory is made up of the short and the long term. Through these two forms of memory, the creative individual is able to focus on current activities against memories of images, sounds and other data, which form our ‘remembered’ data (Proctor 2005:59). Then, through recollection and gathering both of these aspects, the act of creativity occurs as we ‘start to make new connections between them’ (Proctor 2005:59). McClelland explored this notion of connection to construct his Connectionist or Parallel Distributed Processing Model. He suggested that ‘information about people, events and objects are stored in several interconnected units rather than a single location’. He suggested that the strength of our ability to make connections between these different aspects of ‘our memories depend on our learning and ultimately affects how creative we can be’. The basis of the Parallel Distributed Processing Model also referred to past and present memories and was based on mutual influences of ‘syntax’ and ‘semantics’ (Rumelhart 1986:6) and an interplay of multiple sources of knowledge (Rumelhart 1986:9).

Schön discussed creativity in terms of forward and reflective thinking. He suggested that creativity in practice is about reflective thinking in the action of ‘undertaking the daily tasks’ (Schön c1983:54). Schön’s research suggests that there is interactivity between our thoughts or memory and current activities (Schön c1983:54). This concept of interactivity is explored in Chapter 7.

Torrance suggested creativity was the process of ‘becoming sensitive to problems, deficiencies, gaps in knowledge, missing elements, disharmonies, and so on’. He suggested it is the ‘identifying and formulating a hypothesis about difficulties, searching for solutions, testing and retesting them and then finally communicating the results’ (Torrance in Proctor 2005:2). This suggestion highlights that creativity is a process of working up the idea, and that an important aspect of creativity is communication, back either to you or to a greater audience. Communication of creativity is an issue of relevance to this study, as my research context is a collaborative architectural practice. Communication of creativity is demonstrated in Chapters 6-7.

The periods of thinking in creativity include both unconscious and purposeful thought15. As such, creativity is linked to imagination and concerned with ‘how we imagine things’ (Proctor 2005:3). Creativity is about thinking and thinking differently. For example, Weinman considered creativity to be the ‘ability to go beyond the mundane and obvious and to reject the traps of

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15 Victor Papanek said design is the conscious effort to impose meaningful order. Buckminster Fuller said the opposite of design is chaos (Allinson 1993:21).
repetition and pre-set categories’ (Proctor 2005:3). In addition, Edward de Bono argued to be creative we need to think ‘lateral’ (de Bono 1967). Lateral thinking is not concerned with ‘problem solving or looking at things in a vertical or hierarchical manner’. Lateral thinking has to ‘do with looking at things and ideas in new ways’ (de Bono 1967:12). De Bono distinguished between lateral thinking, open to everyone who is interested, and creative thinking. Creative thinking is a special part of lateral thinking, which covers a ‘wider area and requires talent for expression’ (de Bono 1967:14). Repetition and thinking differently as ways of being creative is displayed in Chapters 6-7 as part of my own practice fieldwork.

The individual and the group play differing roles in creativity. As Rickards suggests, creativity is a partially unconscious personal discovery process, which leads to ‘new and relevant insights’ (Proctor 2005:3; Rickards 1988:225). While it is largely the individual, through cognitive processes and practical activities that inherently comes up with an idea, Collins observed that a team of individuals can play a role in gathering and rearranging those ideas in new ways and also play a larger role in maintaining a creative environment (Collins 1998:80). Creative exchanges between the individual and the group are displayed in Chapter 7.

Non-cognitive factors also influence creativity. Factors such as ‘personality, brain function, intrinsic motivation and the ability to act on opportunity’ are also involved (Dacey, Lennon et al. c1998:8). Creativity is moving through periods of thinking, as well as periods of making to discover and create something that was not there before. Added to the role of thinking in creativity is the role of making and the relationship between what we think and what we make. Creativity is often gained through images (Proctor 2005:180) and other creativity techniques such as brainstorming (Proctor 2005; Correll c2004). During the process of this research in Terroir, a director suggested that images assist in our ‘imagination’. This imagining through imagery is demonstrated in Chapter 7 Interactive Designing.

Koestler suggested that creativity often emerges from a ‘matrix’ of conscious habit and unconscious linking of visual and/or verbal concepts (Koestler 1964:105-108). The matrix is made up of a ‘routine of planning and problem solving through everyday life’ (Koestler 1964:108). Creativity can be found by way of analogy, recognising that a present situation is the same as a previous situation and/or applying hypotheses to the new situation; through ‘trial and error’, the creator may find that only one situation offers a solution. Thus, there is a settlement for an approximate solution. Koestler argues that in ‘practical life and in the history of science, there is no better solution than the approximate’ (Koestler 1964:651). Creativity gained through working toward an approximate solution is discussed in Chapter 7.
There is a criterion of purpose and usefulness in creativity. Proctor suggests purposeful thinking enables the ability to ‘organise our thoughts in such a way that readily leads to a different and even better understanding of the subject or situation we are considering’ (Proctor c2005:2). Moreover, creations often have a value to their creators, and a major factor in successfully achieving this usefulness is that creations need to be proposed and employed at ‘the right time’ (von Fange 1959:5). The use of creativity techniques, at ‘the right time’ is discussed in Chapter 8.

Dacey, Lennon et al. argued that in the future’s ‘fast changing world’, the ability to deal with vast ranges of complex problems and opportunities is at a ‘premium’ (Dacey, Lennon et al. 1998:3). Many researchers promote the worth and value to the industry in continuing to understand the nature of our creative practices (Pink 2005:49-50; Lab3000 2004:11). Coconete, Moguilnaia et al. suggested that companies generally would benefit from focusing on creativity, particularly to support technological developments and sustain a competitive advantage (Coconete, Moguilnaia et al. 2003:294-295). To argue that we need to continue to create improvements and advance our practices, von Fange even referred to King Solomon in the Bible (Prov. 29:18) ‘where there is no vision, the people will perish’ (von Fange 1959:2).

Generally, there seems to be no precise explanation for creativity, which makes the phenomenon ambiguous and multi-dimensional. My own project studies, covered in Part Two of this thesis, tested aspects of creativity in the early stages of architectural design, variously refuting or supported some of the ideas from the literature discussed above. The challenge of how a practice addresses the ambiguities of creativity and the pressures of practice is discussed later in this thesis and a series of potential resolutions are given, including generative and communicative design techniques for the early stages, examples of how to use them at the ‘right time’ (von Fange 1959:2) and the process of working towards approximate (Koestler 1964:651) solutions.

**General Discussion on the Definitions of Design in Available Literature**

Where creativity is gaining new meaningful ideas and forms, and draws on intuition, design is the decisive fashioning of those ideas and forms, in this case for an architectural design. The term *design* is just as multifaceted as the term creativity, is used in everyday conversation and holds different meanings by particular groups (Lawson 2006:3). It can refer both to an end
product and to a process (Lawson 2006:3). The term design can define a plan or drawing produced, as well as the action involved in making the plan or drawing (Oxford Dictionary 2001:236). Generally, design is a highly complex activity and can require sophisticated skills (Lawson 2006:14). A commonly used description in the literature is that design is a process of conscious decision-making.

**General Discussion on the Definitions of Architectural Design Process in Available Literature**

During the 1960s there was general confusion as to what design was and how design was undertaken (Lawson 1982:71). The confusion resulted in understanding design as a process and saw the establishment of the stages in architectural practice. The following is a discussion about the changes in understanding.

Before the 1960’s was a period that Conrad Jameson called, ‘de novo’ design (Lawson 1982:71). During this stage, ‘all problems were considered unique and needed original solutions’ (Lawson 1982:71). From the 1960s design studies emerged that regarded the nature of designing, for example *Introduction to Design* (Asimow 1962), *The New Utopians* (Boguslaw 1965), and *A Pattern Language* (Alexander 1964; Alexander, Ishikawa et al. 1977) (Lawson 1982:71).

In *A Pattern Language*, Alexander, Ishikawa et al. aimed to provide a working alternative to present ideas about architecture, building and planning (Alexander, Ishikawa et al. 1977:ix-xi). Their concept was that design was very much a problem and solution system. The authors put together a ‘language’ of entities, which they coined ‘patterns’. For Alexander, Ishikawa et al., a pattern was a ‘problem that reoccurred’ (Alexander, Ishikawa et al. 1977:x). For each pattern, the authors provided a range of different ways that the patterns could be made manifest (Alexander, Ishikawa et al. 1977).

![Figure 17: Alexander, Ishikawa et al.’s understanding of the design process as problem/solution.](image)

*Figure 17: Alexander, Ishikawa et al.’s understanding of the design process as problem/solution.*

I have created this diagram to visualise Alexander, Ishikawa et al.’s premise of the design process (Alexander, Ishikawa et al. 1977).
Alexander, Ishikawa et al.’s publication coincided with the emergence of digital technologies for design and a strong belief at the time that the emerging digital technologies could assist in the solving of problems through automation, efficiency (Walker 1964:450) and artificial intelligence. The advent of computers in the 1950s provided new hopes that by using computers a designer, and/or architect could access ‘multitudes of prior solutions’, ‘obtain help when generating new ones’, ‘test them and even fabricate them at the touch of a button’ (Kalay 2004:xiv). However, the reality of these suggestions has been questioned as to whether they conflict with the nature of design or are only beginning to be realised.

Other scholars, including Broadbent in *Design in Architecture*, argued that an architectural project is not typically as simple as a defined problem to which an equally satisfable formal solution can be mapped (Lawson 1982:72). Broadbent also argued that a designer works through a design process (Broadbent 1973:265). Broadbent’s concept was that this process moved the design through a series of stages from analysis through synthesis into evaluation (Broadbent 1973:269).

Maver followed by Markus furthered this concept, with both arguing that design is a cyclical process (Lawson 1982:72). They argued that design is a four-part movement through analysis, synthesis, appraisal and decision-making, and that this operates in a cyclical manner (Lawson 2006:36-38). Markus argued that an architectural problem is a set of requirements that may not necessarily be made explicit at an early stage. Furthermore, the problem and solution depend on each other and are inextricably linked (Lawson 1982:72). The design process is not linear, as it was believed in the 1960s (Lawson 1982:73).

![Figure 18: The cyclical design process.](image)

*This diagram, from Lawson’s publication, is used to demonstrate the cyclical design process (Lawson 2006:38).*

Design studies continued to strengthen the understanding the process of design as a form of cycle. The design process was the ‘putting together of psychological skills in a mosaic manner’ (Lawson 1982:73). So whereas in the 1920s, design focused on the architectural product, by the 1970s design was considered as a process (Cross 1977:3). As Markus’ cyclical process needs to originate from some stage, Darke and Lawson added the notion of a primary generator of
design (Lawson 2006:46-48; Jane Darke 1978). The primary generator is a ‘set of guiding principles or values’, which is held by the designer, for example landscape or structure. The designer may then use the primary generator, and a list of external ‘constraints’, in the initial explorations for a solution for the design (Lawson 2006:189).

This line of thinking, that design is a process, continues today. In architecture, Blau observed that design is a process, be it in large or small firms. Design is an ‘ongoing set of activities’ involving ‘specialised and interrelated tasks’ (Blau 1984:10). More recently, Brady suggested that the design process is both ‘non-linear’ and ‘not random’. Brady argued that the process in the early stages is one of balancing both directed and discursive inquiry. Brady also suggested that the design process is an activity that aims to move from ‘memory into understanding and imagination’ (Brady 2000:261-262). Kalay suggested that design is a purposeful activity and added that, if executing this action requires participation with other people, another important aspect of the design process is the ‘communication’ of the design to get their opinion, agreement and assistance (Kalay 2004:5).

Issues of superficiality and judgement occur in design. Through my experience at university and in practice, I am aware that design, which too simply applies or relies on preconceived ideas, is commonly questioned. Barrow suggested that the purpose of the design process in the early stages is the working up of thoughts and objects. Design considered as a process allows the designer to build up a credible basis for a design through sometimes complementary and sometimes contradictory evidence that they find out about the project. Design as a process allows the designer to ‘discover an individual project as it unfolds’ (Balmforth, Benjamin et al. 2007c:153-154). Designing through process transcends precedent, moves beyond concerns of superficiality and style and provides an answer to the complex debate surrounding judgment (Barrow 2005:104-105; Burgess 2004:98).

The AACA suggests that the architectural design process includes many elements of design that come together to constitute a system, a set of incidents, which are dynamically related (Architects Accreditation Council of Australia 2003:7). These often merge, repeat and inform each other throughout the length of the process and cannot easily be considered in isolation. An architectural design evolves through the early stages of exploration and reappraisal of ideas progressively to the eventual resolution of a coherent design proposal (Architects Accreditation Council of Australia 2003:7).
Terroir considers current design studies and its own process of design into a singular diagram. For Terroir, design is cyclical and non-sequacious; the firm considers its designs as a fanning out of ‘questions’. The designs move from question towards proposal, which, in itself, provokes a new set of questions (Balmforth, Benjamin 2007b:108-109).

**Figure 19: Terroir’s diagram of the design process.**

Richard Blythe, director at Terroir, has used this diagram in a PowerPoint lecture, as detailed in Appendix C. The diagram describes how ideas can expand and become multifaceted over time and how, in Terroir, the design team selects and coordinates from these numerous ideas to refine and coalesce a single project’s proposition. (Appendix C PP Fri-Sat 21-22/10/2005 Slide 8/51)

Lawson suggests that the design process is a design worked through and that designers understand problems and develop ideas through conversation (Lawson 2006:265). These conversations can occur with drawings (Schön 1983 in Lawson 2006:266), computers and/or with other designers (Lawson 2006:266). As computers become more powerful, their ability through artificial intelligence may result in computers conducting more meaningful conversations with the designer. However, some still claim that it is impossible to reduce certain kinds of representation to the simple representation needed by the computer. Design requires certain cognitions that are different to the processes of a computer (Lawson 2006:283-285). As Lawson suggests, we need an interpreter to ‘converse’ with the computer. If we are to converse with computers and integrate them into the design process at a more fundamental level, a designer will need to engage in the complexity of computer language and the often myriad of
techniques required to perform design (Lawson 2006:283-285). In Chapters 5-7 I demonstrate how the designer and their digital media converse and interact with new and existing digitally supportive media.

Given the increase in use of digital media, previous understandings of the design process again face significantly questioning. Questions now arise on the role that digital media plays and the effects that it has on the design process itself.

General Discussion on the Definitions of Digital Media and Their Status in Australian Architectural Practice Taken from Available Literature

In this thesis, I use the term ‘digital media’ to refer collectively to the digital software and hardware I am using in practice. The word ‘media’ comes from the plural of the Latin word *medium*, which means, by which something is communicated or achieved (Oxford Dictionary 2001:555). The word ‘media’ acts as a collective noun able to cover a group of *medium*. By digital media, I am referring to types of computer support for architectural designing in the digital format. These include computer-aided drafting packages, computer-generated visualisations, text, animations and photographs.

Before computers, certain design techniques formed the designer’s ‘toolset’. These aided the early stages of design, conceiving and translating ideas into building proposals. They included analogue media such as hand-drawn sketching and drafting, models and illustrations such as perspectives.

Other design methods also existed in the designer’s toolset. These included various ideographic methods. Nigel Cross detailed early examples of these in a *Design Methods Manual*, including brainstorming, classification and creating a matrix (or bubble diagrams) (Cross 1975). Other ideographic methods have been reappropriated from other disciplines, such as the metaphor. Brady is one researcher who has investigated the role of the metaphor in architecture. She noted that where poetry turns visualisations into text, architecture is actually the reverse, turning text into visualisations (Brady 2000:262). The use of metaphor in digitally supportive communication media is discussed in Chapter 7.
Many digital technologies are available as a toolset in the early stages of design. Technologies can aid in design by mimicking a designer or can extend a designer’s creativity by acting generatively. Glanville suggests that a digital toolset is made up of digital tools, which are digital technologies that are acting restrictively (Glanville 1992:213), or digital media, which are digital technologies that are acting generatively (Glanville 1992:213). Other research suggests that the media is an extension of some human faculty, physical or psychic (McLuhan and Fiore 1967:26; McLuhan 1964:7) and that the media alters the way we think and perceive the world (McLuhan 1967:41).

Lui observed that, in the year 2000, architectural firms commonly used computer drafting for plans, elevations and sections. Small and big firms all over the world used ‘AutoCAD™ for drafting, 3D Studio Max™ for computer rendering and simulation, Form-Z™ and Maya™ was used for creating three dimensional spaces, and computer animation and multimedia presentations were created using Premiere™ (Liu 2003:7). Since 2000, there has been an increase in explorations into ‘new forms and space, parametric intelligence, building simulation, animation and rapid prototyping’ (Liu 2003:7). Today there is a vast and increasing variety of digital media available, both common and uncommon to architecture, for all stages of architectural design.

Digital media is categorised in a variety of ways in the available literature. For example, categories include one-dimensional, two-dimensional, three-dimensional and multi-dimensional modes (Mitchell and McCullough 1991:ii-vii). One-dimensional includes words, text and sound. Two-dimensional includes images, drafted lines and maps. Three-dimensional includes lines in space, surfaces and assemblies of solids. Multi-dimensional includes motion models, animation, hyper-media, databases and virtual studios. There are applications for these modes in the design, documentation and fabrication of architecture.

<table>
<thead>
<tr>
<th>one-dimensional</th>
<th>words, text and sounds etc.</th>
</tr>
</thead>
<tbody>
<tr>
<td>two-dimensional</td>
<td>images, drafted lines and maps etc.</td>
</tr>
<tr>
<td>three-dimensional</td>
<td>lines in space, surfaces and assemblies of solids etc.</td>
</tr>
<tr>
<td>multi-dimensional</td>
<td>motion models, animation, hyper-media, databases and virtual studios etc.</td>
</tr>
</tbody>
</table>

*Figure 20: The different digital media categories.*

This figure is based on Mitchell and McCullough’s categorisation of digital media (Mitchell and McCullough 1991:ii-vii).
The main architectural digital media is computer-aided architectural drafting (CAAD). CAAD technology was introduced in the post-war era. It has been adopted in everyday architectural practice, beginning from the 1970s. By 1982, studies showed that 35% of architectural firms and 84% of engineering firms had computers and only 1% of architectural and engineering firms used computers for computer graphics and automated drafting (CAAD) (Harry Mileaf of Sweet’s study, mentioned in Stitt 1984:102). At that time, the industry understood that it took time to implement the hardware and new systems of work (Stitt 1984:102).

The early examples of CAAD began by mimicking conventional tasks and skills of paper-based traditional design processes. For example, the concept of layers, which is used in CAAD, was derived from the traditional practice of overlaying drafting pages. This concept is now a common feature in digital drafting systems. Digital media mimics the creation of conventional models. CAAD enables the creation of three-dimensional models of proposed buildings. By doing so, the digital models can be used as the basis of two dimensional drawings, visualisations and presentations. The models can contain an enormous amount of data, which is increasingly being utilised in the documentation of proposed buildings to builders. The data can be exported to spreadsheets of geometrical data, including finishes, and set out coordinates. Over time, CAAD packages have advanced by mimicking tasks that are more conventional and so enabled the creation of more complicated forms by solving the complex geometric manipulations.

Many packages have the same base functions. These packages are differentiated by the elements of interface, unique functions and ease of use (Kalay 2004:71-74). Other digital media include visualisation packages. These packages can automate the creation of perspectives, through rendering packages. Digital visualisation media mimics hand-drawn illustrations. These packages can mimic pens, pencils and painting techniques in the use and the appearance of the output to retain the qualities of conventional media.

The CAAD package continues to replace the way architects used to draw two-dimensional drawings of proposed buildings. The power and beauty of the computer was in ‘ease of creation, reusable data, convenient storage, ease of manipulation of the data and convenient retrieval’ (Stitt 1984:101). Digital media faces more difficult challenges in architectural practice, such as ‘speeding up the execution of procedures, manipulating large quantities of data and reducing demand on labour, thus minimising costs to practice’ (Mitchell 1977:22).

The use of digital media in architectural practice has always sparked debate. Since 2000, the debate has shifted from a technical focus into issues related to the ‘digitality’ of architecture.
Questions raised include, is the ‘use of digital media in architectural design practice a permanent or temporary phenomenon’, ‘will digital media in architectural design practice ‘hurt’ architecture, since we are not familiar with it’ and ‘what is digital architecture?’ (Liu 2007:7). Concerns, unfamiliarity and a considerable focus by avant-garde architectural designers demonstrating the capabilities and possibilities of design offered by computer technologies resulted in many architectural firms either rejecting or privileging the conventional approaches to design. Early research into digitisation resulted in a focus on ‘how’ a design is created technically. Arguably this focus fell short of the ‘more important’ socially conscious questions of the ‘why’ and reflections on the design’s raison d’être (Bilak 1998). This criticism saw some architectural designers return to the essence of design expressed in a ‘simpler’ way and a return to other conventional and humanistic drivers of design. Presented below is a detailed discussion about these questions, debates and a series of examples by architects using digital media in designing.

**Efficiency Versus Creativity in Digital Media**

The creative benefits for design and efficiency benefits for production are the two main paradoxical applications of digital media in the architectural process. Digital media was introduced in the field of architecture with great optimism that it would automate significant portions of the tasks in design (Coyne, McLaughlin et al. 1996:15). There is a difference between automating tasks for efficient production of documents and assisting in the organisation of architectural design and using digital media for a generative purpose in design. So far, most of the focus and uptake of digital media in Australia has been for production over a generative use of digital media for designing.

In Australian architectural practice, digital media is used in AEC industries primarily for economic rationalisation and production. In Australia, reports show more than 50% of technological innovations undertaken by the AEC industries are driven by productivity and efficiency (Manley 2004:3). In my practice of design, software that mimics and automates commonly performed documentation tasks can be easily used for predestined and task-specific applications in documentation. Coyne, McLaughlin et al. suggested that developers and executives foster this pragmatic usage by producing software with these particular interests in mind. Given the large amount of information that AEC industries need to process, there has been an impetus for developers and their executives to construct media around a pragmatic and utilitarian view that addresses issues of efficiency and speed (Coyne 1991:421; Coyne, McLaughlin et al. 1996). Thus, the benefits of digital media have been relegated to delivering efficiency in the later stages of the design development and documentation process.
In parallel to the integration of digital technologies for production, various studies into the scholarly and practice-based creative benefits of digital media in designing by architects and design theorists have been underway since the 1960s, for example, Negroponte’s artificial intelligence design studies (Negroponte 1969). These studies cover the effects of automation, artificial intelligence and generative design. These generative research studies by academics into the integration of digital media continue today.

Pre-dating contemporary ‘digital architects’, or a primary use of computation and digitally supportive media in architectural design, is a mindset of mathematics and other computational ideas as drivers of architectural design. A proto-computing paradigm existed among architectural designers such as Antoni Gaudi and Frei Otto (Scriver 2006:27).

In my experience, the generative use of digital media for the early stages of designing has so far been limited to a small niche of architectural designers labelled ‘non-standard architectures’. Non-standard architecture includes digital or virtual architectural design that ‘exploits digital elements, deals with questions of representation (such as virtuality and hyperspace) and highlight current modifications to the industrialization of architecture’ (designboom 2005). Non-standard architecture refers to design with a primarily mathematics basis and that draws on fractal and catastrophe theory and artificial intelligence (designboom 2005). Typically non-standard architectures do not primarily drive design in terms of site specificity or phenomenology.

Examples of Using Digital Media in the Early Stages of Design
Few published practical studies on the integration of digital media in design practice exist. This gap in literature indicates a lack of consensus among professionals and academics. Moreover, existing literature offers an inadequate explanation of the advantages in the early stages of design for a mid-sized architectural Australian-based practice whose primary drivers are not mathematics and other computational ideas. Available published literature that discusses digital media in design process mainly refers to the technical, pragmatic and/or utilitarian applications of digital media. The few theoretical observations regarding the integration of digital media suggest that there are design opportunities within the transient and lightweight nature of digital media (Benjamin 2004:54; Erdman 2004). Kalay suggested that a contemporary design studio needs to integrate these new digital modes with conventional media (Kalay 2004:133-187).
William Mitchell observed that digital media is increasingly becoming so indispensable that architectural practice without it is ‘as unimaginable as writing without a word processor’
Researchers such as Kvan, Mark et al. demonstrated that digital media can be beneficial, not only in the later stages of the process where efficiency plays a primary driver, but also in the very early stages of the design process. As Kvan, Mark et al. argue, this early integration of digital media, in turn, challenges both architects and educators alike to formulate a new understanding of the design realm (Kvan, Mark et al. 2004).

Practical examples of using digital media in the early stages of architectural design in practice are limited to a small niche of architectural practices, known as ‘non-standard architectures’. These architects have convincingly amalgamated digital media into the early stages of their architectural design process, and include the likes of NOX Architects, Zaha Hadid and Australian’s Tom Kovak and Paul Minifie (Mackenzie 2004:16).

An illustration of these architectural practices and an illustration that computers are becoming essential to the communication of design in the early stages and to the generation of a design, including its structure, form and composition, can be seen in a recent competition in 2002. The 2002 competition shows that ‘state-of-the-art’ includes a wide range of digitally derived or conveyed architectural solutions. The designs and presentations of this competition clearly illustrate the increasing importance of computers and digital media in the design of the built environment (Chiu, Tsou et al. 2003:464). In this competition, some of the architectural designers are integrating the digital media to draw on the computational facilities to aid engineering or mathematical principles. Some of the practical examples challenge architectural design at an intellectually rigorous level through the exploring of concepts and translating them into their material counterparts (Rahim 2002; Leach, Turnbull et al. Ed. 2004) and a few examples demonstrate the integration of digital media for more abstract and ‘humanistic’ principles. The examples below of this 2002 competition illustrate some of the range of capacity that digital media offers for the early stages of design (Protetch 2002; Chiu, Tsou et al. 2003).

**HADID** (Guggenheim Foundation 2006:140) *Wireframe diagrams are a representation of a ‘nurb surface’ modelled in a 3D modelling package.*
HADID (Protetch 2002:56). Abstract assemblages are not trying to be a building but transfer an idea in a very evocative way. This image was accompanied by a considerable paper on the theory of the project (Protetch 2002:56).

HADID (Guggenheim Foundation 2006:119,151). In presentation images, the light effects, colour and position of the camera reinforce the idea of the building. There tends to be a fake plastic quality to digital representations. This quality of the imagery correlates with Hadid’s interest in concrete and surrealism. These images take a significant amount of time to produce.

HIMMELBLAU (Protetch 2002:34-35). Drafted overlays give a depth to line drawings and can create an optical illusion by the discrepancies between the layers.
**HOLL** (Protetch 2002:66-67). This hybrid of conventional and digital media has a tactile or work-in-progress quality to it, and is an example of how to capture process and represent it in presentation and physical models.

**LIBESKIND** (Protetch 2002:84-85). Presentation image photomontage of site and proposed building. Quick to compose as opposed to spending hours accurately creating a fake site in the digital model. Convincing due to its realism.

**KOVAC** (Protetch 2002:80-81) and **LYNN** (Protetch 2002:90-91). These alien forms and sensuous images of a seductive fluid form lack site information and are not contextualised.
This sited form is drawn from mathematical or natural influences. It is similar to the previous category but tries to explain why and from where the proposal is drawing ideas.

Emotional assemblages feature people and brilliant colours that try to tell a story about a potential situation (or series of situations) resulting from the selection and building of a proposal.

**Conclusion to the Analysis of Terms**

Despite the few avant-guard examples, overall there is a general unknowing and lack of uptake in the use of the digital media in the early stages of design (Kvan, Mark et al. 2004). Digital media is seen as ‘just another tool’ filling at best an ancillary and service role in the design process (Kvan, Mark et al. 2004). This view means therefore that designing with digital media has not advanced very much (Corrigan 2003:86). However, the dominance of digital media for production will continue, and the perception of CAAD as only a production tool is expected to change. This change is expected to come about as the training in, familiarity and availability of digital media alters (Szalapaj 2005:4).
Section 2 What Is Known

I am aware from my own practical experience that the available digital media offers opportunities for designing in a mid-sized collaborative Australian architectural design practice. Initially, I had fear and was sceptical of the implications of this media integrating into the architectural process. Here I explore the concerns surrounding the integration of digital media into the early stages of design. The section reviews the possible hindrances (arguments against) and advantageous ‘uses’ (arguments for) that may result from digital media.

Issues Affecting the Integration of Digital Media in Designing

Several forces, such as philosophical, political, and cultural, are catalysed by, and constitute, digital media. These forces have sparked debate on the role that digital media plays in the design process and the implications these forces have on architectural practice, namely the integration of digital media into architectural design practice.

This debate extended into Terroir. Before this study, I was both sceptical and intrigued by the implications of either side of the argument. Through my own architectural experience in using digital media, I suspected that that extremist views, on the integration or otherwise of digital media into the architectural design process, were distracting to a more desirable questioning. I reasoned that any such investigation should question how a designer masters an expanding architectural design practice through an approach that includes ideas, conventional media and digital media. To address this scepticism of integrating digital media, I framed the question as, what is the extent to which it might be advantageous to include digital media as part of the designers’ ‘tool set’ in the early stages of design. I drew on this question to assist me in reviewing the available literature and to test this question in practice. I also considered my series of component questions to gather specific information regarding the topic and to collate my findings. Below, I highlight the relationship between these component questions and issues found in the available literature.

An Overview of the Fears and Concerns Affecting Digital Media

Surveying the literature reveals fears regarding the uptake of digital media during the conceptualisation process. Digital media are often negatively coined ‘the digital’ suggesting that digital media are an ‘alien graft to the supposed body of architecture’ (Mackenzie 2004:16)
Technology evangelists of the 1980s expected and predicted a 'paperless office' (Sanders 1996:4-5). Many architects, however, viewed and implemented the computer tools with caution. Some architects believed that computers threaten the noble traditions and artistic foundations of the profession. These architects tended to emphasise technology’s weaknesses and downplay its strengths (Sanders 1996:4-5). This cautious approach lead to the infrequent characterisation by software developers and technology evangelists that ‘architects were “technophobic”, “ignorant” or “cheap”, when at least compared to the engineering industry that was more readily integrating digital media into practices’ (Sanders 1996:4-5). The lack of uptake was, to an extent, due to architectural design being ‘more difficult and complex than engineering to translate into the digital format of 1s and 0s’ (Sanders 1996:4-5). Today, representation of both academia and practice continues to harbour a lingering technophobia. This technophobia has resulted in a hesitation to integrate modern technologies to expand the toolset of an architectural designer (Mackenzie 2004:16). Added to this hesitation are feelings of caution and unwillingness in those unfamiliar with the tools. There is little trust and generalised understanding in what the applications of digital media may mean for creative pursuits. As Andrew Mackenzie notes in a recent editorial, a lingering professional view sees ‘the digital’ as onerous imports from beyond architecture (Mackenzie 2004:16).

The supporters and technology evangelists locate benefits in the use of digital media for the early stages of architectural design. Advocates are able to use technology for their own benefit. The advocates promote that digital media can provide computer-generated design (Spuybroek 2004), increased exploration (Kvan, Mark et al. 2004) and heightened quality (Barrow 2002:103) in the process of architectural design.

While digital media is used in most architectural design firms, the use of digital media is typically relegated for the efficient production of documents and the presentation of design (Liu 2003:7). Architectural design practices that use digital media in practice separate into two opposing camps. Practices are divided into those that do and those that do not generatively engage the digital media into the early stages of the design process.

**Arguments Against the Use of Digital Media in Designing**

Various arguments exist that oppose the integration of digital media in the designing process. Some of these include issues of humanistic qualities and social responsibilities, fundamental
conflict in the way architects design to the ‘off the shelf’ techniques available, focus on form resulting in superficial architecture, fear of change, loss of skill and mistakes resulting from the seductive nature of digital media. Architects also fear the idea that in using digital media they will lose control and ultimately lose creativity. This section presents arguments against the use of digital media in designing.

**The Humanities Versus Technology**

Architects are expected to bring a high level of selflessness to architectural work done on behalf of their clients and society (International Union of Architects 1999:4). A concern in using digital media, through automation, efficiency and a focus on the technical aspect, is that architectural design foregoes humanistic qualities and social responsibilities (Negroponte 1967:6-7).

This concern is confused by the ambiguous intersecting relationship that is shared between the creative humanistic aspects of architectural designing and computation or ‘the machine’. Humanities and technology share a lengthy, intimate and inevitable relationship (Postman 1993:xii). Many theoreticians have demonstrated and observed this relationship. A lineage of these theoreticians include Lewis Mumford (Mumford 1955), Jacques Ellul (Ellul 1965), Herbert Read (Read 1947), and Arnold Gehlen (Gehlen 1957). In 1959, Sir Charles Snow published works such as *The Two Cultures and the Scientific Revolution* (Postman 1993:xi) to discuss the differences between humanities and the technological. In 1959, Snow presented a perceived problem of the age, which continues today, that art (and humanities) and science (and technology) are in opposition. He argued that ‘creativity, inventiveness, aesthetics, talent and genius are human blessings and gifts and “the machine” would never be able to replace these humanistic qualities’ (in Postman 1993:pxi). This argument is strengthened by the damaging effects that have resulted from the unquestioning faith in technology of that age. The 1960s was a period of self-confidence and an emphasis on technology and the generation of goods and services. As result of using digital technology, damaging effects to society are still being discovered. For example, projects were undertaken with ‘far greater technical complexities than was understood and managed’ (Evans 1982:3). These uses of technology led to ‘large-scale projects with social and political problems that were bigger than before’ (Evans 1982:3).

The evolving use of technology in practice continues today. There is no consensus on how it should be integrated or what the ramifications may be. In dramatic terms, one side of the debate regarding the relationship suggests that uncontrolled growth of technology can destroy the vital sources of humanity. Adversaries argue that uncontrolled uptake and use of technology can
create a culture without moral foundation and can undermine certain mental processes and social relations that make human life worth living (Postman 1993:xii). This contrasts the other side of this debate, which suggests that digital media can be controlled (Lynch 1999:c30 in Steele 2001:13) and can offer possible rewarding approaches to architectural design practice, and that the relationship between the humanities and technology, held in balance by patience and trust (Postman 1993:xii), can advantageously evolve practice and culture.

**Designing and Mapping New Digitally Supportive Media**

Fundamental conflict can result in the way architects design to the digitally supportive media available. Wonder and curiosity have led architects and academics to investigate how architectural designs can be generated through rules and complex computation. At the Possible Futures symposium in Adelaide, Lars Spuybroek of NOX Architects declared ‘we generate form, we do not design it’ (Appendix B FN Thu 09/03/2006; Scrivener 2006:27). This statement suggests that the conception of architecture when engaging digital media can be simply a generation of a form by, for example, making explicit information, rules and complex computation, and that this automated process has nothing to do with design.

However, available literature suggests that the use of digital media in the early stages of design need not, and should not, be merely the crunching of numbers dominated by massive computing power. Lapidus offered the view that as long as human emotions exist, the architect, not the machine, will be required to satisfy the requirements of architectural design and ensure emotional fulfilment is present in the structures that they deliver (Lapidus 1967:204). Furthermore, Kalay and Marx suggested that architects should not ignore the place-making principles that have contributed so much to our cultural and social evolution (Kalay and Marx 2001:231).

What the available literature suggests is that designers need not base their design merely on rules and complex computation. A view of computers as only tools can indeed hinder creativity (Glanville 1992:213). Creativity can be blocked because it needs more than strict and prosaic processes of rules or automated calculations. As Mitchell discusses, designing includes explicit embodied knowledge from education, memories and reference material, elicited material from clients and consultants, and knowledge discovered by observation. These design aspects constantly change, Mitchell suggested that the ‘hindrances’ are a result of ‘thinking that explicit design aspects are constraints and that are fixed’ (Mitchell 1993:11). Mitchell suggested that a
design struggle exists in a schema, which is ‘constructed by the designer and explicates the differing design aspects, reality and the changes that occur over time’ (Mitchell 1993:11).

There are many internal and external factors involved in architectural design (Cuff 1991:72-84). Terroir, for example, acknowledges that architectural design draws upon multiple factors (Blythe, Reinmuth et al. 2005:52-53) and these extend farther than digital media techniques (Appendix I. FN Fri 03/11/2006A). Cross observed that architects need to consider the interacting and interdependent aspects of architectural problems (Cross and Open 1975:31).

It can be easy for an architectural designer, operating under the pressure of practice, to utilise only the ‘off the shelf’ features and familiar techniques in digitally supportive media. However, as Chris Abel (Abel 1997:6-7) observed, relying and constructing standards and/or automation may stifle designing. If designers become too complacent in designing, relying on the familiar at the cost of addressing change, the implications may be detrimental to culture, context and creativity. As Allinson suggests, an architectural designer focusing too narrowly may jeopardise a holistic response (Allinson 2006:122; Lawson 1982:82). Responding to a problem with over-simplified solutions can make balancing the many conflicts upon architectural design difficult. Abel suggested that it is advantageous to exercise control over a total process of design and production (Abel 1997:7).

Available literature suggests that the design process is complex and is a working-up of design intelligence, which informs and strengthens a holistically considered design proposal. ‘Off the shelf’ processes should be questioned and/or exploited as one part of the design process. To assist in the complexity and ambiguity of a design process that engages a multitude of factors, Lawson suggests that architectural designers need to develop heuristic techniques and processes in using digital media, alongside conventional media, in designing (Lawson 1982:82).

**Issues of Form and Style Resulting from Digital Media Usage**

Concern exists about the focus on form, resulting in superficial architecture. Can the new digital media conceivably expand the design processes beyond just the form and style, compared with the creative benefits inherent in conventional drafting and models? The involvement of digital media in aspects of form or style is complicated. Coyne noted that there is a readily observable tendency in computer use to focus merely on form (Coyne 1991:422). Fear exists that architectural design will fall victim to merely a focus on surface appearances of mimetic images and result in overly simplified and rationalised architectural content. Overt emphasis on form
and the visuality of contemporary architectural production catalyses fears that architectural
design will be relegated to simply being pretty pictures, sacrificing a cohesive design (Gusheh
media in architectural design, in particular its imagery is alien to the selflessness values and social
responsibilities of architectural design practice. Moreover, dwelling on the output can result in
minimal critical engagement and result in trivial and superficial architectural propositions (Allen

This argument against the use of digital media in designing is that, due to the tendency to focus
on form, digital media in designing is superficial. The superficiality is encouraged by
contemporary society’s particular consumerist culture that is fascinated with the image, or the
style of something (Ewen 1988:22-23). In traditional times, an image and style stood for
unchanging, hierarchical and static environment. However, in modern times, style and images
can be understood as in constant change and flux (Ewen 1988:23). The outcome of this shift is
that the cursory nature of digital media and computer visualisation techniques is viewed by many
architects as only superficially beneficial to the design process and thus only appropriate at the
later stages of design for presentation, either to satisfy council requirements or to be used as a
marketing tool. Computer visualisation techniques thus are seen to bear minimal relevance to
the conception of architecture (Kvan, Mark et al. 2004). As I will discuss in later chapters,
viewing digitalisation as formal objects and/or artefacts that are elite and fixed can be limiting.
Rather understanding that digitalisation can be a way of, as Ewen suggests, visually ‘conveying
and receiving human value, structures and assumptions’ can be far more powerful (Ewen
1988:3). In viewing digital media and their visualisations in terms of what they offer
operationally within a process of design, through a contemporary understanding of their
transient and changing nature, can offer visual reference points to a design in progress (Ewen
1988:23). This view could offer advantages for architectural design in the early stages, as is
demonstrated in Chapter 7.

General Fear of Change

With the advent of new technology, there is always the fear of change arising from its uptake.
What are the cultural implications of the uptake of digital media? The available literature
highlights fears of changed sociological factors and shifts in operating practices. Fears in
integrating digital media into architectural design practice extend beyond the fear of digital
media itself. People generally fear change. There is solid evidence in the available literature that,
while people say that they value novel ideas, they do not actually value the new. In 1968 Zajone
found that what most people like is the familiar; the ‘more people become familiar with new things, the more the new thing, and the new change, becomes accepted and integrated’ (Sternberg 1995:20).

As Aspinall observes, it is a misconception on the part of the unfamiliar architectural designer that digital media is not more readily taken up into the early stages of design. This lack of understanding promotes the idea that digital media is not suitable for incorporation into the earlier stages of design (Aspinall 1998:85). This suggestion regarding familiarity is demonstrated in my own practice fieldwork.

**Loss of Skill**

Another issue is a concern over losing valuable skill sets through using technologies that replace conventional modes of practice. For example, Pressman argued that knowledge is acquired in drawing (Pressman c1997:131). Pressman also argued that trained architects will lose, or not acquire, the same necessary intuition and knowledge about the information that appears in digital drawings and other digital representations (Pressman c1997:131). This concern is discussed further in Chapter 7.

**Digital Media Seduction**

Design and other architectural mistakes may result from the seductive nature of digital media. Digital media, in particular digital imagery, can be overbearing and conflicts with the way architects design (Steele 2001:18; Jamison 1985). Negroponte observed that when digital media and design meet, they can ‘bring out the worst in each other’ (Negroponte 1995:223). One of the implications of this disagreement is that the signature of digital media can be too strong. The ‘signature can overpower the intended expression and drown the subtler signals of the art’ (Negroponte 1995:223).

In a journal article, architect Sean Godsell noted that his design sought to identify an architecture appropriate to the make-up of an unfolding democracy, rather that one which ‘dwells sentimentally on our past or which is seduced by the digital technology of the present’ (Godsell 2000:64). This comment highlights this fear of digital media, namely the issue of its highly convincing and seductive signature. Pressman also observed that digital presentations are seductive and convincing. He suggested that the seductive nature of digital media can make it easier for architects to miss mistakes that are concealed by ‘wonderful and orderly mannered digital presentations’ (Pressman c1997:131). There is fear that the seduction of ‘the machine’,
used to generate design, form, and visualisations and replace conventional tasks will not be ‘understood or recognised’ (Pressman c1997:131). The issue of seduction is discussed in Chapter 6.

**Conclusion to the Arguments Against Digital Media use**

The fears about the perceived limitations and disbenefits about digital media have hampered the uptake of digital media in the early stages of design, and can explain why digital media is not widely used in the design stages of architectural practice.

**Arguments Advocating the Use of Digital Media in Designing**

Strong arguments exist for the integration of digital media; these arguments range from heretic arguments to considered suggestions, and concentrate on the advantages of integrating digital media in design.

Steele (Steele 2000) reviewed the history of technological ‘determinists’ who argued for the integration of digital media in architectural design. One such affiliate, Winner, argued that increasing reliance on digital media in the design process is desirable and inevitable. Winner argued that involving digital media in design ‘improves the process, beyond question and debate’ (Winner 1986:6; Steele 2001:13). Lynch also strongly argued against the concern that the signature of digital media is overbearing. Rather, he argued that digital media are neutral forces ‘that can be controlled’; thus, he suggested, the relationship between designer and their digital media will always ‘balance’ (Lynch 1999:c30; Steele 2001:13). Negroponte also researched the integration of digital media into design. Negroponte suggested that the outcome of integrating digital media into the early stages of design could shift the outcome of design and practice either radically or via subtle modification (Negroponte 1995:223). In his considered suggestions, he speculated that the field of multimedia is likely to be a discipline that bridges a ‘gap’ between technology and design (Negroponte 1995:81).

The new university graduates with skills in digital media in designing will continue to pressure existing, conventional architectural practice. So there is a need for the profession to take a critical, reflective and engaged look (Allen 2000:xv) at the application of digital media to transition the implications brought by this change. As Binkley argues, designers need to develop
their understanding to cope appropriately with the new digital contexts (Binkley 1997:115). Other arguments that I will cover include a strong need to achieve a ‘balance’ (Lynch 1999:c30; Steele 2001:13) between technology and creativity, and strengthening generative uses of digital media, including exploiting the transience of the digital image (Benjamin 1970:214). As an advantage of digital media is manipulation and storage (Binkley 1997:109; Stitt 1984:101), the designer can learn more about the design itself through transformations that can occur in the representation of the design (Erdman 2004:73-73). Furthermore, the designer should develop more approximate models of design (Koestler 1964:651), augment computation with curation and use a hybrid of media (Chen 2007:581). Technology and their users are connected to each other; as Winograd and Flores suggest, computers have changed, and are continuing to change, the way architects practice (Winograd and Flores 1986:6).

The Changing Role of Digital Media in Architectural Design

An argument for the integration of digital media into architectural design practice is that architectural schools are educating students on its use in the design of architecture. I expect the outcome of this developing trend in architectural education will increasingly pressure architectural practices to gain more awareness of the use of digital media in designing. A large number of universities around the world and in Australia now offer specific degrees in digital media (or ‘virtual architecture’). These include Sydney University’s Master of Design Science (Digital Media), University of Technology Sydney’s Master of Digital Architecture, and other postgraduate and workshop courses at SIAL.

Most of the focus and uptake of digital media in Australia has been for production, rather than the generative use of digital media for designing. As technologies advance and the industry is becoming more familiar with digital media, the focus increasingly will shift from production toward how the digital media can advance innovation through more creative pursuits (Lab3000 2004:11). The ‘reality of evolving new paradigms in practice as well as in the cutting edge of theoretical production is beginning to render obsolete the pragmatic and utilitarian view of digital media’ (Kvan, Mark et al. 2004).

The dominance of digital media as a production tool is expected to change in the coming years as universities begin to more thoroughly promote and support training in the use of digital media in the architectural designing process and as industry becomes more familiar with its use. The shifts in academia and practice strengthen the argument, as Allen suggests (Allen 2000:xv), for a critical engagement with digital media in designing in architectural practices and for
university support to postgraduate studies into how the digital media advances innovation through more creative pursuits.

The Relationship between Designer and Digital Media
Using the digital media in the conceptualisation stage raises the debate on the relationships between the humanities and the technological, but the literature (and my research) also demonstrates that positive relationships exist and develop between the designer and the digital media.

Various philosophical notions exist on how the relationships do and/or should occur. The two aspects of the relationship between the humanities and the technological are described by the terms 'poiesis' and 'techne'. Poiesis is the act of making or producing something specified, and is derived from a Greek term meaning 'a making' (Collins Australian Dictionary 2005:1253). The term techne, the Greek derivative of the term technique, means a practical method, skill or art applied to a particular task (Collins Australian Dictionary 2005:1652). The two aspects of the relationship are also referred to as ‘technology and creativity’ (Dasgupta 1996). Technology is the ‘application of scientific knowledge for practical purposes’ (Oxford Dictionary 2001:933), while creativity ‘involves the use of imagination or original ideas to create something’ (Oxford Dictionary 2001:200). McLuhan (McLuhan 1964; McLuhan and Fiore 1967) and Negroponte (Negroponte 1969) viewed an understanding that a relationship exists between what a designer thinks, makes and their humanistic natures and values, and the technologies that they employ.

Publications undertaken by academics such as Coyne, McLaughlin et al. (Coyne, McLaughlin et al. 1996) have discussed potential implications and outcomes of the relationship. Coyne, McLaughlin et al. observe that technologies and their users are connected to each other and ‘form parts of complex systems’ (Coyne, McLaughlin et al. 1996:5). The complex systems include:

… physical dependencies, such as the dependence of computer systems on the electricity grid and the telephone system, and metaphorical dependencies, such as CAAD systems that are related to manual drawing tools, and historical dependencies, such as multimedia that is related to film and video and electronic mail that is related to the telex and CB radio. Other relations include institutional dependencies, through industries, systems of distribution, regulations, training and education systems and local dependencies, for example the computer requires the printer, the modem connects the computer to the telephone line, and so on’ (Coyne, McLaughlin et al. 1996:np).
There is a long history of debate on the issue of balance in the relationship. Strong arguments exist, either advocating or discouraging, whether technology or creativity should dominate the relationship (Mumford 1955; Ellul 1965; Read 1947; Gehlen 1957; Snow 1964; Postman 1993:xii). As Postman argues, in past times as in recent times, the ‘humanities and technology have no quarrel and their mixing should be encouraged’, and that their ‘connections should be built based on trust and patience’ (Postman 1993:xii). Due to the lengthy, intimate and inevitable relationship between the two, technology should not be seen as an enemy but, as Postman also suggests, a ‘stauch friend’ that can ‘make life easier, cleaner and longer’. (Postman 1993:xii).

Ultimately, it is widely acknowledged in the available literature that both technology and creativity share an important productive and fertile link that needs to be somehow balanced. Lapidus suggested that the integration of digital media for designing is not merely the crunching of numbers and a foregrounding of massive computing power; there is a strong need to include the humanistic factors (Lapidus 1967:204). Lynch strongly argued against the notion that digital media imposes an overbearing signature of a project. In achieving an advantageous relationship between technology and creativity, Lynch argued that digital media are neutral forces that can be controlled. Through this control, the relationship between designer and their digital media will always balance (Lynch 1999:c30; Steele 2001:13). Aspinall also supported the idea that digital media are neutral forces that can be controlled, arguing that the benefits in the use of digital media in the design process will re-emerge as the computer is ‘reinstituted as the servant, and not master, of architectural design’. He suggested that by ‘distinguishing the three-dimensional modelling software, quite separate to that of two-dimensional drafting, the analogy between the conventional and digital media can be observed literally’. Therefore, as architects complement their repertoire of skills with additional digital software, they can enhance the computer’s role as ‘more than merely a drafting machine’ (Aspinall 1998:85). To come to terms with the conflict of digital media overbearing the design process, the hand of the designer could well serve to mediate the signature of the digitally supportive media (Aspinall 1998:85).

The close relationship shared between technology and the designer suggests that neither side of the argument—for or against digital media in designing—is ‘good’. There is a strong need to achieve a ‘balance’ in the relationship. Some literature discusses how exactly this balance is achieved through the design activities architectural designers undertake, what the implications may be and where the integration of digital media could lead in the future. Suggestions include generative uses for digital media and collaborative shifts in modes of practice. In the following
chapters, I build upon these suggestions to show advantages in practice and demonstrate mutuality between the designer and digital media in the early stages of the design process.

**Generative Uses of Digital Media: Images**

Computer visualisation techniques are seen to bear minimal relevance to the conception of architecture (Kvan, Mark et al. 2004). However, in the transient nature of the digital image, there is potential opportunity for expanding conventional architectural design in a productive and generative use.

The teaching of architecture has always related to theories and media of representation (Kvan, Mark et al. 2004) and the ‘eye has had domination over all other senses from antiquity until now’ (Allert c1996:1). Furthermore, there is an increasing cultural familiarity with understanding the image as transient and in flux. The familiarity is changing views on imagery, including views regarding the commonly used two-dimensional digital presentation or photo-real image that capture, through perspective, a level of ‘reality’. With the advancing quality of digital media, the digital image can be generated more convincingly to confuse and lie as well as to thrill and inspire (Binkley 1997:115).

A debate surrounding the role of the image in design has existed for centuries and it continues today with the integration of digital media. The image was previously seen as static, an imitation and/or a figuration (Ewen 1988:23). One common use of digital media in architecture today maintains this idea and sees digital presentation visualisations used seductively and figuratively to advertise buildings through the photo-real quality (Liu 2003:7). A common criticism of these digital presentation images is that they are too strong in themselves and thus distract the viewer from analysing the design productively (Negroponte 1995:223). However, the design of objects and the use of digital imagery need not be understood as stable. Images need not be static; they can be understood as dynamic (Boyman 1995:viii). Subtle variations can give rise to new possibilities of seeing. Today, there is a belief that the image can be freed of the figurative responsibilities of the past and acquire a new dynamic role (Boyman 1995:viii). Andrew Benjamin argued that digital media can produce ‘potentialities’ and the architectural image can have an aleatory nature emerging through experiment and practice (Scraver 2006:27). Viewing digital images in this way, the digital image is not feared due to its transience, but the transience of the digital image can be exploited for productive purposes in the process of design. The productivity is advantageous in facilitating the abstraction of an architect’s ideas and encouraging a trajectory from which the idea and its formal manifestation may progress (Scraver
The productive use of digital imagery in the early stages of design is demonstrated in Chapter 7.

**Generative Uses of Digital Media: Reproduction and Originality**

Digital media can indeed be advantageous through its generative use, if it is viewed in terms of its artificiality and if the idea of reproduction is exploited. The definitions in the literature around creativity and design suggest that iterative, virtual and organic design processes stemming for the generative use of digital media could complement the ambiguity and cyclical nature of creativity and design. In addition, Erdman suggested that the designer can learn more about the design itself through the transformation that can occur through the ‘re-presentation the design’ (Erdman 2004:73-73).

Binkley and Stitt both suggested that an advantage of digital media is ‘manipulation’ and ‘storage’ (Binkley 1997:110; Stitt 1984:101). Through digital media, an architectural designer can manipulate, replicate and reproduce results. Using digital media techniques, the architectural designer can generate variations of the original; for example, through automated animation media or manually identifying numbers, the computer software generates a digital image, which, associated with mathematical formula or algorithmic instructions, can then tell the computer how to manipulate and re-generate them, resulting in fantastic and familiar forms (Binkley 1997:113). Digital media’s transience and immateriality means that the same design may be represented in different formats (Binkley 1997:110).

From these ideas, two opportunities for integrating digital media emerge. First, as Kolarevic suggests, digital media is increasingly being used not as a representational tools for visualisation but as a generative media for derivation of form and its transformation. Digitally generated forms are calculated by the chosen generative computational method. Instead of modelling the external form, the designer articulates an internal generative logic, which then produces, in an automatic fashion, a range of possibilities from which the designer can choose the appropriate formal proposition for further development (Kolarevic 2003:13). Generative logic, and the basis of computations, relates to the idea of constraints in the design process (Lawson 2006:93-97). Gero described constraints as an aspect of digitally generated designing (Gero 1993:ii). In generative computational methods, design schemas need to be made explicit at an early stage in the design process and used as a basis for the generation of design iterations (Gero 1993:17). The design schemas can be changed over the process of design, but they do need to be maintained in the face of contradictory constraints. As Kolarevic suggests, with parametric
software, designers can create an ‘infinite number of similar objects, geometric manifestations of a previously articulated schema of variable dimensional relational or operative dependencies’.

The advantages of this design approach are investigated in Chapter 5, where I introduced parametric software, constraints and design schemas in a project at Terroir.

There is also an issue of the original in reproducing and generating variations through technology (Benjamin 1992:211-244). Walter Benjamin states that ‘even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be’ (Benjamin 1992:214). The integrity of the original is questioned because digital media enables fast and easy reiteration (Brady 2000:264). Losing or jeopardising the integrity of the original does not necessarily occur with the integration of digital media in designing. Walter Benjamin used the term ‘aura’ in regard to the original (Benjamin 1992:216). He suggests that with the advent of technology the ‘aura’ could, for the first time, be divorced from its ‘previous bourgeois status’ and freed as ‘mechanical reproduction emancipates the work of art from its parasitical dependence on ritual’ (Benjamin 1992:218). The original versions of a digitally designed object always remain, due to the storage capacity of computers; thus, reiterations of digital images could actually re-establish and extend the role of the original. The importance of the original is not that it is first. Rather, the original is verification, it is something that is referred back to at the end of the iterative process as validation and verification. As Walter Benjamin concedes, ‘technical reproduction can put the copy of the original into situations which would be out of reach for the original itself’ (Benjamin 1992:214). Iterations are not just about generating a number of representations. Walter Benjamin’s observations suggest that the process requires the designer to generate iterations, referring back to the original and through ‘concentration’ (Benjamin 1992:232) question whether there has been any loss. The process, in a mid-sized architectural office, also includes a team of architects ‘absorbing’ (Benjamin 1992:232) the iterations, and the team’s interpretations of these iterations are effected through the ‘distraction’ (Benjamin 1992:232) of the numerous versions.

The concern that creativity is hindered by integrating digital media manipulation is countered when the integration of digital media manipulation is based on an understanding of the generative and iterative benefits that can be delivered through artificiality. As Brady suggests, digital media facilitates when it visualises quickly and can be revised throughout a process (Brady 2000:264). Thus, digital media could assist in the making of many things, and the iterative assistance aids the designer in a productive manner in learning more about the design itself through transformation (Erdman 2004:73-73). ‘Reiterations, grids, repetitions and symmetries generated through digital media can lose their past raison d’être as infinite variability becomes
feasible’ (Kolarevic 2003:13). The generative digital process shifts the design emphasis from the ‘making of form to the finding of form, form is variable not stable, multiple not singular’ (Kolarevic 2003:13). Alternatively, reiterations made through digital media can re-establish the priority of the architectural design’s raison d’être being considered, addressing the concern that digital images are too seductive and distract the viewer from analysing the design productively. By generating many iterations, the priority of the actual individual image can become diminished. Thus, the seduction of the digital image (Steele 2001:18; Jamison 1985) can be mediated and designers can begin to consider and assess the operation of the design. This discussion of an iterative approach suggests that advancement in design is not through objects made with digital media, rather by objects sourced through the process of design and how productive the digital media is in facilitating the designer to learn more about the design itself. The available literature suggests that the advantage of digital media is manipulation and storage (Binkley 1997:109; Stitt 1984:101), thus the designer can learn more about the design itself through the transformation that can occur through the re-presentation of the design in a process that incorporates and exploits digital media. Iteration and its use in a collaborative design team is demonstrated in Chapter 6 Iterative Designing.

Generative Uses of Digital Media: Heuristic Processes

The design of a building is the combination of multiple internal and external influences (Cuff 1991:72-84) and the design of the building is generated through a cyclical process (Lawson 2006:35-36) that involves making the design and the building (Koestler 1964:105-108; Schön 1983; Lawson 2006:266). The complexity of the many influences and the ethical responsibility to deliver a ‘good’ building has seen some architects look to computation to deliver ‘good’ solutions (Kalay 2004:xiii). The general euphoria over knowledge-based approaches to design was associated with artificial intelligence (Kalay 2004:xiv). Theoreticians aimed to assist designers by making explicit generalised nomothetic design techniques, including Alexander, Ishikawa et al. (Alexander, Ishikawa et al. 1977) and Cross (Cross 1975). These texts demonstrated that it is possible to convey design techniques that may assist the designer to design. In terms of digital media, other theoreticians have demonstrated that it is possible to draw on computation to capture certain parameters of a design such as symmetry, recursion, parameterisation, and combinatorial analysis. By isolating these reoccurring design features, as Celani has shown, it is possible to automate a series of forms for a design through generative tools (Celani 2002).
Reflecting on design changes over time, Lawson observed that contemporary advancements in technology and sciences, in contrast to those of the eighteenth century, transformed the thinking of the designer (Lawson 1982:82). Where designers were once free to ‘design shapes and locate buildings by context and seemingly approximate rules of thumb, contemporary sciences are now much more accurate and provide sophisticated techniques that can calculate to high degrees of proficiency’ (Lawson 1982:82). Traditionally architects used drawings as a primary vehicle to create architectural propositions. CAAD software has replaced much of this traditional process but has not proved capable of providing effective support for creative design. Mitchell suggested that the difficulty lies in the way CAAD systems describe and manipulate shapes (Mitchell 1993:27). In CAAD, a designer needs to accurately establish geometric primitives, classify each and specify their relationship. Thus, the usefulness of computation in creativity becomes the structured nature of such primitives. In contrast, traditional drawing has no inherent structure and thus ‘are merely dirty marks on paper’ (Mitchell 1993:29).

The idea of approximation, heuristic approaches and autonomy (Lawson 2006:184-185; Lawson 1982:82; Steele 2001:14; Stamm 2007:103; Balmforth, Benjamin et al. 2007:100-109) counters ideas and concerns regarding high degrees of proficiency, structure, and classification, and provides another approach to designing with digital media.

The counter view to relying on, or believing that, digitally supportive media may generate creativity, and to the idea of ‘good’ solutions achieved through computation, is that the design process need not hinge on computation and accuracy. This counter view acknowledges that humans are susceptible to error and that this error is needed in arts, including creativity and design as much as the sciences, including computation and accuracies afforded by digital media (Ozkan 1997:ix). This view acknowledges that creativity is largely about intuition and that human imperfection or ‘fallibility’ is acceptable. The advocates of this view maintain that many of the conventional processes be maintained in the design process including imperfection, intuition and the understanding that designers can have ‘a feel for design’ (Lawson 1982:82).

This debate over whether a design may be ‘good’ if facilitated by digital media computation has generated the view that architectural solutions can only ever aim to satisfy the problem through an approximate, autonomous and heuristic way (Lawson 2006:184-185; Lawson 1982:82; Steele 2001:14). Recognising that architectural solutions can only ever satisfy through approximation is one reason why Terroir believes that design in the early stages is not so much about providing solutions rather it is the putting forward of propositions or more questions (Blythe 2007c).
An advocate of this view, Lawson concluded that design is a process where problem and solution emerge together through understanding requirements and testing numerous solutions against explicit and implicit criteria (Lawson 2006:48-49). Due to the indeterminacy and ambiguity of the influences on the design process resulting from, for example, inexplicit criteria the designer needs approximate and cruder models of design than merely the linear process of a solution to a problem (Lawson 2006:184-185). To increase integration of technology into the ambiguous process, designers need to develop heuristic techniques that, through approximation, ‘conceal the complexities of digital media’ and create direct links between performance and solution, such that this integration reinstates an architect’s ‘feel’ for what he or she is doing in designing (Lawson 1982:82).

Furthermore, in response to the contention that the computer delivers a ‘good’ solution is the idea of autonomy. The generation of a design’s ‘own laws’ addresses the issues of the ‘fail safe’ or ‘infallible’ idea of the computer and complements the idea that designing is a humanistic process. In Greek, auto means self and nomos may be translated as ‘rule’ or ‘law’. ‘Something that is autonomous is self-legislative and provides a basis for judgement’ (Balmforth, Benjamin et al. 2007b:103). As the International Union of Architects outline, architects have a professional responsibility to provide autonomous objective expert advice and thoughtfully consider the social and environmental impact of their professional activities. Marcelo Stamm suggested that autonomy and how a designer acquires and then makes autonomous judgement about the architectural proposals that they produce is through the process of the designing the building itself (Balmforth, Benjamin et al. 2007b:100-109). Through the design process, the building generates its own laws, unto which decisions can be made and rules on how it should be judged. The idea, for example, is that a building could be designed quite singularly as an iconic object without regard to any contextual influence. An architectural designer could argue that this approach to design has little validity, little to be judged against, due to its dislocation. Whereas if a building is designed drawing on its context—for example, the way the land falls or the way people need to circulate through the space—one can start to determine through respecting its

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16 Abel mentions that the parallel changes in technologies towards cybernetics accommodate vast optioning, which sees a change in the roles of worker and management (Abel 2000:3-14). He argues that the impact of technology is unlikely to result in the extinction of manual work and that there will remain many tasks uneconomic to automate. He also mentions the ‘Non Linear System’ to working—or ‘team assembly approach”—where a team undertakes an assembly of a whole unit rather than limited tasks, which more often results in workers becoming slaves. The non-linear system draws on human’s natural heuristic talents allowing our understanding to adapt to changes more easily and control variation and management through awareness (Abel 2000:8-12). Moreover, specialisation does little to ensure broader problems of the firm are resolved (Abel 2000:13).
context and achieving the aims of the client, the design becomes a part of an ‘ensemble’
(Balmforth, Benjamin et al. 2007b:100-109). Thus, the design is made valid through ‘specificities’
(Balmforth, Benjamin et al. 2007b:100-109). Terroir presents a solution to this problem of the
fail-safe and the uncontextualised design. The firm’s interest in engaging with place provides a
solution to digitalisation, which can have a self-contained, self-generating and sterile outcome.
In Terroir, digitisation is not an effect and the approach to design is not based on digitally
supportive media techniques, so it does not compromise or ignore a holistic approach (Allinson
2006:122; Lawson 1982:82) or the many internal and external factors (Cuff 1991:72-84) of
architectural design. In Chapters 5-7, the opportunities and limitations of heuristic and
autonomous approaches in design are demonstrated.

**Generative Uses of Digital Media: Curation**

Although the output of digital media possesses much seductive power, the computer itself has
‘no power, it remains mute’ (Binkley 1997:115). Digital media remains ‘adroit at manipulating
stored numbers’ (Binkley 1997:115). Technology and creativity share an important creative link
that needs to be somehow ‘balanced’ (Postman 1993:xii). To add a visual dimension to numbers,
information and data stored within a computer, Binkley observed that we require a converter.
These converter functions may be performed by digital media processes, typically the 'interface'
that moves back and forth automatically and swiftly between the designer and data. Without the
interface that links it to the human user, the computer is incomplete (Binkley 1997:114).

In terms of the interface, and the designer’s dependence on the interface, Binkley argued that
digital media can ‘augment, rather than undermine, analogue descendants’ (Binkley 1997:112).
The augmentation is through the curation that is undertaken by the designer. The visual
aesthetics of the information, that remains un-curated and un-prescribed in the computer, relies
heavily on the prioritisation and establishment of appearance by the designer. The designer must
choose the representation.

Some designers are increasingly creating interactive files, which can be displayed and
manipulated by users on their own computers and devices over which the designer has no
control (Binkley 1997:114). Examples of these interactions are needed in architectural design
practise. This is discussed in Chapter 6-7.
Generative Uses of Digital Media: Hybrid Media for Designing

To inspire creative works, designers need to engage both conventional and digital media simultaneously. Results from published research show that using conventional and digital media simultaneously, compared with only using individual media, can help ‘arouse creative thinking, cognitive activity and design outcome’ in the stage of conceptual sketches design (Chen 2007:581). The findings suggest that the integration of various design media provides one feasible way to inspire creativity and to initiate ways for the new media to assist design (Chen 2007:582).

Designers may use a repertoire of design concepts, techniques, solutions and ideas. Traditionally these included sketchbook, photographs, previous projects to aid memory, visualisations and drawings to explore new combinations of ideas. The computer can augment these by storing, displaying, combining and manipulating (Pressman c1997:266; Binkley 1997:109; Stitt 1984:10). Sources of information can be stored and accessed over the Internet. External component solutions and manufacturing files can be combined to result in rich, varied, and unexpected results (Pressman c1997:266).

Thus, the available literature suggests that using a hybrid of media can facilitate creative variance. The deployment of many tools used in diverse ways can expand the conventional toolset because there are now many more techniques available. Due to the hesitations of many architects, and despite the improvements in digital media, little has been discovered about the complex interplay between both the traditional and new digital media and how designers are employing them (Coyne, McLaughlin et al. 1996:1). Shared dilemmas for both academics and practitioners exist (Andresen 2003:72; Greenway 2006). These include how to seek a useful convergence between the respective domains to align the ‘emerging digital media craft with time-honoured modes of practice’, and to know how and when to begin introducing the new tools (Baker 1998:76; Burry 2004: np). As Andrew Benjamin suggests, ‘we need a philosophy of software’ (Benjamin in Terroir 2007b:55); there is a need in practices for examples of integration and interaction with digital media. This gap in knowledge is addressed through my component question, how do conventional media mesh with the new digital media and foster design, which is understood as a conversation? I present and analyse a variety of examples of integration in Chapters 5-8.
Changes to the Way Architects Practice

The link between technology and creativity changes the relationship between the architectural designer and the use of digital media. The interconnection between user and technology, as Winograd and Flores observe, changes practice and in turn changes ‘our languages and understanding’, and ultimately ‘changes the world that we construct’ (Winograd and Flores 1986:6). An example of the change is the introduction of word processing and the changing role of the administrative assistant. Word processing technology was designed and developed based on conventional typing practice. As these conventional tasks became automated, the demand on the administrative assistant’s time reduced. As the technologies advanced, the role of the administrative assistant shifted and evolved to handle new tasks, such as the incorporation of dynamic charts (Coyne, McLaughlin et al. 1996:5).

Technology and users form ‘technological constellations’ that are enmeshed with ‘complex user constellations’ (Coyne, McLaughlin et al. 1996:1,5). As Coyne, McLaughlin et al. suggest, the role of the manager is caught up with spreadsheets, the cellular telephone and the company car, secretaries and administrative assistants are involved with typewriters, word processors and telephones. In architectural design, the role of the designer is enmeshed with technologies such as the drawing board or CAAD systems, and other related technologies (Coyne, McLaughlin et al. 1996:5).

Kvan, Mark et al. observed that computers have changed, and continue to change, the way architects think and represent design (Kvan, Mark et al. 2004). Coyne, McLaughlin et al. suggested that the role of the architect as an individual in a firm is changing along, with changes in IT. They suggest that a new IT-based definition of the architect is emerging. The new definition of the architect is that of a generator and coordinator of information (Coyne, McLaughlin et al. 1996:11).

To understand the changes in architectural practice arising from integrating the new technology, and to speculate on the future avenues of digital media use, architects need to take a critical, reflective and engaged involvement in the application (Allen 2000:xv) and a self-examination of the technologies in how they work, what they can do, and what can be achieved through their use (Coyne, McLaughlin et al. 1996:np). In response, I see my study as a critical, reflective and engaged involvement in, and examination of, digital media designing at Terroir, by observing the changes of practices at the firm. The component question regarding the shifts in my role and the culture of Terroir through integrating the new digital media is addressed in Chapter 9 Practicing Digital Designing.
Conclusion to the Arguments for Digital Media Use

Designers need to develop their understanding of the new digital media to cope appropriately with the new digital contexts (Binkley 1997:115). A strong need, however, exists to balance the relationship between technology and creativity, and to strengthen generative uses of digital media, including exploiting the transience of the digital image. Digital media’s advantages of storage and manipulation (Binkley 1997:109; Stitt 1984:101) means the designer can learn more about the design itself through resulting transformations. Furthermore, the designer should develop more approximate models of design, augment computation with curation and use a hybrid of media. Technology and their users are connected to each other and, as Kvan, Mark et al. suggest, computers have changed and continue to change the way architects practice (Kvan, Mark et al. 2004). Regardless of the arguments for and against the use of the digital media in design, architects as Allen suggests need to refine their critical faculties to assess where design innovation comes from, and how it comes about, rather than just becoming more tolerant to the new technologies (Allen 2000:xv).

Section 3 Gaps and Ambiguities for Examination

Having established that both fears and opportunities exist concerning the uptake of the digital media technology, the following pages summarise the gaps and ambiguities that I tested in my practice.

The digital media is mainly for production and later stages of design. However, the dominance of using digital media for production is expected to change as familiarity and availability alters. Australia has been observed as lagging in the uptake of digital media in practice generally and in design (RMIT University 2005b; Salah 2002:3,46; Gutteridge 2001:82). After years of resistance and scepticism, it seems that architects are slowly accepting computer design systems as competitive assets. As information and conceptualisation is a primary asset to the post-digital era, there is demand that we think more critically about how and when we address the uptake of digital media (Allen 2000:xv).

The close relationship shared between technology and the designer suggests that neither side of the argument for or against digital media in designing is ‘good’. The available literature strongly suggested that there is a strong need to achieve a ‘balance’ in the relationship. The problem that faces architects is how they use the changes in technology as a creative element without over-weighting one side of the relationship.
My own experience, and the available literature, reinforces digital media as an inevitable and unavoidable domain that is advancing around architectural design practice. This may be disheartening to many in the profession but it is up to the profession to invest time in advancing the designer’s understanding in what it is that architects do.

Digital media can both thwart and advance design practice. There is a fear and concern in using digital media. The fears are due to the implications of the integration on the humanistic aspects of design and because architectural design involves many influences to which the signature of digital media can overbear. The concern is also that people fear change and that the digitally supportive media techniques ultimately may fundamentally conflict with the way a designer wants to design. The fears and conflicts have meant that the uses of digital media in the early stages of design have not advanced very much (Corrigan 2003:86).

The available literature shows that architectural designers such as Spuybroek, Lynn and other ‘non-standard’ architects have used digital media to assist in the generation of complex forms and styles. Despite these few examples, there is a general unknowing, and a lack of uptake of digital media exists in the early stages of design. The application of digital media has had arguably little qualitative effect (Kalay 2004:xvi), and many architectural designers have not yet engaged at a conceptual or generative level (Kalay 2004:xvi) with the use of digital media in architectural design. This limited integration suggests that while there are new challenges to the designer’s process to incorporate new digital media techniques and variables, there is a concomitant need to theorise the extent of the ensuing implications of uptake and the effects on the design process itself (Bettum 2002:73).

Software developers such as Dassault Systemes suggest that new digitally supportive media can aid in designing and aid complex formal investigations (Dassault Systemes 2007:5). Academics suggest that digital media is advantageous when viewed in terms of its artificiality and iterative nature (Sanders 1996; Erdman 2004:73-73). Binkley suggested that we should continue to understand the nature of digital media (Binkley 1997:115). Chen suggested that to inspire work that is more creative and to advance architectural designing, designers should engage both conventional and new digital media simultaneously (Chen 2007:582).

The lack of available literature on this emerging paradigm leaves a field of ambiguity about how digital media actually assists daily architectural practice. In asking my principal research-question, 

*what is the extent to which it might be advantageous to include digital media as part of the designers’ ‘toolset’ in*
the early stages of design, I aim to understand how a designer expands the ‘toolset’ without forgoing established practice and to address the ambiguities that are present in my own experience and in the available literature. The available literature confirms that there is a demand to investigate the component questions I listed in the Introduction chapter. In the following chapters, I aim to capture and then analyse my own architectural design practice in light of this literature review under the two main groups that I mentioned previously, namely an account of practice and a new role in practice.

The first group of questions addresses an account of practice and covers practical implications of integrating digital media into the established design practice of Terroir. The questions, and their founding issues, include:

- As the majority of focus concerning digital media has been in production and efficiency in architectural practice (Manley 2004:3), does mapping new digitally supportive media contribute beyond merely being production and automating devices in the early stages of design?
- Criticism by observers (Coyne 1991:422) suggests that users are focusing too heavily on the generation of a form, so how do digital media expand conventional design processes of drafting and models beyond a focus on form?
- How can the practice of digital media can be advantageous in designing as suggested by others (Negroponte 1995:223; Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73; Benjamin 2004:54; Chen 2007:582; Glanville 1997:4), how to address concerns regarding the seduction of technology (Pressman c1997:131; Steele 2001:18; Jamison 1985), and how do conventional media mesh with the new digital media and foster design, which is understood as a conversation?
- What are the implications in terms of Coyne, McLaughlin et al.’s suggestion that technology closely interconnects with its surroundings (Coyne, McLaughlin et al. 1996:4). Given these suggestions, my understanding is that as technologies advance, architectural design practice is similarly influenced. Based on the evolutions that occur in Terroir and the available literature on the relationship between technology and the user, would the practical shifts that occur in Terroir’s practice be relevant to other practices, and can my project studies offer an understanding of the relationship between technology and creativity?

The second grouping of questions centres on the cultural implications of integrating digital media into the established organisation of Terroir. Questions include:

- Given my role as an architectural designer and being interested in commenting on the changes that occur through integration (Winograd and Flores 1986:6), what are the
implications of integrating new digital media into Terroir on the role that I hold within the practice?

- In light of the changes that occur through undertaking participant observation postgraduate research in an architectural practice, what are the shifts in the culture of Terroir through integrating new digital media?

The following chapters detail my own practice fieldwork and present my conclusions.
PART 1: BACKGROUND CHAPTERS

CHAPTER 1: Outline of Study
Introduces my primary question, theoretical framework of this study and introduces the various parties involved.

CHAPTER 2: Definition of terms
Overviews a series of terms that I use throughout this thesis

CHAPTER 3: Research Design
Reviews my research methodology for this postgraduate research in embedded practice

CHAPTER 4: Review of Available Literature
Presents a review of available literature. Surveys some of the key foundational influences of this study

PART 2: EMBEDDED PRACTICE RESEARCH

CHAPTER 5: Parametric Designing
Examines parametric software CATIA in an attempt to use the software as design media

CHAPTER 6: Iterative Designing
Examines animation software in an attempt to use the software as design media

CHAPTER 7: Interactive Designing
Explores various digital media integration and how they can be advantageous in designing in the early stages

CHAPTER 8: Integrating Digital Media
Overarching interpretations, reflections and summations of my experiences in integrating digital media into the early stages of design in a mid sized architectural design practice

CHAPTER 9: Practicing Digital Designing
Explores changes to the role of the designer and discusses a new role in practice offered by the possibilities afforded by integrating digital media

Summation: Towards Symbiotic Designing
Propose conclusions to this study with reflections upon the extent of advance in integration of digital media
CHAPTER 5 PARAMETRIC DESIGNING

My first research project study, which I undertook after I started the research, investigated digital parametric software CATIA™ in an attempt to use the software as a design tool within Terroir and within the context of academic postgraduate study in architecture. The expensive and rarely applied digital parametric software CATIA™ was made available to me as a part of my academic study program. There has been a long-standing tradition in using CATIA™ at SIAL for production purposes in design development and construction stages very successfully (Holzer 2006; Holzer, Tang et al. 2005; Burry 1999; Burry, Felicetti et al. 2004). Dominik Holzer found that through using CATIA ‘convergence of architectural and structural thinking can be assisted by the 3D CAAD (computer-aided architectural design) model in CATIA which is both parametrically reconfigurable and dynamically responsive’. The existing SIAL studies focused on the later stages of designing and meant SIAL were enthusiastic to see if I could be just as successful in applying it in the early stages to assist designing. Sequestered in architectural academic institutions, a few boutique architectural offices and used largely in aircraft and shipbuilding, CATIA™ has lead to innovative advances in design than other computer-based production tools that are the basis of tool kits in many architectural firms (Rahim 2006:1). For example, in Gehry’s Bilbao Museum CATIA™ has destabilised the traditional mode of standard practice altering the way that the building was designed ad made. In Bilbao, distinct parts of buildings design and construction process that before the use of CATIA™ would have been segregated, were instead integrated (Rahim 2006:1).

The software was of particular interest to me because it was promoted as an operative way of designing (Kolarevic 2003:17). I expected these endorsements to ‘destabilise’ Terroir’s conventional design process and generate innovative architectural design (Rahim 2006:1). The features of digital parametric software were exciting for Terroir’s rigorous and critical design process. The features seemed to complement Terroir’s design process, which involved the creation of many iterations and very rapid adjustments to project designs. Terroir believe understanding of design cannot be achieved in the absence of an iterative process (Blythe 2007a:164). I suspected that digital parametric media, with their operative features, could augment Terroir’s design process by automating the iterations creating wider varieties of options in a faster timeframe.

This chapter explores the application of the parametric software CATIA™. This examination results in realising a potential danger: that unquestioningly introducing ambitiously sophisticated sets of digital media to established modes of design practice may inadvertently hinder the design
ideology of that practice. At worst, unthinking application could thwart that practice from realising its aims.

In this chapter I will discuss how these first project studies were not ineffectual regardless of their results, because through the ‘failures’ in applying the digital parametric software, I demonstrate clear benefits from the provocative adoption of digital media within the design process. The project studies in Terroir are examined to understand what positive aspects can be taken from the application of this new digitally supportive media. I will describe how the CATIA™ program can suit stages of the design process other than the early stages. I will also discuss possible opportunities that could emerge from knowledge gained in testing this software. In addition, I will discuss the potential in iteration and variance in the early stages of design.

**Parametric Software**

Parametric software is promoted to support the constant changes that occur as a result of the many influences on an architectural design (Dassault Systèmes 2007:1). Change often occurs in the complex architectural design process as it involves many internal and external influences, including site, brief, clients and consultants (Cuff 1991:72-84). An architectural designer needs to work within this context to produce a formal proposition for the project.

The internal and external influences typically form the design brief, alternatively labelled a list of ‘constraints’, a ‘framework’ or ‘schema’ of an architectural design (Gero 1993:11; Lawson 2006:92). In Lawson’s studies into the design process, he suggests that constraints exist within design and that they result largely from required or desired relationships between various elements (Lawson 2006:92). Lawson suggests that constraints emerge from many areas such as client brief, circulation, details, site conditions and context and formal and symbolic constraints (Lawson 2006:93-97,104-105) and that the constraints exist to ensure the design performs the functions demanded of it (Lawson 2006:100). Portill and Dohr suggest that constraints differ from criteria in the design process, which are implicitly held by members of the design team (Lawson 2006:109-110). Gero also explores the idea of ‘constraints’ in design. Gero considers Zeisel’s 1981 claims, who suggested design consists of three activities, imagining, presenting and testing. The activity of imagining and presenting develops the design. The activity of testing results in explicit constraints, which a design is aiming to satisfy (Zeisel in Gero 1993:11). Gero firstly acknowledges that constraints can limit creativity if they are considered as ‘fixed’ (Gero 1993:11) and therefore suggests that constraints are set into place for testing and are continuously changeable and transient.
I suspected before undertaking my own project study that quantifiable constraints, particularly mathematical and/or geometric constraints, could be considered computational design ‘parameters’, which were then mapped into parametric software akin to CATIA™. To use parametric software a designer needs to clearly identify certain constraints and relationships of a design.

Based on the idea of clarifying constraints or parameters in a design process, it also seemed that the clarification of constraints to be mapped into a digital model could also be used to communicate a design to a team of designers. Thus, the parametric software is not just a technology for generating form but could aid in a design’s communication.

The digital parametric software, CATIA™, aims to facilitate operative adjustment. Developers of the software suggest that its dynamic way of working is obvious, intuitive and very powerful (Dassault Systèmes 2007). CATIA™ is one example of digital parametric software that is available to the architectural designer. All digital parametric software, for example CATIA™, Digital Project, Maya™ and 3D Studio Max™ differ from conventional drafting software. In conventional packages, the drawings are static and limited by fixed locations and dimensions. Within digital parametric software, models are operative. The models can be made up of components that can numerically shift. In the more advanced software, these parts can maintain described relational properties. Relationships can be created at differing scales from individual components, small parts, and larger assemblies to entire models relative to a site context. Some parametric software can allow an easy tracking of changes made to the relationships across the entire model. This tracking can make changing numeric values of parameters easier and more efficient as a developed model can be quite complicated and have a thousand different features.

In terms of the history of CATIA™ software, in 1982, CATIA™ was developed by Dassault Systems, a subsidiary of French aircraft manufacturer of Mirage jet fighters. The program was used for surface modelling and numerical control capabilities to an existing design system. Since then, CATIA™ has supported entire design processes, from conceptualisation to manufacturing in a variety of industries and it allows data interchange (Dassault Systèmes 2007:1).

Dassault Systèmes, the developer, suggest that CATIA™’s capabilities allow for its application in a wide variety of industries, from aerospace, automotive, industrial machinery, electrical, electronics, shipbuilding, plant design, architecture and consumer goods, to jewellery and clothing. The developers suggest that the software can provide a ‘unique virtual community’
enabling integration between internal design team members and external consultants ‘facilitating the reuse and sharing of knowledge’. The software is aimed to help practitioners to better collaborate by shortening the overall joint product development cycle, helping the entire product development process to run more smoothly and a company to be more innovative and responsive (Dassault Systèmes 2007:1). Concerning the early design stages, Dassault Systèmes suggest that a constructed model in CATIA™ breaks the traditional approach of surfaces modelling to enable quick surface creation, rapid virtual prototyping, ideas expression and simulation (Dassault Systèmes 2007:2).

These potential benefits for the operation of projects and the more operative approach to creating digital models was exciting for Terroir’s rigorous and critical design process. I was aware of the claims regarding this digital media in available literature (Dassault Systèmes 2007; Holzer 2006; Holzer, Tang et al. 2005; Burry 1999; Burry, Felicetti et al. 2004) and I was interested to assess the technique within practice as a potentially useful extension to Terroir’s mode of design practice. I was aware through experience that Terroir’s mode of practice is made up of multiple ideas and multiple people. The multiple ideas influence the project design and continue to adjust throughout the process of design. The operative nature of CATIA™ seemed to complement Terroir’s established iterative design process. On this premise, I started my own practice fieldwork to test the claims.

**Project Studies: Digital Parametric Software in the Early Stages of the Design Process**

The aim for this first exploration was to investigate the claims in the available literature by developers and academics to understand how it operates as a design tool. An operative and conceptual advancement to the early stages of the architectural design process was the expected outcome of this exploration.

Description of the Project
In this case study, I tested digital parametric software CATIA™, previously untried in Terroir, on an established design proposal. I chose the project as it presented a familiar design problem and had been in design development for the past three years. The building design was made up of a series of specific components, which had variable relational aspects. Whilst the overall building design was substantially agreed upon with the client, there was still space for alteration in the location and extent of the components and relationships. I saw this established project as an opportunity to troubleshoot any advantages or hindrances in the software prior to using the media in a new architectural project.

Firstly, the aim of the exploration was to re-create the building in the software. I saw this exploration as a way of learning the parametrically dynamic way of modelling. Secondly, I aimed to contribute operatively to the development of the building design by drawing on the parametric features of the software. I was aware from available literature that I would be able to construct a model made up of various constraints and relationships that could be dynamically adjusted to accommodate changes required in any design conversation. For example, flexible models had already been successfully achieved by other researchers at SIAL (Holzer 2006; Holzer, Tang et al. 2005; Burry 1999; Burry, Felicetti et al. 2004). I hoped that this exploration would present a new way of interpreting the traditional pencil plans and sketches delivered by the Terroir creative directors.

The Research Process
I began by analysing the constraints and relationships in the documented building design. This resulted in a list of rules that explained the relationships of the building form to its context and to adjacent building components (Figure 2f).
This sketch that I created during the early stages of design in the Hazards project shows the established plan of the project and shows the dominant landscape feature that it foregrounds, a series of granite mountains called 'The Hazards'. Overlaid are a series of lines denoting angles and planes that form the setout of the established plan. Alongside the sketch is a list of rules that describe the relationships. These are listed in a hierarchical order. The order defines control, where the proceeding object has control over the following object. The premise of this examination was that explicating these rules of the design would mean that using CATIA™ was cogent.

I then modelled the form in the parametric software. Instead of modelling the building based on fixed numeric locations and dimensions, I constructed the model using a series of parametrically dynamic planes and angles. The list of rules had a hierarchy where proceeding objects had control over following objects. The application of the rules onto the parametric software resulted in a model made up of planes and angles that could numerically shift.

Through this process, I consciously assessed each relationship that I built into the model so that I did not rebuild the same restrictions that were in the established design proposal. For example, I avoided the use of conventional drafted lines and coordinates. I also used the software's new built in functions. For example, I used the power copy function, which makes certain drawing tasks more efficient, such as performing repetitive modelling of small components.
**The Outcomes**

Several positive and negative outcomes resulted from this first practice fieldwork examination. I successfully achieved an understanding of how to use this software. I was able to model a building made up of adjustable parts that could numerically shift and maintain described relational properties.

I confirmed that constructing the model in the parametric software was a different process to constructing a model in the traditional and static software. In changing the software that I typically use to design, I became more consciously aware of how I use digital media to model architectural form. I typically draw a series of drafted lines in plan. From this, to create three-dimensionality, I extrude the lines and adjust the elevation through Boolean functions of addition and subtraction. I then iteratively rebuild and adjust the plans and three-dimensional forms in a rough manner in response to critique from the design team. Out of this process, a form emerges and continues to be worked up and refined into a design proposal.

In the parametric software I found that to model architectural form the designer needs to first make explicit a series of ‘rules’ or parameters, which are then used to set up and construct the CATIA™ three-dimensional model. I found this approach very rigid in comparison to the usual Terroir supple approach to design at the early stages. The ruthless efficiency of the CATIA™ database software and the need to make explicit ‘rule’ information about a design prior to the process of making and working up a design proposal, as I typically do in conventional media, was in direct opposition to the lighter processes normally put into play by the firm. The characteristics of the constraints, the briefing and other inspirational ideas at the early stages of a design, are typically dynamic, inexplicit and broad ranging. These qualities mean that they are not easily translated to the measurable parameters utilised by CATIA™.

I was not able to address my aim to contribute operatively to the development of the building design by drawing on the operative features built into the parametrically dynamic model. I found that the planes and angles that I did make explicit in the CATIA™ model had limitations. The software would calculate the possibility of the relationship and if they were not mathematically possible, the software would disable any further development. Typically, in Terroir’s process the team experiments in a loose and inaccurate manner to test potential forms and will only refine the mathematical and construction realities later in the development of the project. CATIA™'s

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17 This refers to a discussion I had with Andrew Maher at SIAL on the 07.04.2005 regarding the concept of CATIA.
accurate approach was too restrictive to enable any significant formal experimentation for the project.

This project study reinforced values in the usual design process in Terroir in the early stages of design, which is both too loose and uncommitted in comparison to CATIA™’s apparent demands. The valuable offering of this investigation for Terroir, was not the analysis of rule based designing and applying parametric software but a self-reflection on how the firm designs. Because of the investigation Terroir, through an exchange regarding the effectiveness of the project have come to understand more clearly that the comparative inefficiency of a loose design process in the early design stages is an opportunity that ultimately encourages progression towards refinement. The usual design process characteristics seen in this project and other projects in Terroir are diversity and a scattergun approach. These characteristics need not be seen as a hindrance, rather these looser techniques, that include the working up of an idea through the process of discussing the various supple ‘constraints’ in a design and making two and three dimensional forms in conventional and less precise and explicit digital media, can be funnelled for a designing purpose. The usual approach can accommodate supple and unpredictable iterations to be developed in response to design conversations.

To confirm these issues and the role of parametric software CATIA™ in the early stages of a design I tested its use in a new project, Montpelier.

**Project 2: Montpelier Retreat – Commercial Building, Hobart Tasmania 2005**

**Description of the Project**

In this case study, I directly mapped parametric software onto the commercially driven project. The project was chosen as it presented Terroir with a familiar design issue. The project involved a site with a strong sense of place (Terroir 2007: np). The project also presented a new problem for the practice: a commercially driven project demanding carefully controlled area calculations. Based on the information received from SIAL, software developers Dassault Systemes and academic papers written about the software (Dassault Systèmes 2007; Holzer 2006; Holzer, Tang et al. 2005; Burry 1999; Burry, Felicetti et al. 2004; Gehry Technologies 2005), CATIA™ seemed an appropriate tool for managing the area calculations and the ensuring certain view corridors in an operative and innovative way. The expected outcome of the exploration was to
successfully use the software from the very beginning of the project and deliver a formal proposition for the project, which maintained certain area calculations and view corridors.

**The Research Process**

In the early stages of the project, a workshop was held with the design team to collate a brief (Appendix K FN 22/06/2005). From the brief, the Terroir design team prepared a series of studies in plan and section studying the various extents of the brief in their usual design process manner. With the information gathered from the available literature regarding CATIA™ in mind, I began to test the new software in parallel to the usual design process. Unlike the previous project, I worked alongside the design team. I reviewed the client brief and the other ideas that had emerged from the design conversation held between the Terroir design team. From knowledge gained in my previous project study into CATIA™ I aimed to avoid using the software in a conventional manner, I avoided the use of static points and lines made primarily in plan. Instead, I modelled the context and established the three-dimensional view planes based on angles and planes. I then modelled the resulting form on the project site and shared the images with the design team (Appendix K Mon 05/09/2005).

**The Outcomes**

In terms of achieving the aim of this examination, I was unsuccessful in using the software from the very beginning of the project to deliver a formal proposition of the project. Comparing the produced work in CATIA™ to other previously completed projects, the investigation was a clear ‘failure’ for the following reasons.

Formally, I found the program to be cumbersome for the working up of a design. As in the previous project study into CATIA™, the requirement to spend some time in making explicit and detailed rules in order to build precise geometries and relationships was found to be demanding and restrictive. The email-based conversation prior to sharing the images produced from CATIA™ was one regarding the concept, idea and form of the building. This conversation continued as I shared images from CATIA™ but I found that I needed to make explicit my intentions in modelling prior to the activity of drawing it up. This slowed down my process and changed my process from thinking in action to thinking then acting (Appendix K Mon 05/09/2005). I reverted to the more familiar software in the office, AutoCAD™ and continued to model in action. I received clearly positive comments from the directors and so abandoned CATIA™ and continued using AutoCAD™ software (Appendix K Tue 06/09/2005). The need to revert to the usual design process due to the demands and precision
of CATIA™ reinforces my findings in the previous project study that there is value in using software that accepts inaccuracies and experimentation for the early stage of the design process.

The unfamiliar images that I generated in using CATIA™ led to confusion and misunderstanding in the design team. The difficulty was that CATIA™ did not create the expected aesthetic. The material quality of the visualisations produced from the CATIA™ software were more technical, lower resolution and simpler in terms of depth and shadow than the typical 3D Studio Max™ and Brazil™ plugin visualisations that Terroir directors had become accustomed to. To remedy the unfamiliarity I explored how to translate the model into the typical rendering software, 3D Studio Max™ and Brazil™ plugin, to create the familiar Terroir renderings (Appendix K Sat 03/09/2005). I found that it was possible to translate the model however, it added time and slowed the process down. Reverting to the conventional office programs allowed me to adjust quickly a building model and deliver relatively instant visualisations just in time as the design discussion was taking place.

For the purposes of using this piece of software in the early stages of design, as a practice we would need to change the established design process. The process would need to accommodate making explicit design rules early in the project and would require time to create the model itself. The process of making the model would also need to be much more accurate. Significant changes to the fundamental values of Terroir’s design process, including quick, iterative testing alongside conversation, are not the aspiration of the firm. I concluded that for the issues noted above, this software is generally not appropriate for the early stages of design.

Integrating CATIA™ into the early stages of projects in Terroir generally led to disadvantages. Basing an evaluation of CATIA™ on these disadvantages could easily suggest that there is no place for it in architectural design. However, the use of the software in Terroir’s process could not be ruled out completely. As my studies progressed I realised that aspects of the CATIA™ investigation were useful in understanding when the CATIA™ software may become useful to the design process, understanding ‘parameters’ in a design and recognising that whilst digital media may not be immediately useful their may be possible future opportunities for its use.
Project Studies: How the CATIA™ program can suit Other Stages of the Design Process than the Early Stages and the Role of Parameters in Design

Through this focused study into the software program CATIA™, I was able to verify that the ‘failure’ to use CATIA™ in the early stages of a design was not ineffectual as I am able to demonstrate other benefits emerging from these experimentations. The benefits include the following new awareness of when CATIA™ may be useful in a design process and how Terroir’s designs include ‘parameters’ that we set.


Description of the Project

In this project study, I successfully found an application for the digital parametric software, CATIA™. This Hazards Hotel project entered a redesign phase. The building’s roof changed from a form based on simple Euclidean geometries to a smoother form resulting from computer-generated properties. A software program was required that would accommodate the complexity of the form and that could document the form for discussion and eventually construction (Appendix G Tue 20/02/2007 16:56; Appendix G Mon 23/07/2007 19:11).

Figure 22: Early Hazards roof design based on Euclidean geometry

An image generated by a team member in Terroir during the early stages of design in the Hazards Project.
The Outcome

I concluded from the previous project studies that the parametric software CATIA™ is actually limiting due to time and precision for the early stages of a design process such as Terroir’s. However, having spent six-months developing the form of the roof on this project, I could see that there was a considerable explicit body of design information established, which could be used for the construction of an informed parametric model. This new project presented a more developed design to test and an appropriate use for CATIA™.

It became apparent that smoothing the geometry of the roof, and thus increasing its complexity, would mean that the conventional software of the office would no longer be capable of modelling the design. Based on the features available in the conventional digital media in Terroir, in this project, we would not be able to model the roof without a program such as CATIA™ as the program accommodates the modelling of Gaussian geometry. Through discussion with another team member, we identified a series of definite relationships and agreed that a model could be created within the CATIA™ program. This suggests that from maintaining an awareness of the possibilities in new digitally supportive media, new forms may evolve into a firm’s repertoire. In addition, experimenting with new digitally supportive media new and alternate design methods may be more appropriate for a design and also evolve into a firm’s repertoire.

Before this project study, Terroir had not discussed the precise components or the process of working up a design. An outcome of this project study was the analysis and explication of the characteristics of the supple early stages of Terroir design. Looking more closely at the sources of early stages of design and discussing the characteristics with directors of Terroir, I have come to understand that the brief and other design influences, or ideas, including site size, view,
proposed materials, qualities of space, and result from a far wide ranging set of influences than merely the way the tools operated themselves and these influences can be ambiguous and conflicting. In the early stages of a design the brief and other ideas come together to construct a framework for a specific project. The nature of this framework is qualitative, approximate, dynamic and often inexplicit. At the early stages of design, the design team’s conversation begins with a series of quantitative and qualitative ideas, which are held inexplicit and dynamic in nature, beginning as vague suggestions that eventually consolidate over time.

As these multiple design ideas refine over the process of working up a design, the quantitative aspects could become labelled effectively as ‘parameters’ of a design useful for parametric digital media. The term parameter carries the authority of technical and mathematic associations. The term is used in digital media to refer to the factors of a design that have a range of variations or restrictions. Based on the experience gained in previous project studies, I understand that in the early stages of a design, defining parameters and using them for complicated parametric digital models is difficult, often redundant and time consuming. Creating a model based on rules in digital parametric software such as CATIA™ is challenging and accuracy is required. The CATIA™ process also requires time for consideration. The time wastage and precision required would benefit from a more informed list of rules. For these reasons, using programs, such as CATIA™, could be more appropriate in later stages of designing when the radical formal and conceptual shifts are reduced and the demand for accuracy increases, for example from design development stages onwards. Thus, parametric software can become useful after the early stages of the project, when an explicit body of information has been established and the design has entered a design development stage.

**Project Studies: Possible Future Opportunities for Parametric Digital Media**

Through this focused study into the software program CATIA™, I was able to verify that successful integration of new digital media into established conventional design practice is not about mere surface elaboration and applying high-end tools, such as the digital parametric software CATIA™, onto otherwise effective practices. Reflecting on knowledge gained in previous project studies and the past project design in Terroir that I will detail in the following pages, I have come to understand that digital media integration can result in informing the design in new and unexpected ways. The previous project studies into CATIA™ have highlighted the role of variance, and iteration, in the process of the early stages of a design.
From my involvement in Terroir since 2002, prior to this postgraduate study, I was aware that in Terroir’s design process many versions and many numbers of ideas emerge over a design’s process. The following project study is a discussion regarding iteration in a project and that whilst CATIA™ may not be immediately useful in the early stages of design, there may be possible future opportunities for its integration and/or in informing projects.

**Project 1: Peppermint Bay – Function Centre 2002**

Whilst this project is not a digital project or a project undertaken within the period of this study, it does show that there is an example in Terroir’s back-catalogue of generating iterations of form that inform the project beyond surface elaboration. This project also shows that there are openings that a rigorous architectural firm, such as Terroir, can use digital parametric techniques available in programs such as CATIA™. This project demonstrates that the use of parameters, which I observed in the Hazards project, exists in other projects in Terroir. The reoccurrence suggests that there may be future places for parametric programs such as CATIA™.

**Description of the Project**

Peppermint Bay restaurant and function facilities is a part of a $15M tourism development, comprising of a wharf-side cruise centre in Hobart, high speed multi-purpose cruise vessels, a major culinary venue and a dramatic underwater walk allowing visitors to experience the state’s unique marine environment. The project was completed in 2002. A grey metal landscape results from the gathering of all roof and wall elements, exhausts, and entry and exit sequences into a single folded plate.

**The Research Process**

The design process included the generation of numerous cardboard roof models. These models shifted in form subtly and considerably, in response to changes in the brief, new conceptual ideas and reviews of the overall composition. The change in these models varied significantly in terms of their form and materiality at an early stage. In terms of discussion, debate and resolution these iterative models verified or refuted design propositions.
Figure 24: Peppermint Bay process models

These models were created by Terroir design team members during the early stages of design in the Peppermint Bay project. They were iterative, in that they were repetitive (Oxford Dictionary 2001:482), and changed in response to brief, conceptual ideas and reviews of their overall composition.

The Outcomes

The main outcome of reviewing this project was in understanding better how Terroir design. It can be seen that in Terroir a design process in the early stages involves the creation of many iterations and very rapid adjustments. The making of iterations affords understanding of the design in new ways that cannot be achieved in the absence of an iterative process (Blythe 2007a:164). The freedom to explore the formal options quickly is considered paramount to the firm. Thus, based on previous project studies in this chapter, the flexible parametric concept of CATIA™ is applicable however, the designer would need considerable skill to ensure that the program was used efficiently to keep up with the design conversation.

In terms of the future, over time and with more experience, there could be an increased use of CATIA™ in the early stages. I am aware that constraints and certain quantitative parameters emerge through the process of working up design intelligence. The characteristic of constraints is that they are often inexplicit and imprecise in the early stages of a design, which is contrary to the nature of the precise parameter driven CATIA™. The iterative opportunities and the ultimate emergence of parameters in a design’s process suggests that, if a designer recognises the demands of CATIA™ and exploits them as design activity within the working up of a design, there may be opportunities to use the parametric digital media CATIA™ in certain projects.

The iterations and their evolution that respond to aspects of brief and design ideas reinforce that an architectural designer in practice is considering more than merely a surface elaboration in the design process. The iterative nature of Terroir’s design process as identified in the Peppermint Bay project reinforces the importance of flexible and varying modelling in the early stages of design. This suggests a basis for a new set of project studies, into alternate digital
media, that facilitates subtle iterative designing. I will demonstrate alternate digital media in the next chapter.

**Concluding Remarks and Observations**

The project studies presented in this chapter investigated the use of the digital parametric software CATIA™ as a design tool in the early stages of design. I expected to replicate the suggestions in the available literature that the software could lead to innovative advances (Rahim 2006:1) and possibly extend an operative way designing. However, my findings were different to the innovative advances that I expected.

In my first practice fieldwork, I successfully modelled projects in the CATIA™ software. I found that my outcomes differed to my expectations in using the software as a generative design media in the early stages. In using parametric software in the early design stages, I found that the software both thwarted and assisted aspects of design in the early stages. These include the following:

As Cuff noted (Cuff 1991:72-84) and based on my architectural design experience, the changing demands on an architectural project can constantly adjust formal propositions, radically and minutely, throughout the process from conception to construction. What I found through this study was that, particularly at the early stages of a design, the nature of change to the constraints (Gero 1993:11; Lawson 2006:92) of the design and their relationship to one other can undergo significant adjustment. Due to the operative nature of this shifting, I understand that the early stages of the architectural design process are fluid, evolutionary and organic. The premise of parameters in digital media used in design presupposes that architects make explicit their intentions at an early stage or prior to the testing.

The software required me to make explicit a series of ‘rules’, or the parameters, of the model. Working in a collaboration of architectural designers, I found that the design constraints or rules were not clear enough or changed radically in the early stages making it impossible to construct a useful and rigid parametric based digital model.

In the Hazards Hotel and Montpelier projects, I found CATIA™ to be cumbersome for the working up of a design. Whilst the software was promoted as being obvious, intuitive and potentially powerful (Dassault Systèmes 2007:2), the need to make explicit rules necessary for
parametric software CATIA™ proved to be in opposition to the implicit and unquantifiable design processes normally used by Terroir.

CATIA™ did break the traditional approach of surfaces modelling and (Dassault Systèmes 2007:2) as I was required to change and expand my typical process of working up a design form to using planes and angles (Dassault Systèmes 2007:2). However, these changes did not necessarily enable quick surface creation and ideas expression and simulation for use in the design process. I found that CATIA™ did allow a dynamic way of working, however the planes and angles that I did make explicit in the CATIA™ model had limitations. CATIA™'s accurate approach was too restrictive to enable any significant formal experimentation for the project. This suggests that there is value in using software that accepts inaccuracies and experimentation for the early stage of the design process.

The unfamiliar aesthetics of the visualisations: the increased technical detail, lower resolution and lack of material and shadow definition caused confusion. This limitation suggests that in any future use of new digital media it will be important to careful manage the presentation of its output. I found that a determining factor in the usefulness of a piece of software such as CATIA™ is the visual qualities of its output. The aesthetic design of a digital visualisation is important to the generation of design when operating in a collaborative of architectural designers. The importance of the aesthetics of visualisations in the early stages of design to the team also accentuates the difference between architectural design and shipbuilding, a common use for the software CATIA™. The importance of ensuring a particular aesthetic quality in the visualisations highlights that visuality in architectural design is an important determining factor in assessing an architectural proposition in a team environment, alongside the generation of form and other technical aspects.

I concluded that for the issues noted in this chapter, this software is generally not appropriate for the early stages of design. However, the use of the software in Terroir’s process could not be ruled out completely. The result of this experimentation led to a more critical analysis of the appropriateness of the tool in designing. After analysis, I found that CATIA™ was not immediately useful and could actually hinder the design of a project if it was applied too early in the process. Using programs such as CATIA™ could be much more appropriate in later stages of designing when the radical formal and conceptual shifts are reduced and the demand for accuracy increases, for example from design development stages onwards.
I was able to verify that successful integration of digital media onto established conventional design practice is not about force-fitting clever cutting-edge digital media, such as the digital parametric software CATIA™, onto otherwise effective practices. I was able to demonstrate other benefits emerging from these experimentations. These include a new awareness of how designs can include parameters to generate iterations of a form. I also demonstrated the role of variance and iteration in the process of design and suggested that there are opportunities in using parametric digital media in certain circumstances.
CHAPTER 6 ITERATIVE DESIGNING

On completing the project studies presented in the last chapter, the question remained in Terroir of what exactly is the benefit of the digital media in a design process that involves various members of a design team (Appendix C FN Wed 29/06/2005 12:29; FN Wed 14/07/2005 18:00). The initial exploration to investigate parametric software and use the software as a design tool was found to be not immediately useful and actually hindered the early stages of projects due to precision and time. I suspected that the uptake of technologies can assist generative and communicative aspects in design for collaborative teams and those interlocutors can profit remarkably, not essentially from any specific tool itself but from what certain tools can generate if they are applied appropriately. In response to the beneficial outcomes of variance and iteration, I composed a new project study to explore potential opportunities for alternate digital media in the early stages to facilitate subtle iterative designing. I will investigate this speculation in this chapter. I will describe new outcomes that resulted in an exciting revelation for Terroir in a particular mode of working. What was reconfirmed through this project study was, what is important in designing is what happens to the ideas and concepts through the process of a design. Digital media can augment a multivalent approach rather than become the focus of the design process.

Iterative Software

Iteration in designing is, to make or do repeatedly (Oxford Dictionary 2001:482). For Proctor, the iteration is an important aspect of creative designing as it is the searching for solutions and the process of ‘testing and retesting and finally communicating the results’ (Proctor 2005:2).

In terms of digital media, the iteration can be facilitated by certain tools. The view that digital media are ‘simply computational devices to apply mathematical manipulations to digital data’ (Cross 1977) is becoming obsolete. Software such as animation is challenging architects to formulate new understandings of the design realm encouraging the argument that computers have changed, and continue to change, the way we think and represent design (Burry 2001:7; Kvan, Mark et al. 2004).

Digital animation, has been discussed by practitioners and academics, for example Lynn, More, Spiller and Kolarevic (Lynn 1999; More 2001:14; Spiller 2001:82; Kolarevic 2003). It has been brought to architectural design practice typically to extend the tradition of the perspective for flythrough representations. Its other use, as Helen Castle suggests in a recent editorial, has been
to act as a sophisticated design ‘toy’ to create morphological shifts in architectural form through movement in reaction to, or in sympathy with, external forces or even ideologies useful in conceptualisation of architecture (Castle 2001:5).

Animation can be used at a conceptual level and as a device in iterative design generation or as a ‘procedure for evaluation’ (Burry 2001:7). Animation processes are promoted to themselves play a generative role in shaping an architect’s intentions (Richter, Alexieff et al. 2001:22). This suggests that through digital animation media, shapes can be formed and their movement may release the potential of an ‘animated diagram’ that can shed light in a project’s ‘process of becoming’ (Ednie-Brown 2001:72).

At a recent conference in Adelaide, the 2006 Possible Worlds Symposium, Lars Spuybroek, an architect who has extensively investigated digital media in designing, suggested that a designer can ’generate form we do not design it’ (Benton 2006:n.p; Scriver 2006). In other studies using generative digital media, such as animation media, the role of the architect is touted to be not so much to design an actual form, but to catalyse them.

However, criticisms also exist in regard to the use of animation, for example, the newness of the software and the reappropriation of a medium that was not intended for architecture can result in coagulated and unconsidered blobs that offer no more than unadulterated effect (Spiller 2001:84). Spiller suggests that ‘enigma’ needs to be retained in the use of animation media. He suggests that not every detail in the design needs to be accurately conveyed and that designers need to create and maintain ways in which to convey, through imagery, multiple viewpoints which have imagined pasts and imagined futures, similar to conventional drawing (Spiller 2001:85). I suspected that this suggestion coincided with my new knowledge from previous project studies that, in the early stages of design, digital media can be advantageous when it facilitates subtle iterative designing.

In response to a question from the directors during an email conversation asking why digital media would be interesting to Terroir’s design process (Appendix C Tue 25/04/2006 12:49; Appendix C Wed 29/06/2005 12:29; Appendix C Thu 14/07/2005 18:00) I wanted to address the criticisms by observers that users are focusing too heavily on the generation of a form and ask the question of how do digital media expand conventional design processes of drafting and models beyond merely a focus on form? Learning from the previous chapter, I was more cautious in integrating digital media but I still saw its integration as a part of my role as researcher. I continued to investigate this question because of my postgraduate research and my
desire to question provocatively existing practice. Through the projects that I will present in this chapter, I found that digital animation media and their output resulted in providing the firm with ‘new ways to see’ or communicate an idea advancing the creative process of the project. This practice fieldwork resulted in a realisation that the digital media could generatively and communicatively assist the architectural designer in the fundamental tasks of not only finding form but also finding the operations of a design.

The software used in the following studies included AutoCAD™, Autodesk 3D Studio Max™ (3DS), two commonly utilised architectural software and Next Limit Technologies RF4 RealFlo™, a leading physical simulation media used typically in the film industry. The following projects demonstrate clear positives despite there being questions around the digitalisation of the process.

Project Studies: Animation in the Early Stages of the Design Process

Project 1: Fern Tree House – dwelling Tasmania 2002-2005
Refer to: Appendix G

Description of the Project
This project, a residential dwelling, contained a typical programmatic set of spaces including living, sleeping areas and bathing areas, each requiring certain views to be achieved. Due to the client changing the brief, Terroir had already designed and documented two designs for the project. After being approached by the clients to redesign and develop a third design, one design director suggested to me offhandedly ‘my sense is that the answer lay somewhere between the previous two designed versions’ (Appendix F FN Tues 05/07/2005). From this statement I decided to see what would happen if I built a digital model of the old design version then one of new and have dynamic digital animation media compute the versions between so that I could speculatively communicate to the design team what the versions in between looked like (Appendix F Thu 14/07/2005 12:32).
The Research Process

One tool in animation software is the tween, a technique in which frames 'in-between' two keyframes are automatically created. It seemed plausible to me that if I established the two design versions as the two keyframes I would be able to generate digitally the design versions in-between. The configuration of the dwelling’s pragmatic layout was not yet determined, and allowed me the freedom to play with the animation tool with a reduced regard to any pragmatic requirements. I used the tween tool in this project in a diagrammatic fashion. The tween tool produced multiple unarticulated building envelopes that I rendered in a transparent material to maintain an ambiguity in the image. I exported the stills into a movie file and emailed it to the design team (Appendix F Fri 16/09/2005 23:47). The movie was viewed and critiqued by the team. The team found that this new representation renewed inspiration for the familiar project and the design team agreed that one point, approximately sixty percent through the morph, best captured the formal idea and met the view and briefing requirements of the client (Appendix F Mon 19/09/2005 09:43).

Based on the success of this process I was asked to email a set of different views of the sixty percent stage to one design director who suggestively overlaid pragmatic arrangements by hand which I added back into the digital model (Appendix F Wed 21/09/2005 09:57; Appendix F Wed 05/10/2005 21:44). The tween tool was used again to digitally generate the in between design versions of the more detailed model (Appendix F Thu 06/10/2005 17:17). This process continued, each time developing the design, until the team agreed that the digital model united the main pragmatic, ideological and formal aspirations (For example: Appendix F Fri 07/10/2005 14:08; Appendix F Tuesday, 11 October 2005 22:22).
Figure 25: Fern Tree House Animation

This figure displays the numerous images and form that I created via animation media as a part of the Fern Tree House project.

The Outcomes

This project study highlighted that the animation tool can operate as a toy, suggesting simple amusement, discovery and play.

The initial casual request from the director was not meant to suggest a blind use of the technology as a tool or not exercising three-dimensional thinking skills. Rather the digital animation media enabled discovery and the way the form was represented by digital media, in a transparent material, enabled ambiguity and speculation for the design of the project in its early stages (Figure 26).

Through this project study, I was able to verify that decisively mapping dynamic digital media that is common to architecture within the design process can be advantageous to the early stages of the design process as it assists discovery of new and/or unanticipated formal outcomes. CATIA™ burdened my contribution of formal visualisations upfront. Whereas, using animation in the design of form in the early stages generated suggestive visualisations without the need for accurate information or extensive conversations with the team about the parameters or rules of the project. This animation fieldwork stands in contrast, in a generative sense, with my experience with CATIA™.
This study showed that there remained a need for a creative designer to author parameters alongside the computer’s tween tool. The authorship suggests that the creative role of an architectural designer is not removed in the uptake of new digital media. Their contribution adapts and extends to suit the requirements of new digital media.

The design process in this project study was cyclic where a set of design influences were made visual in a set of digital visualisations, which were reworked with detail of plan and elevation integrated in response to project influences of site and client brief. This reinforces suggestions by Lawson that the design process engages digital media in a heuristic fashion (Lawson 1982:82), where the aim of the process is to work towards meshing idea, pragmatics and form in an approximate manner.

Due to the generative and communicative benefits that engaged both designer and their digital media in this project study, I suspect that usefulness of digital media could be through iteration in an interactive process, which engages digital media. This interactivity between designer and media, conventional and digital, could address concerns of superficiality and hold a valid place in the conceptual and development design process of the office. I will explore this idea of interactivity in the next chapter.

Terroir have used animation media in the process of design in three new projects that presented similar design problems, for example the following Hobart Waterfront project. The outcomes to the next project study both strengthen the findings in the Fern Tree project and highlighted new generative and communication issues in using animation media in collaborative design.

**Project 2: Hobart Waterfront, Urban Design Competition, Hobart Tasmania 2006**

**Description of the Project**
The project, Hobart waterfront urban design competition, was an ideas only competition (Appendix H FN 09/2006). The brief for this new project requested innovative ideas for a master plan for a site surrounding the city of Hobart’s dockland area and the brief was very open in terms of pragmatic limitations.

Terroir’s idea for the project was derived from the directors’ own personal experience and knowledge of the Hobart area. Through this knowledge and further research, the design team
became aware of the history and location of a significant river outlet, which the existing dockland concrete apron concealed (Appendix H Thu 28/09/2006 12:44). This river outlet was the termination of a rivulet of water that ran from Mt Wellington, which backdrops the city of Hobart. Terroir’s idea for the master plan was to create a sense of connection on the dockland concrete apron to this mountain and recognise on site the significance of the outlet. Furthermore, the idea was to reinforce the ‘uncanny’ nature of the existing dockland concrete apron by further differentiating the apron to the adjacent Hobart city (Appendix H Sat 25/11/2006 18:57).

The Research Process

With the findings from the first animation project study in this chapter I investigated a commonly used architectural animation tool. An opportunity for me to test an animation tool uncommonly used in architecture emerged in the design process of a competition. RealFlo is a software typically used in the animation industry to simulate water flowing, it is not typically used by architectural practice. Its use in this project study was a reinterpretation of the software’s typical and intended application.

In an early design conversation for this project, I noted that the team repeatedly referred to a metaphor of ‘turbulence’. This metaphor was assigned to an overlapping set of ideas, including water and terrain. I believed that dynamic computer software could somehow allow me to represent, reinterpret and unite these ideas. A team member had previously used the tool RealFlo, uncommonly used by architects, for a project he had undertaken with another firm. He and I agreed that running an animation of liquid over the site’s terrain could either simulate the turbulence metaphor or potentially generate a formal representation of the ideas much like the previous project study (Figure 26) (Appendix H Tue 10/10/2006 00:14). To make the animation I approximated the contours of the terrain and then the computer generated an approximated water flow.

Figure 26: Hobart Waterfront Animation

This figure displays the numerous images of landscape and water form that I created via animation media as a part of the Hobart Waterfront project.
The response received from the directors and the rest of the team regarding the initial images was two-fold. On the one hand, the visualisations were powerful and provided a seductive visualisation of the lost rivulet (Appendix H Wed 22/11/2006 10:20). However, on the other hand, the form produced and its relationship to the landscape that was calculated on approximated parameters was called dubious by the directors (Appendix H Thu 09/11/2006 14:20). This concern originates from the value Terroir consign to site specificity and place (Terroir 2007b). In discussing the criticisms with the directors, I had to agree that there was questionable probity, control or validity in the founding parameters and the modelling of the landscape used in the animation (Appendix H Thu 09/11/2006 14:20). The RealFlo animation and the form generated were dropped at this point in the design process and the other design methods continued to develop a formal proposition, including planning, sketching and drafting. This episode confused my earlier findings in the Fern Tree project study, where form and animations stills were interpreted by the team collectively in a diagrammatic manner and resulted in a generative advancement for the form and concept in the design process. An answer to this confusion emerged as the team finalised the Hobart Waterfront urban design competition.

The role that I had established as researcher, to provocatively question the design process, saw me persist in finalising the animation. Another team member and I completed the full RealFlo animation movie file. Simultaneously I continued to compose a photomontage for the presentation panels based on images provided by the competition organiser. The aim of the photomontage was to convey Terroir’s idea for the project. The team was exhausted from the frustrating process of discussion and composing the representation, which was not quite capturing the essence of the turbulence idea (Appendix H Tue 21/11/2006 12:40). Some way into this process, I shared the full RealFlo animation movie file with the directors. The directors responded enthusiastically to the animation visualisations believing that they represented an aspect of the project’s idea (Appendix H Wed 22/11/2006 10:20). As a result, some stills were manipulated to demonstrate the generated river flow morphing into Hobart’s waterfront concrete apron (Appendix H Tue 28/11/2006 14:12). These manipulated images were added to the side of the competition panel at the last minute as a diagrammatic representation with the sensitivity and beauty that the team was aiming for (Appendix H Thu 16/11/2006 16:50).

The Outcomes

This project study reinforced that animation media, uncommon to architecture, can operate as a toy, suggesting simple amusement, discovery and play. The media can be fundamental in
moving a project’s design beyond creative stagnation and re-energising a team who are feeling creatively exhausted.

The Fern Tree house was a heuristic process (Lawson 1982:82) of working up a design that began from a three-dimensional form generated in digital media. The Hobart project was also a heuristic process of working up a design that included media that was largely conventional.

The Fern Tree House presented a new way of seeing a design, an augmentation to the diagramming process undertaken in Terroir. The Hobart project concluded in opposition to the initial finding where the flexibility of iterations was seen as a potential from the start. The Hobart Waterfront urban design competition project raised the concern that the virtual reality or artificiality of the output of animation digital media, the digital visualisations and the generation of form could be opposed to the site specificity values held by Terroir. This suggests that in Terroir there is a need for a strong grounding, an ethical and ideological reading of the place of the project for the basis of an architectural form. As opposed to futility and misrepresentation that can be a result of approximating reality in digital media.

In analysing why I gained conflicting reactions to the use of similar digital media, I identified an issue of communication. The main difference between the two projects, Fern Tree and Hobart Waterfront, was the communication or origin of ideas. In the Fern Tree project, my visualisations responded to a statement received from directors. The visualisations and their ambiguous quality that I delivered via email unaccompanied with very much textual explanation were well received and it was clear that they were understood as diagrams that responded to the director’s statement. In the Hobart project, my visualisations and their distinct quality originated from my own interpretation of the project’s ideas. The distinct visualisations that I delivered via email accompanied with a level of textual explanation were not well received. The team’s response to the animation visualisations was that this use of digital media had resulted in a distinct formal outcome, which was somewhat dubious due to its founding parameters. In this case, I mis-communicated the visualisations to the team, as they were not seen as a diagram of the turbulence metaphor. I presented the visualisations in definitive manner, not in the transparent material that maintained ambiguity in the Fern Tree project. The team’s response suggests that they were read too literally. The response also suggests that in the future my role as the architectural designer will need to be responsible for the clear communication of digitally generated design.
A fear existed in the Hobart Waterfront urban design competition that there was no probity to the digital media modelling and that the animation produced merely seductive visualisation. The outcomes did not result as per my assumptions or predictions to result in generatively advancing the design. The animation stills were confused in their communication and conflicted with the values that Terroir place in site specificity.

Concluding Remarks and Observations

The purpose of this chapter was to address the criticisms by observers that users are focussing too heavily on the generation of a form (Spiller 2001:84) and ask the question: how do digital media expand conventional design processes of drafting and models beyond merely a focus on form? I suspected that I needed to address the implications of going beyond a sole focus on the tool itself, as what is important in designing is what happens to the ideas and concepts through the process of a design (Burry 2001:7; Kvan, Mark et al. 2004; Richter, Alexieff et al. 2001:22; Ednie-Brown 2001:72).

These explorations lead to the realisation that some high-end digital media can be advantageous beyond form generation and act as more than merely tools to be deployed by some already humanly determined set of intentions. For example, the digital animation media did operate similar to a ‘sophisticated design toy’ (Castle 2001:5), enabling play and reinvigorating the design team at times of crisis. In addition, the generation of iterations could be utilised to extend diagrammatic design processes. This experiment into animation media gave Terroir confidence in the potential of digital media where a digital animation media resulted in a conceptual breakthrough in a project and presented a way of seeing the project’s concept with greater clarity. Through multiple imagery, the explorations enhanced diagramming design exercises in the early stages of the design process (Spiller 2001:85). The imagery was more effective when presented in an ambiguous manner similar to Spiller’s suggestion for them to have imagined pasts and imagined futures similar to conventional drawing (Spiller 2001:85).

As seen in the Hobart project, using animation can begin to result in ‘coagulated and unconsidered blobs that offer no more than unadulterated effect’ (Spiller 2001:84) and, in the digital generation of visualisations and form, confusion over the digitalisation of design can occur between members of a design team. Even though the digital modelling was questioned over its probity, the activity allowed breakthroughs in understanding the design process and the communication of design. Through the ‘successful’ integration of digital animation media, new
understandings of the design process occurred reinforcing the argument that computers can change, and continue to change, the way we think and represent design (Burry 2001:7; Kvan, Mark et al. 2004).

The requirement for careful communication and curation of the digitally generated iterations, for example through an ambiguous nature of imagery and/or accepting approximation in the foundations of digital models, highlights the important role of the designer. In response to the suggestion that architectural designers can 'generate form we do not design it' (Appendix B FN Thu 09/03/2006; Scriver 2006), I believe that the designer does hold a design role. The designer not only designs form and models, but also acts to catalyse them. Change from integrating digital media occurred not only in the design process but also to the role and responsibility of the designer, including curation and communication of digitally generated design.

Through these animation project studies, I realised that an important aspect in the integration of digital media into the early stages of design is not the form generated, but how the integration of digital media works in the process of design in the early stages. The design team and I learnt that the team’s ideas are informed by the iterations of digitally generated form and/or new ways of seeing ideas. As Cross suggested digital media need not be considered simply as computational devices to apply mathematical manipulations to digital data (Cross 1977). Another important aspect in these project studies was the communication of my iterative testings. These project studies also correspond to Proctor’s suggestion that creative designing is the searching for solutions, testing, retesting, and finally communicating the results (Proctor 2005:2).

The two aspects of idea generation and communication suggest a relationship between the team’s ideas and the digital media that is used to visualise and generate them into architectural propositions. Due to this relationship between the architectural designer and their digital media I hypothesise that digital media can be interactive, understood as operative and play a role in shaping design intentions. Thereby, whilst design in an idea-focused firm (Coxe, Hartung et al. 1986:52-53), such as Terroir, is driven by overarching ‘ideas’ regarding landscape, culture and which result from collective conversation, the role of digital media can play a generative part in the making and working up of an idea. This hypothesis leads to the question of what other tools afford generative and communicative benefits in the making and working up of ideas that extend beyond a basis of computation.
CHAPTER 7 INTERACTIVE DESIGNING

In the previous chapter, I investigated producing iterations with digital media for use in designing. Analysing the outcomes I confirmed clear benefits in the integration of animation digital media. My practice fieldwork into integrating animation digital media also suggested an interaction was occurring between the designer and their digital media.

Through the ‘success’ of formalising a suite of options, which allowed a team of architects to see an idea in new ways and identifying the issue of communication, I now recognise that introducing sophisticated and/or unfamiliar sets of digital media into the early stages of design need not be something to fear. At this point in my studies, I believed that I had not investigated the design process as a whole and the integration of digital media enough to appreciate these emerging and positive understandings. This chapter addresses this concern. I will present further practice fieldwork into the implicit natures of my architectural designing practice and both the provocative and cautious integration of digital media. I investigate various suggestions as to how digital media can be advantageous in designing in the early stages, including meshing conventional media with the new digital media and how digital media fosters design, which is understood as a conversation.

In this chapter, I will investigate suggestions made in the available literature. Negroponte suggested the desired shifts from integrating digital media into the early stages of design might be subtle or significant modification (Negroponte 1995:223). This chapter aims to test this idea. I also cover the transience of the digital image (Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73), developing more approximate models of design (Lawson 2006:184-185; Lawson 198282; Steele 2001:14; Stamm 2007:103; Balmforth, Benjamin et al. 2007b:100-109), augmenting computation with curation (Binkley 1997:112,114) and using a hybrid of media (Benjamin 2004:54; Chen 2007:582).

This chapter is a collation of practice fieldwork and essays I discussed informally in Terroir or presented at lectures and exhibitions between 2006 and 2007. The series of project studies, presented here under the theme of interactivity, explore ‘subtle mutual relationships’ (Negroponte 1995:223) and convey an increased layering of technical support that can occur in the integration of digital media in the architectural design practice.
Interactivity in the Early Stages of the Architectural Design Process

Interactivity, as Emanuel Schegloff (Suchman 2003:305) defines, is
‘not the stage on which the exchange of messages takes place, or the means through which intentionality
and interpretation operationalise themselves. Rather, interaction is a name for the ongoing, contingent
co-production of a shared social/material world’

Furthermore, Suchman (Suchman 2003:305) defines interactivity as
‘engaged participation with others which cannot be stipulated in advance, but requires an autobiography,
a presence, and a projected future’

This chapter will test my postulation, based on my experience gained through the first two case
studies, literature review and familiarity of architectural design practice at Terroir, that
interactivity can in part address my primary question to what extent is it advantageous to include digital
media in the early stages of design. I hypothesise that digital media need to be regarded as more than
tools deployed for already determined intentions. To achieve interactivity, in a critical and
rigorous design process such as Terroir’s, I suggest that in line with Schegloff and Suchman’s
definitions, the role of digital media needs to be considered as one fundamental generative
factor by the architectural designer. In addition, the digital media need to provide ongoing and
contingent operation for the design process and play a series of generative and communicative
roles in shaping the intentions of the design process.

To address the above hypothesis, I begin this chapter by more closely focussing on how Terroir
designs. Based in Terroir, I began this research with the understanding that the design process
was an interaction between words, drafting and models (Appendix C PP Tue-Fr2-5/03/2004
Slide 10/28; Blythe 2007a:164) (Figure 28). So in the following pages I investigate interactivity in
these three processes involving digital media under the headings:
- Project Studies: Productive Digital Visualisations in the Early Stages of Design
- Project Studies: Digital Modelling in the Early Stages of Design
- Project Studies: Conversations (Words) in the Early Stages of the Design Process

I will discuss and demonstrate the main interactions in design and change to the existing
processes in Terroir through email archives and informal discussions presented in the appendix
(Volume 2) and visualisations that are documented as figures and which have been taken from
the project studies.
Project Studies: Productive Digital Visualisations in the Early Stages of Design

Digital renderings have historically been used as presentation devices, simulating design proposals through their realism (Lui 2003:7; Aspinall 1998:85). Available digital media to produce digital imagery has been relegated to producing these presentation devices and are perceived by many architects as only appropriate for the later stages of design presentation devices (Aspinall 1998:85). Thus, digital visualisations are not often a productive agent in the early stages of the design process. However, as I will demonstrate in this chapter, digital visualisations have become my primary tool for communicating ideas within a four-way design conversation, between the three creative directors and myself. I will demonstrate the potential in the transience of the digital image (Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73).

From the following analysis of a project study, I have come to understand more about negotiating the digital visualisation for a productive concern through categorising the different functions visualisations can take of a design. The following study was presented at a symposium, Transcapes: digitally mediated environments on the 3rd November 2006 at UTS University in Sydney, on the role of digital visualisations in the design process (Appendix L FN Fri 03/11/2006B).
Project 1: Prague National Library Competition – Prague, Czech Republic 2006

Description of the Project
This competition project based in the city of Prague requested a building design for a new national library to house a modern library space, protection for an archive collection and a series of public gathering spaces. The site was situated on the periphery of Prague’s historical city, on the corner of a flat park called ‘Letna Park’. The park sits on an escarpment overlooking the old town and adjacent to the historical medieval ‘Prague Castle’.

The Research Process
The following pages detail the process of design for the Prague National Library competition project. It includes the main types of visualisation I presented to the team and describes the comments I received in response.

The following examples of digital architectural visualisations in the Prague National Library competition project include diagrams and digital montages, which I made. The visualisations were not to present a static image of a proposed building, but to present to the internal Terroir design team, over the email based design conversation in the early stages of the design, provocative and productive engines for a debate regarding the intention of the project.

The first set of digital visualisations that emerged in the Prague project occurred in a scattergun manner as I searched for the idea and a way to portray the idea. They included photographs of a model (Figure 28) that I constructed in response to a comment from one of the director’s regarding an arctic painting by Caspar David Friedrich, The Polar Sea (1824) (Koerner 1990:201), and creating a building about a violent rupture action (Appendix L Tue 04/07/2006 10:17).
The ‘diagram’, a long-standing design device (Allen 1999; Eisenman 1999; Galofaro 1999) is fundamental to Terroir’s own design process (Blythe 2007a:164). The diagram technique has remained fundamental throughout this study and integrating digital media. In the Prague National Library competition project the first series of digital architectural visualisations were essentially diagrams. The visualisations included figure ground studies (Figure 29) that described and were used to analysis the surrounding context. Reflecting on all project design in Terroir, this figure ground design exercise is common in the firm as a way of gaining an understanding of the ground. Whilst the model was digitally generated based on my approximate interpretation of the real terrain, the team did not perceive the figure ground studies visualisations as dubious. The team understood and used them as diagrams.

The digitally derived figure ground studies were used by the Terroir design team to discuss context and debate the idea of the project. The team produced several iterations of the digitally
derived figure ground studies. Some of the iterations were discarded by the team and some remained central to the conversation as they highlighted, clarified and formalised aspects of conceptual ideas. Two-dimensional studies have been used in Terroir in the past and the studies were quickly generated in CAAD software and visualised the varying densities of the city. The three dimensional digital studies were a new exercise for Terroir and they exposed not only the densities of the city, but how the city density sat in context with the landscape, in particular the tight valleys of the escarpment. The impact of the three dimensional digital studies proved that one reading of the site and an idea for the project, in the familiar two-dimensional study was contrived and thus the idea was dropped by the team. The digitally derived figure ground studies, in particular the new three-dimensional studies, were productive in that they yielded positive progression and reinforced values that Terroir held regarding a building’s site specificity to existing landscape (Terroir 2007b).

I produced a series of digital visualisations to assist in formalising different ideas of the project. The following is a discussion regarding the working up of a form for the archive collection. The idea for the archive was secret egg-like cases that lay dormant below the grass of the park. To find a form I re-appropriated existing images of eggs and stones. I mapped these images onto digital surfaces and manipulated the surface to match (Figure 30). I also tried the iterative design process that I used in the previous chapter and digitally animated egg-like forms emerging from below the a digital ground surface. The design team responded to these visualisations over the email-based conversation. Most of my digital studies received the response that the visuals were not successfully capturing their intent (Appendix L Mon 28/08/2006 2:11; Appendix L Mon 28/08/2006 17:38; Appendix L Mon 28/08/2006 6:51; Appendix L Mon 28/08/2006 20:31). I found that these digital processes were hard to manage and contain to the small area that I had available in a limited amount of time. These images did not receive positive comments but their productive use was in clarifying the intention.

Figure 30: ‘Cockroach egg’ illustration using digital media

I created the above image in the early stage of design in the Prague Library project.
As the digital techniques of iteration, animation, manipulation and mapping, were not successful I abandoned them. I used another, more conventional, approach to formalise the idea. Instead of using digital media, I used drawings created by hand to illustrate in plan what I thought the team would want to see (Figure 31). The result was that I received positive feedback from the directors and found that the forms could be generated and managed more quickly, thus proving more productive for the task.

![Figure 31: 'Cockroach egg' illustration using hand drawing](image)

I created the above image in the early stage of design in the Prague Library project.

In the Prague project the debate regarded whether the ‘roof’ of the project should be considered as an extension of the existing green grass ‘park’ or considered as an extension of the existing adjacent stone ‘freeway’ (Figure 32). Having learnt from previous experience, in terms of design communication and curation, I began the digital visualisations in greyscale and progressively and carefully applied colour and texture to highlight aspect of the conversation. For example, grass was coloured green and stones were textured with a stone map only in response to the direct debate over the material of the form. My intention was to keep the conversation centred on how the components should relate to one another, rather than have it distracted by a debate over the quality of the image. Using this approach, I found that designs in Terroir could begin in a singular manner and gradually become divided and differentiated into components as the idea matures. The intention of the immateriality and my curation, or my carefully thought through, prepared and documented, presentation of the digital images was intended to maintain a freedom for the design that was divorced from the pressure of reality to investigate the full potential of the idea and how it may operate.
Figure 32: Materiality in representations

I created the above image in the early stage of design in the Prague Library project.

An initial review of the pragmatics was undertaken at the start of the design process. Later in the design process, the idea and the form that had been created in the digital model was checked more thoroughly against the detailed pragmatics of the brief. The staged process was an interaction and mediation to coalesce ideas, formalisations presented in digital visualisations of models and images and pragmatic constraints. This interactive process of analysing these aspects altered the formalisations. To this point, the digital visualisations had been generated from renderings of a rough three-dimensional model created in 3D Studio Max™. On completing the review of pragmatics, a new series of digital visualisations were generated. The rough three-dimensional model made this process efficient and I could deliver a number of new visualisations in a tight timeframe maintaining the momentum of the conversation.

The views were shared with the team over the email software. The digital visualisations were compared to the list of ideas for the project to ensure that the project form was not diverting from the agreed conceptual idea.

Once establishing and agreeing on the ideas and the form of the building, the digital visualisations turned from being generative to becoming a communication device of the design intent. The design conversation also changed from discussing the essence and quality of the idea of the project and formalising those ideas to questioning the qualities and character of digital visualisations themselves. The change in focus was because we had to produce a competition presentation that conveyed the architectural intent.

The aim of the main representation for the Prague National Library competition project was to capture the multiplicity of the conversation and to promote the idea to the competition judges. As the idea in Terroir is primary, the main representation, digital idea visualisation, was given
priority to be a primary component of the presentation of the project. The team was not looking to present a typical glossy presentation image of a building but an ideological and illusionary digital illustration that captured the essence of the idea, and have a subtly that suggested more. Enigmatically the digital idea visualisation needed to be an ‘answer’ to the competition that proposed a new set of questions.

In the process of generating the digital idea visualisation a debate occurred which centred on the perspective, content and quality of the visualisation. After all the views were aired, the digital idea visualisation and the debate reached an impasse. I had generated many versions of the visualisation using digital media. However, the team suggested that these were not capturing the intent. My unfamiliarity with producing a digital idea visualisation required me to investigate new ways of presenting the image and possibilities available in digital media within the tight timeframe. In frustration of these tasks, I hand sketched in a more conventional manner (Figure 33) what I thought of the perspective, content and quality. Sharing this hand sketch visualisation led to a new debate. The design team commented on the hand sketch visualisation’s subtle qualities, particularly the placement of shadings. The design team believed that the subliminal and intuitive qualities of the hand sketch visualisation refocused the intention of the visualisation. I used the new understanding to direct how I applied and coordinated a range of digitally supportive media, including 3D Studio Max™ and Photoshop™.

![Figure 33: Hand drawn representation](image)

*Figure 33: Hand drawn representation*

*I created the above image in the early stage of design in the Prague Library project.*

Over its development, the final digital idea visualisation was tweaked, added to and manipulated in digital media until the design team all agreed that it encompassed the multiplicity of the idea (Figure 34). A typical digital rendering can be produced by creating an accurate digital model, simulating lighting and material and ‘rendering’ a single visualisation. In this project however, combining different digital media resulted in a hybrid technique and presented a vast array of
techniques from which to create an enigmatic idea image. The final visualisation became far from the typical presentation rendering, a ‘snapshot’ of a digital model. The final digital idea visualisation was highly curated and controlled. The design team agreed that the final digital idea visualisation’s manipulation and layered nature stood as a testament to how Terroir designers work together, a collaborative artwork where the ideas emerging from conversation and visualisation are galvanised together.

Figure 34: Idea image

I created the above image as a presentation image in the Prague Library project.

At the conclusion of the presentation stage of this competition project, the final visualisations, the list of ideas captured in the presentation panel and email archive and the digital models that I had created become a communication of the design’s autonomy. The visualisations captured the intent of the project. The information within the digital archives, the emails and the digital models exist for a future design team and for development of the project.
The main outcome from the Prague National Library competition project study was a new awareness of the interactivity between digital visualisations and design activities that occur across the process of a design in the early stages, or what Terroir have coined as the ideation stage. The Prague National Library competition project study’s ideation stage chronologically fell into three stages. Firstly, the digital visualisations took second place to a focus on the verbal conversation. Secondly, as the project ideas developed through the conversation, the use and generation of digital visualisations increased and they became a generative and operative tool in searching for an idea’s formal language. This second stage was the most interactive where the visualisations changed dynamically and productively, both influencing and being influenced by conversation. The final stage was the presentation of the project’s idea, which resulted in a series of presentation images that could be used as a tool for communicating design intent.

By the time the process had reached the third presentation phase, the visualisations that the design team were using had become increasingly digital in format. The visualisations used in the design process were not merely presentation renderings produced by computer packages (Lui 2003:7; Aspinall 1998:85). The Prague visualisations were numerous and used with a level of artlessness. I believe this suggests that the transience of a digital image (Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73) can be used productively for the early stages of a design. In the Prague National Library competition project study, I was able to demonstrate a series of generative and communicative uses of digital media.
This project study showed that the role of digital visualisations in a design process such as Terroir’s, need not merely be a simulation of a building rather they can be productive devices that play a generative part in the formalisation of ideas. Negroponte suggested the desired shifts from integrating digital media into the early stages of design might be subtle or significant modifications (Negroponte 1995:223). The outcome of modelling the ideas with the use of digital media, including digitally mapping materials and generating visualisations, correlate with Negroponte’s suggestion in sometimes subtle and sometimes significant unexpected results. This was exemplified in the figure ground study (Figure 36), the presentation of a visualisation of a digitally derived terrain significantly altered the design team’s understanding of the site and changed the direction of the idea.

Figure 36: Figure ground diagrams in 3D
I created the above image in the early stage of design in the Prague Library project.

The concern that certain digital media can themselves result in formal outcomes that can be perceived as too dubious for the basis of an architectural idea reoccurred within the team in this project study. The Prague project raised questions regarding visuality and communication, interaction and the perception of digital media that are independent of the generative advantages.

In the Prague project, I found that materiality could be influential in the process of design in a team environment. Based on experience in Terroir, I am aware that Terroir’s architectural designs are rarely generated from material properties. Rather, the opposite is true. Materiality in Terroir architectural design is considered as a transient influence. I am aware that in Terroir the materials for a project can change considerably and are therefore too volatile an influence to
base an idea. Terroir believe that there needs to be mutability where the designs are based on the conscious intersection and manipulation of three ingredients, culture, landscape and building (Terroir 2007b). The Prague project demonstrated a typical Terroir response to material, where all details are considered to be non-descript ‘cardboard’, the components of a design and its visualisation have no material or colour distinction and these details only emerge later through the development of a project’s idea.

The significance of this observation is that in terms of digital visualisations, assigning materiality to objects can have a significant influence and distract design conversation. I have experienced this in previous projects, for example in the designing of the roof form in the Hazards Hotel project I produced many digital visualisations. In a design process, I can lose a digital colour map, due to software access rights or lighting that needs to be recreated in new versions of a digital model file. When this occurs the directors question even slight colour tone change. This questioning suggests that there are issues in what the directors are reading from the visualisation iterations. The questioning suggests that a virtual model is interpreted as real. In these cases of material or other visual changes, comments received regarding the actual design of the form can often not be included or be limited. In addition, mapping a colour to a form can sway and strengthen a design. For example, in the Maitland City Bowling Club project, I applied a green colour from early on in the project and this was one small trigger to start a trajectory of investigating green colours in the project overall. From these conflicts and insights, I believe that whilst positive and productive outcomes can occur from the transience of digital imagery, the imagery needs to be carefully curated to not confuse and frustrate. In line with Binkley’s opinion to augment computation with curation (Binkley 1997:112,114), I believe these insights suggest that there are new roles and skills demanded of the architectural designer in learning how to carefully curate and communicate the generation of digital visualisations to a team of architects to acquire and sustain productive conversation.

18 Refer to the Maitland City bowling Club project (Figure 59, Appendix I). The material of the roof changed through different types of metal sheeting with considerably different properties. As the idea of the project was to produce a topographical roof, the specific form of the roof could alter and not significantly hinder the formal development of the project overall.
Project 2: Hobart Waterfront Urban Design Competition, Hobart Tasmania

Description of the Project
My participation in another competition project, Hobart Waterfront, confirmed the successes, and failures, of the Prague project’s design process. The competition also reinforced the notion of heuristic and approximate models of design (Lawson 2006:184-185; Lawson 1982:82; Steele 2001:14; Stamm 2007:103; Balmforth, Benjamin et al. 2007b:100-109). The project, Hobart Waterfront urban design competition, was an ideas only competition. The brief for this project requested innovative ideas for a master plan for a site surrounding the city of Hobart’s dockland area and the brief was very open in terms of pragmatic limitations (Appendix H FN 09/2006).

Terroir’s idea for the project was derived from the directors’ own personal experience and knowledge of the Hobart area. Through this knowledge and further research, the design team became aware of the history and location of a significant river outlet, which the existing dockland concrete apron concealed (Appendix H Thu 28/09/2006 12:44). This river outlet was the termination of a rivulet of water that ran from Mt Wellington, which backdrops the city of Hobart. Terroir’s idea for the master plan was to create a sense of connection on the dockland concrete apron to this mountain and recognise on site the significance of the outlet. Furthermore, the idea was to reinforce the ‘uncanny’ nature of the existing dockland concrete apron by further differentiating the apron to the adjacent Hobart city (Appendix H Sat 25/11/2006 18:57).

The Research Process
Reflecting on the ideas, to connect dockland to Mt Wellington and recognise the significance of the rivulet, I identified a piece of software that would simulation the flow of the rivulet (Appendix H Tue 10/10/2006 00:14). From this simulation, I generated a series of images that, as presented in the previous chapter, could result in a new way of seeing the project idea (Appendix H Wed 22/11/2006 10:20).

Figure 37: Hobart Waterfront Animation
This figure displays the numerous images of landscape and water form that I created via animation media as a part of the Hobart Waterfront project.
Various technical problems were experienced in the process of putting together the simulation. This was mainly due to limited computing power to handle the large urban scale digital model and limited inter-office server connection to share the files produced (Appendix H Mon 16/10/2006 15:02). This need for increased computing power suggests that animation and integrating increasing sets of sophisticated software requires more technical capacity than the norm available in architectural resources. The technical problems meant that conventional design exercises were undertaken by the team, including hand drawing 'water flow' over the project site. This suggests that the integration of new software is about not purely about replacing existing methods by new hardware and software but also the continued use of established design processes as appropriate.

When stills from the RealFlo simulation were completed, I shared them with the design team. The stills were used to discuss with a director how the presentation photomontage could be improved. An enthusiastic response was received upon showing the full simulation of the water flow to a director (Appendix H Wed 22/11/2006 10:20). The director suggested that the full simulation and a number of stills taken from the simulation captured the project’s idea. The enthusiastic response and a director’s suggestion resulted in some of the stills being added to the panel at the last minute (Appendix H Tue 28/11/2006 14:12).

**The Outcomes**

Reviewing the progress of this project, I could see that the process of design followed similar patterns to the Prague project. Three stages occurred including conversation, visualisation and presentation. However, the process was not a linear movement from conversation to presentation. It was repetitive and cyclic in nature. On analysis of the process of the Hobart Waterfront competition project, I could see that previously abandoned work completed during the stages was reviewed by the team regularly and at times the old work assisted in clarifying a new problem. The reappearance of earlier ideas and solutions resulting from earlier practice fieldwork suggests that the design process needs to be regularly reviewed as it informs, and is informed, by the new exercises undertaken throughout the process of design. This confirms that the design process is and needs to be circular as it maximises creativity. These observations also demonstrate how a heuristic designing process which supports the suggestions of Lawson (2006), Steele (2001) and Balmforth, Benjamin et al. (2007b).

The visualisations used in the design process were not merely presentation renderings produced by computer packages. In the Hobart Waterfront competition project, I was again able to
demonstrate a series of generative and communicative uses of digital media visualisations to suggest that whilst Liu and Aspinall’s suggestions that digital renderings have historically been used as presentation devices (Liu 2003:7; Aspinall 1998:85) there can also be productive opportunities in their use. Digital media was used from the beginning of the project process. The use of digital media facilitated visualisations alongside conventional media, which either advanced a design idea and/or confirmed that a design idea was dubious.

**Project 3: Maitland City Bowling Club - Alteration & Addition, Maitland**

**Description of the Project**
I mentioned at the start of this chapter that interactivity exists between digital media and the architectural designer’s practice. In this project study, I will investigate the suggestions made in the available literature, regarding using a hybrid of media (Benjamin 2004:54; Chen 2007:582). An existing bowling club requested a significant transformation to address energy and occupation issues while providing an iconic new form that signalled a new identity for the club. Terroir won the architectural competition with a submission that proposed a re-branding of the Club and a master plan that could be implemented over a five to ten year period (Terroir 2007f). Three key design elements emerged as essential to the initial phase of work: a new roof, new servicing, and a new façade to the bowling greens. Functionally, the roof acts a new ‘backpack’ of sorts, enabling and containing new and more efficient building services, while also acting as a giant rain harvester, and as a solar parasol protecting the building from the harsh Hunter Valley sun. The elevation of the roof to the Bowling Green mimics the line a bowled ball should take along the bowling green in plan. The topographic roof plane ties the building complex to the rolling hills of the surrounding Hunter Valley (Terroir 2007f).

**The Research Process**
In this project study, design was a process of generating conventional and digital models and visualisations (Figure 38) alongside site and brief studies (Figure 39). I used various conventional and digital media as required to find a language for the idea. These were reviewed at daily critiquing sessions in both face-to-face and email conversations (Appendix I Thu 02/03/2006 18:31).
The digital visualisations in this project were produced from rough three-dimensional digital models (Appendix I Fri 21/10/2005 1727). A series of two-dimensional planning studies were completed by another team member (Appendix I Mon 24/10/2005 18:05). To coordinate the two lines of design tasks, undertaken by two team members, the rough three-dimensional digital models were cross-referenced over the digital planning studies. The renderings generated from the three-dimensional digital models were adjusted by hand drawing in response to conversation and then remodelled (Figure 40).
**The Outcome**

Digital visualisations were not complete in themselves but gained greater generative or communicative potential through their coexistence with other digital and conventional visualisations, brief and/or ideas (*Figure 39*). For example, in the Maitland project a visualisation was compared with briefing studies, material qualities, history, topography and even the experience of playing a game of bowls (Appendix I Tue 25/10/2005 11:09; Appendix I Thu 12/01/2006 10:22). This range of sources reinforced that the influence on the design of architecture does include a far wide ranging set of influences. Digital media is just one small part and the variety of sources suggests that designing in architecture is generated and dependant on more than new digitally supportive media.

*Figure 40: Interactions with Maitland City Bowling Club design team*

These photographs, taken during early stage design on the Maitland City Bowling Club project depict my interactions with the design team on Maitland City Bowling Club project. Digital media was integrated into design conversations with directors, project architects, consultants and used alongside other conventional media.

Terroir believe the ideas that resulted from the design team’s collective conversation are primary drivers in design. In analysing the design process in the Maitland City bowling club this was certainly the case and in addition I could see that the digital media used in the process, both to model and visualise those ideas, played an equally important part in the working up of the ideas. Because of viewing digital visualisation, new alterations to the form or to the idea were recognised. For example, three-dimensional models were rendered and through conversation, hand sketching was used to integrate other ideas regarding composition, material and/or ideas about connecting the form to the surrounding landscape (*Figure 41*) (This can also be seen in Appendix I Thu 02/03/2006 18:31).
The above images were created by myself and design team members in the early stages of design in the Maitland City Bowling Club as detailed in Appendix I. A range hand sketching was used to integrate other ideas regarding composition, material and/or ideas about connecting the form to the surrounding landscape.

The interchange that is captured in this project’s email archive between the different media, brief, history of the site and design team conversation, confirms that design includes identifying ideas, searching for solutions, making design proposals, iteratively testing and retesting them (Proctor 2005:2; Appendix I Tue 25/10/2005 11:09; Appendix I Thu 12/01/2006 10:22). Added to this were the communications that the team used to gain results (Refer to Appendix J). The study confirmed that whilst a design process such as Terroir’s remained driven by overarching ideas that result from collective conversation and that these were held as primary, digital media played an interactive part in the working up of the idea.

In this project, the types of visualisations used in the design process had expanded from the conventional hand sketches and CAAD drafted visualisations, which were employed by Terroir at the start of this research study. The digital visualisations in this project study included screen captures, models and even spreadsheets (Figure 39) (Appendix I Thu 02/03/2006 18:31). The variety of visualisations and their generative and communicative nature had become a highly effective increased layering of technical support that integrated the beneficial aspects of new digital media with the techniques of the past producing new systems for evaluation of design.

Reaffirming Liu’s observation (Liu 2003:7) I have demonstrated that computer drafting, rendering, animation, simulation and multimedia are good tools for design presentation and advantageous for design. I believe the hybridity of the process that I have presented for this project study demonstrates Benjamin and Chen’s suggestions of using a hybrid of media can be advantageous for the start of a design process (Benjamin 2004:54; Chen 2007:582).
Reflecting on the expanded toolset that the previous project studies have drawn from, I also believe that the hybridity, the heuristic nature and the interactions between digital media, designer and design team conversations in Terroir's design process has seen the firm's design process become one of living evolution rather than simply an archived preservation of initial sketches or images. I will discuss this suggestion further in Chapters 8-9.

**Project 4: George Street Foyer – Commercial Building, George Street, Sydney**

**Description of the Project**

An aim of this project study was to explore how digital media could be regarded as more than tools deployed for already determined intentions. In a critical and rigorous design process, such as Terroir’s, their role would need to become more fundamental such that they begin to be interactive, that is to provide ongoing and contingent operation and play a role in the shaping of our intentions. The exploration was to test whether an engagement of digital media could leave traces in the design processes past and present, and project potentiality useful for the process’s future (Suchman 2003:305). This project study expands upon how the digital media has played a role in the shaping of our intentions through its ability to be generative and assist in communicating the operation of an idea. The George Street foyer forms one section of a larger redevelopment of a heritage listed Sydney high-rise located in the historic precinct, The Rocks (Terroir 2007i).
Figure 42: Photograph of the George Street Foyer site

This photograph was taken by a design team member. The photograph demonstrates the high-rise building in the historic precinct of The Rocks on George Street, Sydney.

The Research Process

In the early stages of the design process of the George Street foyer, a colleague in Terroir generated images for discussion with the directors and for presentation to the client. The two tasks had different intentions and this caused confusion. The different intentions resulted in conflicting demands. The confusion resulted from not being aware of the two intentions. Upon reflection some way into the process of designing, the design team recognised that there were two aims of the digital visualisations being shared which was unclear to them and resolved that they needed to make an explicit and clearer distinction between the two tasks of generating design and presenting design (Appendix M Wed 22/02/2006 18:08).

To begin with, for the discussion with the directors, the colleague produced iterations of one perspective view of a space. The idea for the space was that of a bridge from the adjacent external street to the building’s internal lift core (Figure 43).
An image of Carlo Scarpa’s Fondazione Querini Stampalia bridge was referred to generate the singular views (Figure 44).

The directors discussed the visualisations and suggested alterations as they were produced. As time progressed, the directors began to see that the idea and its formalisation were not advancing, as they would have liked. The directors realised that the iterative versions of the single view were not assisting them in understanding the space or assisting them in formalising the idea about the bridge (Appendix M Wed 22/02/2006 18:08). They suggested that the colleague move from the singular perspective to consider the larger context, to consider the design in the round (Figure 45). The broader view, seen in its three-dimensionality, allowed an understanding of how the idea of a bridge from the adjacent external street to the building’s internal lift core operated in this situation.
The new views also suggested new ideas. The new contextualised digital visualisations led the directors to compare the form to a Chinese take away box. These new ideas in turn lead to the creation of a physical model that mimicked a Chinese take away box (Figure 46).

The final step in this project’s design process was the re-generation of the initial singular perspectives, to test the internal quality of the space, however informed by the new ideas. These new visualisations and the space proposed were critiqued based on whether it was possible to gain a sense of the initial bridging idea (Figure 47).
The Outcomes

From this project study I found that a design could advance more productively when there is a strong idea to drive the development of digital visualisations and forms. For example, identifying the ideas of bridging and Chinese take away boxes provided a basis for assessing the digitally generated proposals.

The project also advances when it is supported by digital visualisations that can explain, comprehensively, the operation of that idea. As this project demonstrated, viewing the context and three-dimensionality of the proposal provided greater information for assessment by the design team. The digital visualisations can be limited by their flat two-dimensionality, as they only present a single perspective. If a series of views are shared then a design team can gain a sense of the design in a holistic manner and gain more of an understanding of the three-dimensionality. Through the three-dimensionality, an operational understanding can be gained.

Furthermore, a design advances more productively through a critical engagement (Allen 2000:xxv) with the digital visualisations. As seen in this project, by presenting a series of three-dimension visualisations, the design team is not merely judging an image, rather they can begin to more critically analyse the idea of the project. As one of the director’s commented

‘we are looking at the imagery as an operation, we are operationally working on them and we need to look at them in their totality’ (Appendix E FN Thu 12/07/2007)

I have concluded from this project that the digital visualisations that were shown through a variety of perspectives and in their context facilitated more sophisticated design judgments. I believe this project study demonstrates Schegloff’s idea of interactivity, in this project’s design a communication took place, intentionality and interpretation were operational through the
imagery and as the imagery suggested new paths for new design exploration there was an ongoing, contingent co-production (Suchman 2003:305).

**Project Studies: Digital Modelling in the Early Stages of Design**

In 2006, Terroir was asked to reflect upon the use of modelling in their design process as a part of the display at the Melbourne Museum and catalogue of the HomoFaber: modelling architecture exhibition curated by SIAL. This exhibition collected material from a range of prominent Australian architectural firms around the use of modelling in current architectural practice. Terroir reflected on the use of physical modelling and concluded that digital modelling had not yet become a part of the everyday language. I saw the request to contribute text and artefacts as an opportunity to comment on the changes that had occurred in the design process as we had increase our use of digital media in the process at Terroir and I could see that digital modelling had began to play a more significant part.

I submitted the following project study as a part of the 2007 HomoFaber: modelling ideas exhibition and catalogue based on the same concept curated again by SIAL again at the Melbourne museum (Appendix J). The new theme for the 2007 exhibition was based on the observation that designers use a wide range of tools to conceptualise and visualise three-dimensional forms and that historically the drawing or sketch has been venerated as the primary creative tool. However, another equally important device is often largely ignored and that is the 'working' model that is rarely celebrated for its critical role in shaping design. This section in this thesis describes the role of digital modelling, how modelling extends from the physical to the computational and how it plays an interactive role assisting the team in the working up of the idea.

‘Terroir began as a conversation between 3 people and the model emerged early on as a tool for giving material form to ideas emerging from that discussion’ (Blythe 2007a:164).

When reflecting on the design process at the firm for the exhibition, Terroir reached the conclusion at HomoFaber 2006 that physical models were conceptual and sought to capture an idea rather than to represent a building. Terroir found they related closely to our conversations (words) and diagrams (drawing/drafting) that were used, they allowed for very rapid adjustments and that in making these models (*Figure 48*) the project was understood in new ways.
and in a manner that cannot be achieved in the absence of this iterative process (Blythe 2007a:164).

**Figure 48: Burns MacDonald models**

The above photographs were taken by Terroir of models used in the early stages of design in the Burns McDonald project.

I began this participant observation postgraduate research in architectural practice by provocatively integrating digital modelling into the design process. This experimental stage challenged the office with ideas about how and why this form of modelling may enhance or impede the design process in the early stages.

**Figure 49: Various idea models used in the process of design**

I captured the above photographs and visualisations in the early stages of design of the Hazards project.
The early experiments, discussed in the previous chapter, gave us confidence in the potential of digital media where a digital model and animation resulted in a conceptual breakthrough in a project and presented a way of seeing the project’s concept with greater clarity (Figure 50).

Figure 50: Fern Tree House Animation
This figure displays numerous images and forms that I created via animation media as a part of the Fern Tree House project.

These modelling explorations enhanced contained design exercises in the design process in the early stages and we became aware that certain digital media were not about to become formulaic or their usefulness easily reproducible.

From reviewing earlier experiments in integrating digital media, I formed a new hypothesis that digital media can begin to be interactive, understood as operative and play a role in shaping our intentions. This study presents that, whilst Terroir design remains driven by overarching ideas that result from the collective conversation and that these ideas are held as primary, the role of various forms of digital modelling can work alongside traditional modes and can play a part in working up the idea.

In a project for a New National Library in Prague, ideas began through gathering a comprehensive and wide ranging body of information about the project. One of the first visualisations of the project was an abstract speculative physical model that I constructed in response to an idea about how the building could be an articulation of a violent landscape rupture. This idea was based on the team’s assumption that there needed to be a visual and circulation link to the existing Prague Castle (Figure 51).
The above concept model was created and photographed by myself in the early stage of design in the Prague Library project.

This physical model was complemented with a digital model in which it was possible to work with a larger and more accurate context. Through the digital model, it could be seen that the fall of the land and the circulation patterns through it differed from our initial readings. The previous idea was thereby built upon a somewhat distorted and contrived understanding of the landscape and a debate ensued (Figure 52).

In Terroir, particularly in response to many people’s opinions, the firm often works through ideas and models to look for the best outcome. In the Prague project, the physical and digital models were integrated into the conversation to assist at points of crisis. Resulting from differing readings of the site, a contrary idea was put forth to build upon the site’s immediate context, a park with a smooth velvet character. Iterations of both of the ideas regarding the rupture and regarding the smooth velvet were digitally and physically modelled and compared. Ideas about mysterious cases rupturing from below the park, to house the archive section of the library, were added to the mix. In the Prague competition, the final design for Prague was
critically selected from this pool of many ideas and models. The project’s final idea intertwined this mix resulting in rupturing cases shielded under a velvety roof (Figure 53).

Figure 53: Models Prague Library Competition
I created the above visualisations (digitally rendered model) during the early stages of design in the Prague Library project

As the firm continue to integrate digital media into the design process in the early stages, it is becoming more necessary to complement those digital media with equally sophisticated physical modelling techniques. The idea of the velvet parkland was modelled in a digital media simulation by locating control points across the site, applying a surface to those points, and then modifying the smoothness and fall of that simulated surface with the computer. Due to the many controlling factors and the laborious nature of the task, the digital media simulation seemed to suppress the potential of the idea. On viewing the digital media iterations, the design team was not convinced that we were gaining any understanding into how such a material may want to operate. At this point physical models were used to investigate the operation of actual velvet material. These explorations were much more convincing and the knowledge was taken back into constructing the digital model (Figure 54).

Figure 54: Models Prague Library Competition
I created the above visualisations (photographed model) during the early stages of design in the Prague Library project
In Terroir, where designing occurs during an email conversation, representations of the digital models sit alongside photos of physical models. The firm fully integrates the traditional craft and digital modelling methods. In Terroir today the term model is used abundantly and ambiguously to describe physical and computational explorations. The final image of Prague was modelled in the computer, rendered and then manipulated. It is both a digital model that holds a high level of information and an ambiguous image that presents a strong idea framework but which could go onto be modified within the confines of that idea framework (Figure 55).

Figure 55: Final Image/Model Prague Library Competition
I created the above visualisation (photographed model) for presentation of the Prague Library project.

The Prague competition called for a physical model to be submitted. Having designed the building with an exterior form with the characteristics of smooth velvet in a digital model, we faced the problem of translating that into a physical form. Our first attempt produced an average quality vacuum formed model. Seeing this result, the team looked for other methods (Figure 56).

Figure 56: Presentation Model attempt 1 Prague Library Competition
The above model was created by the design team during the early stages of design in the Prague Library project.
In the Prague project, the Terroir design process includes the working up an idea. A body of work goes into finding and visualising the idea and an equally important body of work goes into communicating and presenting that idea through visualisation. If it is done well, the production of the presentations can become a continuation of the design process in the early stages. With the time constraints of the competition the team agreed to create a Perspex laser cut model (Figure 57). This was not meant to directly mimic the images on the presentation panels, rather by being abstract, the presentation model maintained a sense of a working model. It was meant to maintain a level of ambiguity and thereby reinforce that we were presenting an idea framework upon which the client and Terroir could build on in the future.

Figure 57: Presentation Model Final Prague Library Competition

The above presentation model was created by the design team during the early stages of design in the Prague Library project and photographed by Brett Broadman.

The Outcomes

I aimed to test the suggestion that an equally important and often overlooked device in the early stages of design is the 'working' model and its role in shaping design. To conclude, I believe that I have demonstrated this through my exposé of a variety of digital models in Terroir’s design process and that the exciting thing about a working model is not accuracy and beauty, rather the understanding and discoveries that happen through the process of making.

The visualisations of the models assist the design team to debate and make design decisions. They are not considered a truthful depiction or a mimetic representation of a future building. They are used as a trajectory for posing questions about and around ideas.

Through modelling our own ideas, or a team member’s idea, I can see that a level of interpretation occurs. Only by making the idea, could the Terroir design team see and interact
with them. This interaction can result in unexpected results and this ultimately expanded the potential of the design process in the early stages.

The intention of this study into digital modelling was to investigate the impacts and changes to the design process in the integration of the techniques into Terroir’s designing. The contribution resulting from this integration has been to augment the design process of the office. Before starting this study, the firm engaged discourse, drawing and physical models. By the concluding months of this study, Terroir retains these processes and in addition, the architectural designers integrate digitally generated models as a part of the conversation about project designs.

Project Studies: Conversations (Words) in the Early Stages of the Design Process

As I mentioned in my review of the available literature design is a conversational process. As described Glanville (Glanville 1997:4) designing is a knowledge generating conversational process. A primary aspect of Terroir's collaborative practice is conversation and plays a significant part in the design process (Appendix D FN Mon 27/02/2006). Before we manage to get to a visual illustration in a project in Terroir we begin with a conversation, an informal interchange of thoughts and information through either through a written or spoken manner.

The directors have observed that the multiplicity and the conversational process of the firm influence the representation techniques (Appendix C PP Tue-Fri 2-5/03/2004). The firm acknowledge that the use of the digital email program has supported the significant role that conversation plays in Terroir’s design process. The directors looked to and took advantage of digital media, in this case email software, to allow a distanced and asynchronous conversation to take place. The conversation was based around the primary interest in architecture so the digital media was always considered as a subservient facilitator, it was never the driver of this process.

After several years of participating in the Terroir email design process I understood that the process involves narration and conversation and I suspected that the conversational design process in Terroir was similar to storytelling. The directors used storytelling to each other from very early in their practice as a way of describing things to each other. They also used the techniques as a way of gaining a common understanding. Using the term storytelling however leads to the notion that the design process is merely an application of a narrative to formalise ideas. Terroir denies that the firm’s design process is merely the application of a narrative to
generate form and the suggestion that the process has a narrative objective undermines their complex and critical engagement. The aim of this project study was to test whether communication digital media played a part in the shaping of the intentions in Terroir.

In terms of available literature on this topic Suchman (Suchman 2003:305) has observed that we are attaining more achievable (and useful) objectives in regard to the role of voice in respect to digital media that is, we now recognise and understand that conversational speech is highly personalised and has an intricacy that is not easily translated into written emails. Speech is more than merely words. It has parallel sub-carriers of information and tone of voice is very important (Suchman 2003:305; Grint & Woolgar 1997: Chapter 3). Evidence exists to contest that a more productive metaphor be used than ‘conversation’ to describe our relation with the computational artefacts. Suchman suggests rather that this be termed writing and reading (Suchman 2003:305). These suggestions correlate to the Terroir design process and the use of the digital email program. In Terroir, I will demonstrate that three types of communication occur between designers and the media, conversation, reading and writing.

SIAL has conducted a series of research projects into communication media and ontology (Burrow and More 2005; Burry, Burrow et al. 2005a; Burry, Burrow et al. 2005b; Burrow 2004; Burry and Burry 2004; Burrow, Burry et al. 2003; Burry and Maher 2003; Amor, Burry et al. 2003; Burry, Dunlop et al. 2002). SIAL therefore supported and encouraged my interests in investigating the nature of Terroir’s internet based design process and analysing potential avenues for change and expansion. I will compare Terroir’s email based design process to some of SIAL researcher’s observations.

In this section, I will also investigate the interaction between the digital media and the conversation in Terroir. Recalling my hypothesis for this chapter study, digital media could play an interactive part in the working up of the idea. This not only relates to the integration of digital media into the images and models we create in Terroir but the words that we share over the email software. I suspected that the digital media that supports the activity of design conversation in Terroir may in fact be contributing more than merely a tool to facilitate the task. This section describes a focused look at the role of conversation in the process of design in Terroir. I will discuss how digital communication media has evolved from being merely a pragmatic and supportive tool to facilitate a disparate conversation about architecture to becoming a fundamental tool, and sometimes generative media, in the firm’s design process. I will also present a series of protocols that both support and hinder the conceptualisation of a project.
The Software
There are many types of digital communication media available. Many of the communication
digital media available allow anyone, anywhere, to be able to converse with one another. Terroir
uses Microsoft Outlook™ in their design process, administration and management. Over the
timeframe of my study, I researched other available media as potential expansion or replacement
of this established system. These included WIKI, a website that allows users to add and edit
content that can be cross-linked with hyperlinks and image databases similar to Flickr™, which
were also website based and allow users to add, organise and share images.

Description of the Project
Designs in Terroir are discussed and presented over a digital email program. For this project
study, I studied the directors, team members and my own email archive for the Prague National
Library project, a competition project that I have discussed previously in this chapter. (Figure 58)

Figure 58: Terroir’s email based design process
I have taken this screen snapshot to demonstrate an example of an email used in Terroir’s design process.

The Research Process
I made a series of informal inquires to the design team to gain an insight into the issues and
benefits of this conversational process and the interactivity of the digital email program
(Appendix D FN Fri 06/10/2006; Appendix D FN Mon 27/02/2006).
I found that the biggest concern raised by the staff in relation to the email system was that they believed information was being lost and forgotten (Appendix D Fri 25/08/2006 11:26). They also suggested that the email format was a ‘dead’ system. They suggested that comments were delivered from design team members into each team member’s inbox and it was then up to the individual to manage it and respond if they thought necessary. I observed that the dislocated system meant that information was not shared, when it was assumed that it had been, or that older seemingly useful comments were lost to previous email strands and not utilised for the benefit of project. The staff, twenty employees over two locations, suggested that the email system needed to be reconsidered and re-coordinated to increase time efficiency and reduce frustrations (Appendix D Fri 25/08/2006 11:23; Appendix D Fri 25/08/2006 11:26).

I also discussed the system with the directors (Appendix D FN Fri 06/10/2006; Appendix D FN Mon 27/02/2006). This discussion resulted in quite a different set of views. The directors believed that the current email system was very appropriate for the design conversations particularly because of the ‘heterotopias’ (Appendix D FN Fri 06/10/2006). By heterotopias, they referred to the wide range of architects engaged in the process and the wide range of issues that a designer can include in one emailed message. The directors saw the email process as a live archive. They suggested that the heterotopias allowed a weak intelligence to exist, which was useful for the germination of ideas.

**The Outcomes**

Through analysis of the email archive of the Prague National Library competition project, it could be seen that the digital email program had a series of communicative uses in the process of design. The pragmatic use of the program allowed a designing process to be held over three disparate places. This had continued to evolve over the history of the firm into a communicative process. The following pages present the series of protocols that I gathered through exploring the use of email in Terroir’s design process.

**Protocols and exchanges of information**

Burrow, Burry et al. observed that organisations often establish both clear protocols in order to realise effective communication and non-formalised and highly selective exchanges of information to foster the looser processes of creativity (Burrow, Burry et al 2003:2). Similarly, Terroir’s process presents commonly understood protocols and selective exchanges of information.
Studying the competition project inbox I could initially see that:

- The archive contained 579 received emails coming from the six people in the project team.
- The emails fell under 152 different subject headings
- The design team stored these emails in a chronological order. This chronology depicted the progression of the project.
- I confirmed that the design team did not have stringent management systems for archiving emails in the program, and
- In this design team of six, the emails were commonly separated into two fields, general design issues and administration issues.

Analysis of the Prague archive, other project email archives, informal discussions with Terroir directors (Appendix D FN Fri 06/10/2006; Appendix D FN Mon 27/02/2006) and available digital media including Microsoft Outlook™ and WIKI programs, I added to the above initial observations a series of common protocols and exchanges of information. These include the following:

**Parallel Conversations**

I observed that an email could spark new and separate issues that were discussed until a resolution or end was agreed. As one director suggested in our informal discussion ‘…it is a precise process that is not overt’ (Appendix D FN Fri 06/10/2006). This approach ensures that a certain type of intelligence occurs and means that the potentiality of a design conversation is not confined. As one director observed the design team does not want to restrict the process with too much organisation (Appendix D FN Fri 06/10/2006), which would occur if the team segregated the information into more hierarchical and managed folders. I acknowledge that the team would want to keep the system flat structured and open so as to not ‘thwart the discussion’ (Appendix D FN Fri 06/10/2006).

If one was to look at the email conversations one can see that there is a level of ‘flick back and forth’ on one issue (Appendix D FN Fri 06/10/2006). It can be seen in the email archive that the difficulty that the staff referred to was in response to the layering of information that were within the emails, that is, an email could contain several issues from pragmatics, administration issues, conceptual ideas, precedents, references, or personal conversations. The email was hard to define into categories and ultimately file.
The first protocol therefore is the use of the search facility and the importance of terminology. One good feature of an email or digital communication media is that you have search facilities to filter the layering of information contained in emails. A team member can search by date or title. In Terroir, an email is titled firstly with the project name and given a brief description of the email content. In Terroir, the design team often reviews superseded archived iterations as they can inform new and future work. Establishing a titling system assists in a project allowing the design team to quickly review the main stages of the design process. In Terroir the flexible system of individual team members filing their emails into the two main categories assists the designing process of working up and reviewing the design process.

**Privacy in Conversations**

In Terroir, the directors and team members use emails to hold private conversations. Privacy in Terroir email is achieved by an author selectively filtering email recipients, individual and restricted email archives with password protection. The directors acknowledged that they have separate design conversations to the main design team conversations. One director noted that the beauty of this system is that these private conversations are ‘not explicit’ (Appendix D FN Fri 06/10/2006). Thus, the Terroir email system conversations are hidden and private. In Terroir, the design team is aware of private emails sent between individual staff regarding various topics and are expected to accept the social and commercial reality of the private conversations taking place.

In Terroir a complete connection between the design team is not required or desired (Appendix D FN Mon 27/02/2006). Terroir’s discreet approach contrast the understanding that a design team would use digital communication system to open or shared design space and allow any member of the team, anywhere, to be able to access and converse with one another. This contrasting understanding of digital communication system to the one used in Terroir has been employed successfully in collaborative academic projects to communicate assignments, share information over distant locations, and disseminate material (Bradford, Cheng et al. 1994; Burry, Burrow et al. 2005:6).

The directors mentioned in my informal discussion that they use the privacy feature to reduce the varied views on the project proposal, control the design, confirm which direction a design may take and ensure productivity to the development to a design (Appendix D FN Fri 06/10/2006; Appendix D FN Mon 27/02/2006). The directors noted in our informal discussion that in Terroir the digital email program facilitates privacy in design discussions and a
hierarchy in the design team (Appendix D FN Fri 06/10/2006; Appendix D FN Mon 27/02/2006)

In Terroir the communicative benefit from the email based design process using privacy features continues to facilitate and control a conversation about architectural design across multiple locations and between multiple participants. The Terroir process establishes and reinforces hierarchy in the design team as the directors can control who is involved in conversation. For Terroir the hierarchy has its benefits in controlling design, where closing down conversations is seen to assist the design team in delivering projects in a timeframe.

**Reading, Writing and Conversations**

Through experience in the design process at Terroir, I am aware that the major aspect of Terroir’s email based design process is reading. The first stage of a design involves reading and researching aspects of a project and brief. Keywords are used to search internet and available literature *(Figure 59)*.

![RE-BRANDING](image)

**RE-BRANDING**

**FRESH & CLEAN**

**WARM, WELCOMING & INVITING**

**VISIBILITY & EXPOSURE**

**MAITLAND CITY BOWLING CLUB**

**COMMUNITY SPIRIT**

**FAMILY FRIENDLY**

**UNIQUE**

**CULTURAL CHANGE**

**POSITIVE EXCITING WORKPLACE**

*Figure 59: Maitland Bowling Club keywords used to read and research into a project*

The above image was created by a design team member in the early stages of design in the Maitland City Bowling Club as detailed in Appendix I.

In addition to reading is the gathering of a large body of information surrounding a design at the early stages over the internet. In Terroir, email has assisted in this process. The email program
facilitates the designer in distilling and sharing new information sourced from books, internet and information stored in past email databases also forms a rich resource and back-catalogue of information. Stored email databases also present challenges for the firm and/or technology manager.

As I have managed Terroir’s technology since 2003 I am aware of the issues in this approach to design. There is an ongoing need to expand hard drive capacities, increase bandwidth and ensure that email archives that are accessible from any international location. Sending images across the email result in large email archives. Through my review of the archive files sizes in Terroir, it is clear who holds designer roles in the practice as these employees have the largest archives. The design team at Terroir have the option of deleting the old versions from the archives however this restriction means that the useful resource and back-catalogue of information is unavailable. Thus, the firm continues to mediate the infrastructural limitation, such as physical Terroir server hard-drive size, older systems near the Hobart office and limitations on bandwidth.

Added to the aspects of reading in the Terroir process are written conversations which allow a team of designers to discuss design over remote locations and disparate times and then distilled that gathered information into a design argument (Figure 60).

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**Imaginary Topography**

Perhaps existential space as noted in the 15.07 email deserves more leash also

- Library as an idea, as a collection
- The nature of an archive, clay tablets etc
- Prague figureground analysis
- Materiality of Prague (copper, cobbles etc)
- The google factor
- Seattle Library as the current exemplar of the type
- The nature of cataloguing
- The site analysis – complex walk to castle versus flat plane of the park
- Winter garden as used in these climates as an orientation place etc
- The Prague coffee house as zone of interaction and philosophy etc and as the **public room**
- Kafka as emblematic of Prague literary world, also a café 
- The whole theatrical nature of the café
- The brief – a core archive being replenished and with large support facilities
- The mapping of Prague’s public rooms as a way of understanding where this sits
- The whole library, book, paper, parchment, bark, peeling analogy
- Prague as the bellybutton or centre of Europe
- The transparency in the painting as noted by sarah on her email 13.07.06
- The smooth transition (velvet revolution) and the **czech** complexity that sits behind this smoothness
- Czech cubism and the note that this can segue into transparency
- The monumental and decadence/opulence

*Figure 60: A distilled list of ideas gathered from design reading and conversations.*

This list was gathered by a director in Terroir and shared over the email system during the Prague National Library competition.
From the commencement of Terroir, conversation both verbal and written played a significant part of the design process, which are then captured and distilled in project reports. For example in the Prague National Library competition, the report took the typical form of a list of ideas developed through the extended discursive process, which in this case took 6 weeks. The project’s ideas began through gathering a comprehensive and wide-ranging body of information about the project over Terroir’s standard email based design process (Appendix L FN Fri 03/11/2006A).

From these design conversations held over the email system the information sourced from the internet or in back-catalogues is distilled into a series of key headings with detailed texts and images. The distillation process provides a trajectory for the formation of a common Terroir opinion and offers ways into the formalisation of the project. As I mentioned in my explanation of Terroir’s practices in Chapter 2 the directors have attempted to explain the firm’s process of design.

![Diagram of the Design Process](image)

**Figure 61: Terroir’s diagram of the design process**

Richard Blythe, director at Terroir has used this diagram in a PowerPoint lecture, as detailed in Appendix C. The diagram describes how ideas can expand and become multifaceted over time and how, in Terroir, the design team selects and coordinates from these numerous ideas to refine and coalesce a single project’s proposition. (Appendix C PP Fri-Sat 21-22/10/2005 Slide 8/51)
Discourse is used in debate to result in, what I call in this thesis, ‘ideas’ about and around the specific architectural projects. The ideas both expand and coalesce over the timeframe of the project. ‘Constellations’ of problems, questions and people emerge and Terroir’s process ‘exhausts itself though the articulation of many possibilities’ (Balmforth, Benjamin et al. 2007:112-113).

**Metaphors in Conversations**

Because of the multiplicities, storytelling has become a rich part of the design process, the directors using storytelling to each other from very early in their practice as a way of describing things to each other. They also used the techniques as a way of gaining a common understanding. Today this still occurs.

In Burry, Burrow et al’s examination of email archives, they found that a design team might use evocative metaphorical terms (Burry, Burrow et al.2005:2). Burry, Burrow et al also observed that once metaphors were created in an email archive they played a meaningful role in fostering the collective imagination, and reappeared and altered throughout the design process (Burry, Burrow et al.2005:2). Similarly, Terroir’s design process features metaphors. In Terroir, metaphors play a significant role in coalescing the team’s understanding of a design’s proposition and/or can be disruptive in the advancement of a design.

A reoccurring aspect in the firm’s discursive process is the metaphor. In a recent project, the metaphor of ‘velvet carpet’ was used to capture an idea about how we saw the project’s site. Another metaphor in the same project emerged late one night at a point when the team was exhausted and the generation of ideas was faltering. A comment by a director, who had just been reading Kafka’s *Metamorphosis*, was that one aspect of the project’s brief, for a precious library archive book collection, should be protected within cases that had the quality of cockroach eggs, which had emerged from the underground. The abstract and playfulness of this metaphor resumed the enthusiasm of the design team and re-launched the project’s design (Appendix I. Mon 07/08/2006 22:29; Appendix I. Mon 07/08/2006 22:30).

Metaphors can also confuse the formation of a project and a designer needs to learn how to filter the ideas and find the best way to formalise them. In the recent project where a metaphor of a ‘sausage’ was used I found that the team was trying to achieve too many ideas through a singular element. This conflict was resolved by looking more critically at the number of ideas against the formal imagery and isolating the more prominent idea. In this case, images of the
form were sketched over. One single idea was sketched at a time, the collection of options was then compared, and the preferred version continued.

From my experience in Terroir, these visual metaphors are used as a starting point for both the conceptual idea and its formalisation. In terms of formalisation, we often simply take their visual counterpart as a trajectory for generating a form and visualisation to critique. After an agreement is reached, the metaphor is readily retained as the description of that part of the project. A level of artlessness is attached to these metaphors as, when they are productive in formalising a proposal their meaning and formality remains at a surface level and can be sacrificed or altered to assist in obtaining a cohesive design proposition. That is the firm does not use singular metaphors but rather uses multiple metaphors of which many may be simultaneously operating in the project at any one time. The result then, is not projects that ‘represent’ a particular metaphor but rather which exist as ‘buildings’ that have been informed, along the way, by a range of metaphors.

The use of metaphors is not always effectual and can lead to misunderstanding and stifle the development of a project. In a recent project, a metaphor of a ‘sausage’ was used to explain a structural element. The resulting formal responses shared and developed through an email process that included visualisations of models resulted in a strangled form. It could be seen on reflection of this outcome that the metaphor was not itself aesthetically inspiring and as such the metaphor needing to be reassessed. The confusion in the project highlighted that terminology is influential in a discourse based design process and that the design team need to acknowledge the impact of interpretations as metaphors can be misinterpreted.

Using metaphors in email and in design can inevitably lead to misinterpretation. Confusion resulting from metaphors can be avoided through experience and be manipulated for a productive use through reflection and making visualisations with digital and conventional media. This suggests that visualisation of the metaphors augments its communication across an email based design process. The influential aspects of terminology and interpretation suggest that digital communication media can foster aspects of design process in the early stages.

**Summation**

The aim of this project study was to test whether communication digital media played an interactive part in the shaping of the intentions in Terroir. A primary aspect of Terroir’s collaborative practice is conversation and plays a significant part in the design process
I found that the general staff who use the email communication system for developing and documenting designs in Terroir saw it as ‘dead’ and its use was resulting in lost information. However, the directors who use the system for designing see the email communication system as ‘live’ as a wide range of architects could be engaged in the design process and a wide range of issues can be included in one emailed message. I detailed a series of protocols that are in place at Terroir to assist in avoidable frustrations such as titling emails and understanding that terminology and interpretation is influential in a discourse based design process. Reflecting on this project study, I believe that the email program itself facilitates designing and generally acts as a tool rather than generative media. However, the opportunity in heterotopias and its role as an archive of information can assist in the creative activity of re-organisation and making new connections between ideas (Proctor 2005:59) and influence unexpected results. These characteristics suggest that using the email program in Terroir does contribute a level of interactive advantages in the early stages of design and plays a part in the shaping of the intentions in Terroir.

Concluding Remarks and Observations

In response to the positive outcomes described in Chapter 6 of successfully integrating animation digital media into the generation of Terroir design, I then focused more closely on how we design at Terroir. In this chapter I have addressed various suggestions as to how digital media can be advantageous in designing, investigated meshing conventional media with the new digital media (Benjamin 2004:54; Chen 2007:582) and investigated how digital media fosters design, which is understood as a conversation, and concluded the chapter with an analysis.

Through analysis of the designing process, I demonstrated roles of visualisations and a variety of modelling. Through analysis of my own role in the practice, I reinforced that generatively identifying ideas, searching for solutions, making design proposals, iteratively testing, and retesting them is one part of the designer’s practice. Added to these generative aspects is the need to communicate the results through visualisations and to a design team through communicative representations (Proctor 2005:2; Appendix I Tue 25/10/2005 11:09; Appendix I Thu 12/01/2006 10:22).

Through the project studies presented in this chapter, I was able to see that project designs result from a far wide ranging context of interests affected by many internal factors that are distilled into a ethically and commonly agreed ideas and influences (Benjamin 2006:81; Cuff
I detailed a list of protocols, selective exchanges of information (Burrow, Burry et al 2003:2) and detailed how communication software can play a role in Terroir's conversational design process through interpretation and accessibility. In Terroir, I believe that design unfolds through an interactive process that accommodates a building up of design intelligence or living bodies of knowledge, through the integration of a hybridity of digital media alongside conventional media used in heuristic processes resulting in an increasingly complex layering of technical support.

In terms of interactivity and integrating digital media I became aware, through these project studies collectively, that the designer can apply digital media in a ways that they are interactive, understood as operative and play a role in shaping our intentions. Analysing the design process, I realise that interactivity is important between tools, designer and the design team. Thereby, whilst Terroir design remains driven by overarching ideas that result from collective conversation and that these overarching ideas are held as primary, there is an interaction where digital media takes many generative forms that are not merely matters of computation (Binkley 1997:112,114) and play a part in working up the idea. To foster the positives gained through integrating a variety of media, I believe that a balance (Lynch 1999:c30 in Steele 2001:13; Postman 1993:xii) between design thinking and making with digital media is needed so that the design process will continue to evolve, particularly in a shared relationship where the designer not only integrates new technologies but their role is also changed by their integration. I will explore this speculation further in the next chapter.

By adding digital media to my design process and becoming familiar with its varied applications, I have begun to address my initial hypotheses that unquestioningly introducing conventional or ambitiously sophisticated sets of digital media to traditional modes of design practice may inadvertently hinder the design ideology of that practice. As I have discussed in detail in this chapter, there can be many positive opportunities in gaining intelligence through experimentation and through integrating digital media in the early stages of design. In the next chapter, I will review the integration of digital media into Terroir's design process collectively and present a series of interpretations.
CHAPTER 8 INTEGRATING DIGITAL MEDIA

The previous chapters 5-7, demonstrated and analysed the integration of digital media through a number of project studies that I have participated in and observed during the timeframe of my research. In Chapter 8, I will present overarching interpretations, reflections and summaries of my experiences in integrating digital media into the early stages of design. The interpretations, given in this chapter, will result from a collective comparison of my project work and participation-observer role in Terroir.

Firstly this chapter considers a list of available digital media for the early stages of architectural design. I will then discuss the influences and restrictions I have found in integrating digital media into the early stages of the design process. I will reconsider these influences and then discuss the proceedings of the ‘Terroir Hobart Workshop’ I held at Terroir Hobart office location, which aimed to review the integration of digital media into Terroir design practice and the changes that had occurred in Terroir’s practice.

The conclusion presents the proceedings of an informal discussion held at Terroir on the 22nd-23rd May 2007, which reflects more generally on the integration of digital media into Terroir. I will discuss the use of digitally supportive design techniques, at the right time (von Fange 1959:5) and how I believe an increased layering of technical support can be positive and achieved in architectural design practice, to minimise people’s ‘general fear of change’, as found by Zajonc in his 1968 research into creativity (Sternberg 1995:20), through an ‘organic uptake’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006) of digital media.

Digital Media in the Early Stages of the Design Process

In this section, I analyse the implications of integrating digital media in practice through a Media Table that analyses a sample of available digital media and the proceedings of the Terroir Hobart Workshop held with a director and the Hobart office employees on the 22nd-23rd May 2007 in the Terroir Hobart office at the end of the study timeframe. The aim of the Terroir Hobart Workshop was to review the integration of digital media into Terroir design practice and the changes that had occurred. In the Terroir Hobart workshop, I comprehensively presented examples of integrating digital media within architectural projects through three main phases of
the architectural process: ideation (design process in the early stages), design development and documentation. The session was recorded and transcribed and I presented key points back to Terroir’s director and associate team. Feedback from the directors and staff were recorded and transcribed (Appendix E FN Tue 17/07/2006-Wed 18/07/2006; Appendix E FN Thu 26/10/2006).

Recalling my research design, the Media Table, the Terroir Hobart workshop and design process of Terroir discussed in this section is not a sample that is used to generalise. Instead, these three sources of data are used as a way of investigating research hypothesis and testing them in Terroir. I am not moving from the Terroir examples as the sample firm to make a statement regarding the larger architectural design population and argue that the findings in Terroir are mirrored in the larger architectural industry context. Rather the examples will assist me in interpreting the implications of the hypothesis.

**Categorisation of Available Digital Media**

In the following pages, I present a sample of digital media available for architectural design and organise the media into a media table. I compare digital media in a table format to examine and address my initial concern that unquestioningly introducing conventional or ambitiously sophisticated sets of digital media to traditional modes of design practice can inadvertently hinder the design ideology of that practice. At worst, the unthinking application could thwart that practice from realising its aims. The first aim of the media table is to record a multitude of digital media that could be used by architectural designers and that have relevance in architectural studios. The second aim is to categorise the digital media against design activities. After analysis of the available media and reflection upon the integration of digital media in Terroir, I categorise the different digital media into the three main phases of the architectural process: ideation, design development and documentation. The categorisation assists me in understanding how to use available digital media at the ‘right’ time (von Fange 1959:5). The categorisation that I present in the following table has resulted from engaging and familiarising myself, and Terroir as a firm, with digital media.

Current practices in local universities see an increasing uptake of digital media education and facilities for designing, including the University of Sydney, The University of Technology Sydney and RMIT University. Thus, I have considered local universities as a source and benchmark to determine what is considered currently available and worthwhile digital media for architectural design in firm located in Sydney, Australia.
In reviewing local Australian university facilities and other available publications, I found that there is a variety of ways to categorise digital media. A local university, The University of Technology Sydney list a range of categorises including drafting, presentation and graphic media, modelling, communication software, high-end animation, generative and interactive media (UTS 2007). Another local university, The University of Sydney list a range of digital software for the architectural designs (USYD 2008) and SIAL offers similar media to these two Sydney examples (RMIT University 2006). In terms of researchers, Mitchell and McCullough have suggested that digital media can fall under a variety of categories from one-dimensional to multi-dimensional.

<table>
<thead>
<tr>
<th>one-dimensional</th>
<th>words, text and sounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>two-dimensional</td>
<td>images, drafted lines and maps</td>
</tr>
<tr>
<td>three-dimensional</td>
<td>lines in space, surfaces and assemblies of solids</td>
</tr>
<tr>
<td>multi-dimensional</td>
<td>motion models, animation, hyper-media, databases and virtual studios</td>
</tr>
</tbody>
</table>

Figure 62: The different digital media categories
I have created this figure based on Mitchell and McCullough’s categorisation of digital media (Mitchell and McCullough 1991:ii-vii).

The following media table presents a sample of available software, that either I have used in this study and/or is commonly available to architectural practice (Liu 2003:7) and at universities (USYD 2008). I have made an initial categorisation of the different media under the different phases of a design process from ideation, which as I established in Chapter 7, includes aspects of communication, visualisation and representation, design development, fabrication to documentation. Discussion regarding appropriateness, the Terroir Hobart workshop and speculations for the future follows the media table.
## MEDIA TABLE 1

**List of Available Media**

<table>
<thead>
<tr>
<th>SOFTWARE</th>
<th>HARDWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AVAILABLE MEDIA (USYD)</strong></td>
<td><strong>USED IN THIS STUDY</strong></td>
</tr>
<tr>
<td>Adobe Creative Suite 2.3 Premium™</td>
<td>Adobe Creative Suite 2.3 Premium™</td>
</tr>
<tr>
<td>Macromedia Studio™ 8</td>
<td>Macromedia Studio™ 8</td>
</tr>
<tr>
<td>ArchiCAD™ 10</td>
<td></td>
</tr>
<tr>
<td>Artlantis™</td>
<td></td>
</tr>
<tr>
<td>AudioScout™</td>
<td></td>
</tr>
<tr>
<td>3D Studio Max™ 9</td>
<td>3D Studio Max™ 9</td>
</tr>
<tr>
<td>AutoCAD™</td>
<td>AutoCAD™</td>
</tr>
<tr>
<td>Architectural Desktop™</td>
<td>Architectural Desktop™</td>
</tr>
<tr>
<td>Next</td>
<td>Next</td>
</tr>
<tr>
<td>Maya™ 8.5</td>
<td>Maya™ 8.5</td>
</tr>
<tr>
<td>Bentley Microstation™</td>
<td>Bentley Microstation™ + Generative Components™</td>
</tr>
<tr>
<td>v8+Triforma™ + Generative Components™</td>
<td></td>
</tr>
<tr>
<td>boujou 4™</td>
<td></td>
</tr>
<tr>
<td>boujou bullet 2™</td>
<td></td>
</tr>
<tr>
<td>Brazil 1.2™ (render plug in for 3DS and VIZ)</td>
<td></td>
</tr>
<tr>
<td>CATIA™ V5</td>
<td>CATIA™ V5</td>
</tr>
<tr>
<td>Digital Project™</td>
<td>Digital Project™</td>
</tr>
<tr>
<td>Endnote X™</td>
<td>Endnote X™</td>
</tr>
<tr>
<td>Final Cut Studio 5.1™</td>
<td></td>
</tr>
<tr>
<td>Form.Z 6.1™</td>
<td></td>
</tr>
<tr>
<td>Google Earth Pro™ Mac+Windows Google Earth Pro™ Windows</td>
<td></td>
</tr>
<tr>
<td>Google SketchUp Pro 6.0™</td>
<td>Google SketchUp™</td>
</tr>
<tr>
<td>Jitter 1.6.2™</td>
<td></td>
</tr>
<tr>
<td>Jitter 1.6.2™</td>
<td></td>
</tr>
<tr>
<td>Lamina™</td>
<td>Laser Cutter</td>
</tr>
<tr>
<td>Matlab R14™ + Neural Network &amp; Fuzzy Logic toolboxes</td>
<td></td>
</tr>
<tr>
<td>Max/MSP 4.6.2™</td>
<td></td>
</tr>
<tr>
<td>Microsoft Office™</td>
<td>Microsoft Office™</td>
</tr>
<tr>
<td>Microsoft Visual Studio .NET™ 2005 incl VB and C++</td>
<td></td>
</tr>
<tr>
<td>Multiframe4D™</td>
<td></td>
</tr>
<tr>
<td>Steel Designer™ &amp; Section Maker™</td>
<td></td>
</tr>
<tr>
<td>ProTools LE 7.3™</td>
<td></td>
</tr>
<tr>
<td>Rhino 4.0™</td>
<td>Rhino 4.0™</td>
</tr>
<tr>
<td>Shake 4.1™</td>
<td></td>
</tr>
<tr>
<td>SOFTIMAGE</td>
<td>Xsi™ 61™ Advanced</td>
</tr>
<tr>
<td>VectorWorks™ 12.5.1 Designer + RenderWorks™ 12</td>
<td></td>
</tr>
<tr>
<td>VectorWorks™ Network 50 Dongle</td>
<td></td>
</tr>
<tr>
<td>Vdress 4™</td>
<td></td>
</tr>
<tr>
<td>WIKI / Blogs</td>
<td></td>
</tr>
<tr>
<td>WinZip 11.0™</td>
<td>WinZip 11.0™</td>
</tr>
</tbody>
</table>

*Figure 6.3: Media Table 1 Categorisation*

(UTS 2007; USYD 2008; Liu 2003:7) To analyse the opportunities and appropriateness of digital media for the early stages experiences this table lists media that is made available at the USYD To verify the relevance of the USYD examples I have compared the suggestions regarding digital media availability made by UTS and use in architectural practice made by Liu. I have also listed the digital media that I have used in my experiences in Terroir.
### MEDIAN TABLE 2

Categorisation of Available Digital Media

<table>
<thead>
<tr>
<th>Categories</th>
<th>Stage of Process</th>
<th>Type of Activity</th>
<th>Software: Specific Uses</th>
<th>Software: Multiple Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation</td>
<td>Ideation / Development</td>
<td>Visualisations Modelling</td>
<td>Google, SketchUp, 3d Scanner</td>
<td>AutoCAD™, Rhino 4.0™, Maya™ 8.5, VectorWorks™</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Modelling</td>
<td>boujou, bullet 2, Final Cut Studio 5.1</td>
<td>3d Studio Max™, Rhino 4.0™, Maya™ 8.5, VectorWorks™</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High end</td>
<td>Matlab R14 + Neural Network &amp; Fuzzy Logic toolboxes, Visual Studio .NET 2005 incl VB and C++, AudioSculpt, ProTools LE 7.3</td>
<td>Macromedia Flash™, Macromedia Flash™, Maya™ 8.5, VectorWorks™</td>
</tr>
<tr>
<td></td>
<td></td>
<td>animations</td>
<td>Adobe Creative Suite™ Brazil 1.2™ (render plug), Shake 4.1™, Large Format Printer, 3d Colour Printer</td>
<td>VectorWorks™, Bentley Generative Components™</td>
</tr>
<tr>
<td>Development / Documentation</td>
<td></td>
<td>Generative Media</td>
<td>Microsoft Visual Studio .NET 2005 incl VB and C++, Adobe Creative Suite™ Brazil 1.2™ (render plug), Shake 4.1™, Large Format Printer, 3d Colour Printer</td>
<td>VectorWorks™, Bentley Generative Components™</td>
</tr>
<tr>
<td>Documentation</td>
<td></td>
<td>Sound &amp; Interactive</td>
<td>Microsoft Visual Studio .NET 2005 incl VB and C++, Adobe Creative Suite™ Brazil 1.2™ (render plug), Shake 4.1™, Large Format Printer, 3d Colour Printer</td>
<td>VectorWorks™, Bentley Generative Components™</td>
</tr>
</tbody>
</table>

Figure 64: Media Table 2 Categorisation

(USYD 2008; UTS 2007; Liu 2003:7) To analyse the opportunities and appropriateness of digital media for the early stages experiences this table lists and categorises digital media that is made available at USYD to reflect experience in Terroir. To verify the relevance of the USYD examples I have compared the suggestions regarding digital media availability made by UTS and use in architectural practice made by Liu.
In the following pages are outcomes and interpretations concerning the categorisation of digital media into the early stages of design in practice, which emerged from analysing the sample of available digital media in the media table.

Media table 1 (Figure 63) presented a list of possible applications and indicated the ones that I have used in Terroir. The categorisation of the same digital media in media table 2 (Figure 64), aimed to address my initial concern that unquestioningly introducing conventional or ambitiously sophisticated sets of digital media to traditional modes of design practice can inadvertently hinder the design ideology of that practice by organising the media. The media table 2 (Figure 64) offers, in a visual format, at which stage a variety of media may be more or less appropriate for different design activities, from verbally conversing, creating models, imagery to fabricating models and documenting design.

After adding digital design activities and comparing available digital media in the media tables I can begin to address my initial concern that unquestioningly introducing conventional or ambitiously sophisticated sets of digital media to traditional modes of design practice and established design practices can inadvertently hinder the design ideology of that practice. I can address this concern by avoiding applying digital media that is more suited to a development or documentation activity, which may have more matured explicit parameters, components and relationships. I can avoid applying digital media onto an ideation (design process in the early stages) activity, which is ambiguous in its idea and form. I understand that I can integrate any of the digital media that I have detailed in the media tables, however in doing so the exercise may be unsuccessful, not immediately useful or a challenge that will need to be absorbed into the timing and staging of the design process. Because of this analysis I understand that different types of digital media exist that are more appropriate for differing stages.

Organising media into ordered categories, such as in media table 2 and aligning certain design activities (Figure 64) raises a concern that the categorisation could be read as fixed (Mitchell 1993:11). The categorisation could impede exploration of new digital media or discourage unorthodox uses of digital media in the design process by establishing standardisations (Abel 1997:6-7). I have demonstrated in the project studies presented throughout Chapters 5-7 that designing is rarely recurring or linear (Lawson 1982:72) and older design work often needs to be reassessed (for example Chapter 6 Hobart Waterfront Project). Based on successful integration of digital media in project studies, such as the unorthodox application of tools in the Hobart Waterfront, I believe that new tools will present themselves through their possibly unorthodox applications. This possibility of new tools arising suggests the need for a customised tool set as
necessary adjuncts to any particular adoption of some of the otherwise attractive new digitally supportive media. I believe new tools themselves may continue to suggest themselves as they are developed, for example, once an e-mail system is absorbed into the office, its deficiencies only become apparent under disciplined critical scrutiny. Thus, the media table 2 (Figure 64) drawn up here should be considered as transient, changeable, in progress and a starting point for assessing future tools. The media table 2 suggests the importance of continuing to stay abreast of available literature and available new digital media for the design process. It also provides important evidence of the range of possible functions of digital media within contemporary architecture.

I found at a recent Terroir director and associate team meeting held on the 25th July 2007, the categorisations, their visualisation in the media table 2 (Figure 64), and their assessment against current staff and skill sets, can assist a team. In this meeting, we were able to recognise collectively the role that various digital media can play across the design process and assist in identifying strengths and weaknesses in the skill sets of an office.

An insight gained from the media table 2 (Figure 64) is that some digital media, developed for architecture or for other industries, can be advantageous in a specialised way for specific design exercises in the early stages. Other digital media can be advantageous in a generalised way across the entire architectural design process from early design to documentation, as their functions facilitate activities occurring in various stages of the design process. The generalised techniques suggest that there are commonalities in how architectural teams approach the creative process. However, within a firm the approach to using digital media is inevitably highly dependant on roles within the firm, specifically relates to an individualised role, and both informs and is informed by the make-up of the design team. The differences of use of digital media suggest that customised digital media applications are necessary adjuncts to off the shelf techniques.

In putting together the media table 2 (Figure 64) and considering the range of media in use at Terroir, I can see that in this research study I have only used a small sample of what is available with existing and emerging media. At the start of this research, I had expectations that I would be able to test a greater variety of tools than what I have indicated in the media table 1 (Figure 63). The reasons have been mentioned in the project studies that I have already presented, for example time limitations. In the following section, I will reconsider the influences, draw conclusions concerning integrating digital media in the early stages of design that cross-reference and compare my project studies and draw from across the whole range of work that I encountered.
The Influences on Integrating Digital Media in the Early Stages

Influences affecting the integration of digital media in the early stages of design include inappropriate application, the differing roles of an architect and circumstance. I also found more pragmatic reasons such as limited time, out of control of the author’s control, investigating in more detail the available software in the firm and finding suitable ‘plugins’ to the existing programs of the firm. This section will discuss in more detail these limitations and opportunities concerning integrating digital media.

Time proved to be a limitation to the integration of digital media in the early stages. In some circumstances, the pressure of the realities of practice and having to deliver design on time restricted the exploration of a digital media. For example, this limitation occurred in the process of integrating CATIA™. I was required to deliver a project design within a timeframe. The time limitation was part of the reason why the project study was dropped. The issue of time and pressing deadlines suggests that explicit strategies could assist in ensuring the ongoing integration of digital media. Analysis of my practice fieldwork suggests that these strategies could include employing an agent provocateur to work in parallel to a design team to test digital media. The establishment of time restrictions and clarifying the priority of design tasks can allow ‘confined design exercises’ or contained experimentation into new or existing media. Due to containment, the explorations can be subsumed within the period of a project’s design process, without necessarily hindering its development.

I have demonstrated in the project studies in Chapters 5-7, that the early stages of design commonly engages conversation and visualisations in a process that is iterative, flexible and is often produced through quickly accessible and productive digital media. When timing is a major factor of a design, in Terroir the design team now knows to have a conversation prior to the commencement of the project about the extent of experimentation into new tools in a project and the extent of representations that the design team generate for a project.

Digital technologies were found to be ‘tools’ (Glanville 1992:213) with certain programmatic qualities that conflicted with design activities. As I discussed in Chapter 5 the digital technologies, including CATIA™, were too cumbersome and in opposition to the lighter design processes normally used by a practice for the working up of a design. Thus, digital technologies became tools that were restrictive.
A designer’s unfamiliarity with the processes of a tool limited integration. The unfamiliarity limited the ability to appropriately exploit or integrate digital technology as generative or communicative media. Throughout my study, I was aware that my limited knowledge in the tools that I was using might be limiting the possibilities of its integration. As in Chapter 6, the Hobart Waterfront project study I drew assistance from other employees and/or often referred to the available help menus. In addition, as demonstrated in Chapter 6 unfamiliarity with the visual aesthetics resulting from the digital media sometimes distracted the team, resulting in miscommunications and limiting the tool’s uptake.

The project studies that I presented in Chapter 7 were largely positive in terms of integrating digital media into the design process as I sought hybridity and heuristic processes to factor in the multiplicities of architectural design. The hybridity suggests that the designer acquires additional responsibilities of curation and mediation in order to manage the interactivity of design thinking and making that includes the use of digital media.

Integrating digital media within projects in Terroir, I found that a design advances more productively when there is a strong and commonly understood ‘idea’ for a project. For example in Chapter 7 George Street Foyer project, identifying the ideas of bridging and Chinese takeaway boxes provided a basis for assessing digitally generated proposals. A project’s design process can also advance when it is supported by digital visualisations that can explain, comprehensively, the operation of that idea. For example in the George Street Foyer project, a series of three-dimension visualisations assisted the design team by giving them opportunity not merely to judge an image, but to begin to analyse the idea of the project presented within the images.

In terms of practicing in Terroir, the integration of digital media was dependant on integrating appropriate tools at appropriate times and on circumstance. The varying skill sets and the role of architectural designers, which vary from design to project management, can influence uptake. Furthermore, the integration also depends on the surrounding industry. The skills and the drivers of the architectural, engineering and construction industry, can influence whether digital media is useful, or understood, in the practice of design. Informed by the Terroir Hobart workshop, the following pages will discuss the two aspects of appropriateness and circumstances in more detail.

Clarified at the Terroir Hobart workshop held on the 22nd -23rd May 2007, Terroir have realised that the firm does not ‘fear’ an uptake of digital media and has a new appreciation of
integrating digital media. I began this study by applying sophisticated digital media, provocatively and/or ambitiously, into the design process at Terroir. The firm has learnt from my study that a more cautious integration can provide results that are more often advantageous. Through caution, Terroir can ensure that digital media are applied appropriately:

…we are using the appropriate tools at the appropriate times (Appendix E Thu 9/08/2007 16:45)

In my first case study, I provocatively integrated CATIA™ digital media to challenge the media’s typical application and expand Terroir’s design toolset repertoire. I understand now that CATIA™ software is more appropriate for development and documentation. In my second case study, I investigated existing software to Terroir, 3D Studio Max™ animation software, and I aimed to expand Terroir’s design process upon its expected use. This more ‘cautious’ approach resulted in new skills acquired in animation. An additional result was the expansion of the uses of digital media in Terroir, from presentation imagery to generating design visualisations, thus providing new ways for a collaborative team to see a design. I also integrated uncommon animation software, with the help of an assistant, and this uncertain investigation was fitted within available time after the more common design exercises were completed. From the success of the project studies presented in Chapter 6, I continued to take a ‘cautious’ approach expanding existing digital media usage in Terroir into words, drawing and models. This expansion included adding digital montages and other types of imagery used in designing. I have also integrated a few new suites of modelling software, which have very similar functions to the standard AutoCAD™ software of the firm and thus act similar to a ‘plugin’, for example Rhino, to expand the firm’s opportunity to model more complex shapes. I have added digital modelling techniques such as digital laser cutting to assist modelling. The more successful ‘cautious’ approach to integration of digital media reinforces the suggestion that digitisation is an extension of practice, not an alienation. The cautious approach also suggests that the integration of digital media into a firm does not have to be centred only upon sophisticated techniques and visualisations. The integration can act in a number of ways in accepted practices and digital integration can take many forms.

Initially I had expectations that I would be able to test a greater variety of digital media than what I have indicated in the media table. One reason for this narrowing of exploration was due to inappropriate application, another reason for this narrowing is circumstance. The integration of digital media was influenced by the context that surrounded it, that of design practice and the industry. On first assessment, my practice fieldwork may seem simple, conventional and hardly pushing the boundary of what is currently possible with digital media, for example generative designing through mathematics, computation and scripting. Concurrently, the advances in
Terroir designing have been largely visualisations, images and models. To advance visualisations I have extended the firm’s use of commonly used digital media in architectural practice, for example AutoCAD™ and 3D Studio Max™. The integration and the conclusions result from the context of my research. The cautious approach is not because Terroir is merely conservative. My integration of digital media and conclusions that I draw have emerged in response to the reality of my process in Terroir and the reality of the Australian industry that surrounds it.

In Terroir, architects and assistants have diverse roles with differing focuses and deploy varying skill sets. One example of a differing role in the firm is the role of managing the construction of a building. Terroir also have clarified that their primary values are site specificity and the three ingredients of culture, landscape and building (Terroir 2007b). Therefore, the firm is not searching for architectural propositions that are generated from new digitally supportive media techniques. The uses and limitations of digital media are interconnected with this ideology of the firm.

Furthermore, the circumstance of industry influenced the uptake of digital media in my research. Terroir is operating within an industry that retains many traditional processes, for example two-dimensional documentation. Although beyond the parameters of my research, Terroir has often encountered a discrepancy within broader interactions with other industry practices. The consultants and contractors are not operating with the same high end (or even medium end) knowledge about technologies, which Terroir has gained through the process of my study. The differing capacities have hindered or limited the amount of progress that Terroir and I have achieved outside the firm in our dialoguing with third parties.

As Coyne suggested the integration of digital media is enmeshed with the complex constellation that is: ‘the role of the designer is meshed to the technology in a process of design’ (Coyne, McLaughlin et al 1996:5). I have realised a similar conclusion due to context in my research. Whilst I have achieved advancements in the generation of design in Terroir, the circumstances that surround the firm and my daily practice shape the possibilities of what I, or the firm, can do. However, despite the limitations, I have seen that through sustained daily effort, research and reflection the design practices of a firm can evolve and I will discuss one aspect of this evolution in the following section.
Expanding a Designer’s Toolset

My initial research aim was to expand the design processes of Terroir. The project studies I presented in Chapters 5-7 integrated various new digital media and extended the way the firm was using established digital media. The integration has influenced the way the firm practices design (Kvan, Mark et al. 2004:np). By expanding the design toolset, Terroir as a firm has needed to re-orientate workflow. Before the start of this study, a designer in Terroir could have drawn on media such as words, drawings and models in the early stages. After concluding my study, I have expanded the firm’s toolset to include visualisations including three-dimensional modelling. I have not replaced the conventional modes in the early stages. The firm now employs more ways to generate and communicate ideas. The process is more complex for a designer in collaboration. The expanded process is increasingly layered and the expansion requires increased coordination and curation by the designer. Based on similar diagrams presented by Von Wodtke (Von Wodtke 2000:206-207) regarding the organisation of documents in an architect’s design process, the following diagrams present a visual explanation of the expansions that have occurred in Terroir’s toolset (Figure 67).

![Diagram](image_url)

*Figure 65: Traditional Organisation Table depicting Terroir’s design toolset prior to my research*

I have created this diagram to reflect experience in Terroir. The above diagram is based on a similar illustration presented by Von Wodtke (Von Wodtke 2000:206)
Figure 66: Transitional Organisation Table depicting Terroir’s design toolset during my research

I have created this diagram to reflect experience in Terroir. The above diagram is based on a similar illustration presented by Von Wodtke (Von Wodtke 2000:206).

Figure 67: New Paradigm Organisation Table depicting Terroir’s design toolset in the concluding months of my research

I have created this diagram to reflect experience in Terroir. The above diagram is based on a similar illustration presented by Von Wodtke (Von Wodtke 2000:207). I have used Von Wodtke’s example as a basis for these diagrams in my thesis to reinforce that the changes experienced in Terroir have also been speculated upon in available literature.
The preceding three diagrams have visualised the expanded ‘toolset’ of a designer in Terroir. The expansion and the complexity that results in assessing which tools to use in design suggests that new demands on the designer emerge, as to work productively, a designer’s toolset needs to be managed.

**Organic Uptake**

By generating intelligence through concisely articulating existing practices and by combining that with acts of provocation and mediation, the outcome of the Terroir Hobart workshop I held at Terroir suggests that a firm may organically coalesce the uptake of digital media into an established practice without inadvertently hindering the design ideology of that practice.

One criticism I recognised earlier in this thesis, in regard to digital media, was whether the uptake of digital media is restricted by fear of technologies and therefore not progressing very much (Corrigan 2003:86). In a valuable confirmation of Terroir’s support for an expanded design process upon the established practice, the Terroir Hobart workshop attendees agreed that Terroir is not trying, and has not tried, to pioneer new technologies in this study. The firm have preferred rather to focus on the idea, delivering that idea at a reasonable cost and operating within our collaboration of architects, all of who have different roles to play. Terroir have taken the approach that the firm do not need to be revolutionary, redefining the mode of architectural practice and the integration of digital media. As a result, the integration of digital media in my research has been an organic process of increasing the layering of technical support (Appendix E FN Tue 17/07/2006-Wed 18/07/2006). Over time design methods and a designer’s practice evolve and changes. This organic, cautious, culture-centric process has been validated throughout this thesis.

I realised from my research that integration of digital media into design processes could evolve over many years, as the restrictions are not only the application of media but also changing culture and structures of the working environment. Validation of the change resulting from this research study was the following director’s statement made during the Terroir Hobart workshop:

> 'people can invent ways of showing things that it doesn’t matter if you want to do a bit of performance dance to explain something its all about using tools which is what SLAL is using tools and knowing when technology isn’t going to give you that tool. To back away. And that’s probably the best position to be explain that we are not searching for answers solely by technology so what has happened is the
general skill set which once upon a time used to be cardboard has grown as a family. Cardboard models still stay there as a valid toolset – as Sarah will attest, velvet and plasticine, we’ve actually got better at producing the quick and dirty images – internal images to convey design…so what has happened is that skill set is growing exponentially and – I’ve spoken to Sarah about this before – that even if Sarah wasn’t doing ‘SLAL’ that would still grow…” (Appendix E FN Tue 17/07/2006-Wed 18/07/2006)

In regard to the overarching alterations experienced by the firm
‘on a general level…I think the last 12-18 months we have probably – or the past 2 years – we are getting better as a collective and that is lead by Sarah and her ‘SLAL’ stuff, but its also naturally seeping through. In the end that is the optimum for the way we operate’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006)

From reviewing the progressive journey of Terroir through this research, I believe that as the media advances and evolves so will a practice of architecture and ultimately the skill sets of the architects themselves. The change to practice and the uptake of digital media will be a continuing spectrum of looking at the drivers of our architecture, the organisation of the firm and comparing the roles of digital media.

In the Terroir Hobart workshop, the attendees suggested that there is a need to foster individuality through specialist roles, yet maintain connections through generalised skills. The Terroir Hobart workshop attendees agreed that the use and uptake of digital media in practice could be about standardising at a very base level and laying down a strong foundation. At a practice level, in terms of digital media, integration may be about identifying general and powerful software. This standardised software could provide the entire firm with a common platform to undertake architecture, from its design to documentation and give employees a basic platform of tools with which to practice architecture. From the generalised platform of tools, integration of digital media for more specialised roles may then occur. In Terroir, each architect can develop that platform in his or her own way. Integrating digital media into specialised areas, such as the design process in the early stages, requires identifying new or existing media and customising outcomes. The outcomes of adding to a general foundation can be dynamic and diverse variations, which can be advantageous specifically for creativity and the early stages of design.

A key outcome of the Terroir Hobart workshop was the confirmation that in Terroir it is preferred that the entire office has a common understanding of digital media in order to
communicate to one another. The entire office requires a minimum standard toolset and understanding of how to use and communicate with the tools. This notion of a common skill set responds to how the Terroir office practices. In Terroir, the entire firm of employees, situated across the two office locations, takes some part in the conversation about architecture. Thus, there is a need to be able to communicate and train everyone in a common design language. An invaluable insight resulting from the Terroir Hobart workshop was the attendees’ agreement that, as the majority of the firm undertakes tasks for design development stage, the minimum common skill set of employees should match the tasks of the design development stage. In Terroir, in terms of digital media, this basic toolset includes two-dimensional conventional media, words, drafting, models, and the use of three-dimensional modelling and creating renderings for discussion across the email based process. Looking at the skill set of the firm, some staff were identified as ‘lagging behind’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006) in these skills and strategies were put into place for training. Terroir employees agreed to continue to strive for a common skill set, which acknowledges that there is a need to maintain a minimum common language so that the entire firm can communicate about architecture and its intention. The Terroir Hobart workshop attendees agreed that integration is about ‘coming up in a line’ together rather than having gaps in the system (Appendix E FN Tue 17/07/2006-Wed 18/07/2006). Furthermore, to ensure that the uptake continues after the conclusion of this research, Terroir employees noted that ‘we don’t want to be constantly worrying that everyone doesn’t share Rhino or Brazil knowledge’ they will be ‘confident that there is an organic take up’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006). An organic nature to the uptake, as suggested in the Terroir Hobart workshop, refers to the ‘continuous or natural’ (Oxford dictionary 2001:624) character in the development and change occurring.

To achieve an organic uptake in reviewing the process that occurred in Terroir over the period of this study was suggested at the Terroir Hobart workshop:

’someone becomes a specialist, then we have three specialists and then everyone just hovers themselves up to that base level and the knowledge transfer goes on from there’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006)

The knowledge of the ‘enthusiasts’ integrating digital media begins ‘naturally seeping through by osmosis’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006). Most commonly in Terroir, the knowledge transfer occurred through collaboration on larger projects. In these projects ‘one architect might introduce media to a project then, because of the need for communication two or three other architects become users of that media’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006). Therefore, from collaboration an organic uptake occurs through employees talking about digital media and refining its use for a particular Terroir task. This negotiation
again reinforces that the uptake of digital media need not involve the emotions of fear and negativity sometimes ascribed in literature to the application of digital media in architecture (Martens, Koutamanis et al. 2007:524; Sanders 1996:4-5).

The process of digital media uptake thus becomes a cycle (Figure 68). As employees begin to integrate certain media in everyday practice they become more familiar with its use and possible integration into projects. As the demand for its use by managers increase, other employees are trained, acquire skills and a new common skill set is established. By the end of the cycle, the process becomes a matter of ‘surgery’ where adjustments and advancements are made to the skill set of employees lagging behind (Appendix E: FN Tue 17/07/2006-Wed 18/07/2006). The aim of a commonality in a firm’s toolset presupposes that there is a strong common vision in the practice.

![Figure 68](image)

**Figure 68: The integration of digital media and the skill set cycle**

I have created the above diagram to visualise the possible organic cyclic process of integrating digital media into established architectural design practice.

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**Mutuality in the Early Stages of the Architectural Design Process**

Through my collective comparison of my project work and participant observation in Terroir a key outcome emerged. I believe that one of the contributions that I am making through my research is an exposé of the mutual relationship between designer and their digital media. On analysis of all of the outcomes I presented in the past chapters, I have become more aware of a
particular relationship that exists between ourselves as designers and the digital media that we use in the design process. This relationship is mutual; it can be productive and many more positives can result from an interaction with digital media than merely a service to the profession. An architect’s ideas can benefit from generative and communicative engagements with new digitally supportive media, as I demonstrated in Chapters 5-7. This mutual relationship provides an answer to my primary question as the advantage of digital media is not an issue of whether or not to integrate the tools. The issue is more how a designer masters an expanding design process through an approach that includes ideas, conventional media and digital media.

Mutuality defines as having the same specific relationship to each other or refers to an activity that is done by two or more subjects equally (Oxford Dictionary 2001:588). Throughout my research I have searched for an ultimate view to take in regard to integrating digital media. However I can not agree with either of the extremist views that either there is ‘no place’ for digital media, which continues to be aired even as I was researching this thesis in 2007 (Martens, Koutamanis et al. 2007:np19; Sanders 1996:4-5), or that computation can revolutionary improve the process, beyond question and debate (Winner 1986:6 in Steele 2001:13). Drawing conclusions from this study, I now believe that digital media can play a significant role in designing yet they should not actually take centre stage. This conclusion is not a surprising revelation as many have suggested similar resolutions (Lynch 1999:c30 in Steele 2001:13; Negroponte 1995:223; Postman 1993:xii). My contribution to research I have gleaned from this study, through my participant observation postgraduate research, is a detailed exposé of the inexplicit practices of an architect, a demonstration of the mutual relationship between the architectural designer and his/her digital media and the circumstances surrounding a highly judged and carefully evaluated uptake.

In addition to mutuality between architectural designer and their digital media, is a co-evolution occurring between these two parties. From the start of my research, my aim has been to understand not only the implications of the digital media in practice but also the factors that lead to change and innovation in practice. Co-evolution refers to the process by which different kinds of organisms develop from earlier forms in response to one another because of their

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19 Martens, Koutamanis et al used the phrase ‘no place’ in their presentation at the eCADDe 2007 conference. In their paper they argue that the relationship that academia and practice share with CAAD can best be described as ‘ambivalent’. Thus, we see that the idea of digital media as antagonistic to creativity in architectural design still has currency in discussion around practice today. The wider concerns regarding these negative sentiments, which are still being discussed in available literature in 2007, indicate and support the relevance of my thesis. I am not reworking an almost obsolete question, but dealing with issues that are still pertinent.
interaction (Oxford Dictionary 2001:305). Through a co-evolution between designer and the integration of digital media, as I have described in previous chapters, changes occur in a designer’s practice and the use of digital media so that we are not only integrating digital media but also are changed through their integration.

I understand from integrating digital media into architectural design practice, that technologies will continue to advance and evolve and the designer’s engagement with them, in various capacities, will also continue to change and be unavoidable. I demonstrated through my thesis that change can result from ambiguities and unexpected outcomes in creative practice, other contributing architectural designers, and expansion of a designer’s ‘toolset’. The changes can occur organically and continuously to either the designer’s practice or the types of digital media used. These changes suggest a progressive journey where the designer not only integrates digital media, but are also changed through their integration.

In previous Chapters 5-8, I have described many changes to the design processes. In addition, what I have learnt from my research is in the future, as a designer there will be increased demands on my role, as I will be required to balance, curate and mediate the integration of digital media in every day practice. I will be required to integrate digital media and draw on its generative and communicative uses alongside conventional media within a collaborative practice. I will discuss this key outcome in more detail in the next chapter.

From the knowledge and awareness gained through the my project studies, from where I directly mapped digital media onto a project in Chapter 5 to analysing a more cautious integration and the interactivity of tooling and designing in Chapter 7, I have become more aware of the mutual connection between a designer and their tools. I believe that the organic concepts of mutuality and co-evolution are relevant to this study. The concept of mutuality is a useful analogy to address the fears and concerns of whether or not to uptake digital media. Mutuality does not position digital media centre stage nor disregard it completely. A mutual view reinforces that the interaction can be positive. Co-evolution is a useful analogy to explain how we can continue to address change and expand the toolset of an architectural designer. The ‘organisms’, of the designer and their digital media, share a close relationship and the extent of their advantage is achieved through one another. As a result of the knowledge that I have gained through my research, I will now approach design with the more informed understanding that the extent to which it might be advantageous to include digital media in the early stages of design will result from mutuality and co-evolution, which depend on contextual issues including the appropriateness of the digital media and surrounding circumstances.
Concluding Remarks and Observations

In Chapters 5-7, I discussed the integration of digital media through a number of project studies. In Chapter 8, I presented overarching interpretations, reflections and summaries of my experiences in integrating digital media into the early stages of design in Terroir.

Firstly, I considered a list of available digital media for the early stages of architectural design. The *media tables* aimed to address my initial concern that unquestioningly introducing conventional or ambitiously sophisticated sets of digital media to traditional modes of design practice can inadvertently hinder the design ideology of that practice. *Media table 1* presented a list of possible applications and indicated the ones that I have used in Terroir. The *Media table 2* offered, in a visual format, at which stage a variety of media may be more or less appropriate for different design activities, from verbally conversing, creating models, imagery to fabricating models and documenting design.

I then discussed the influences and restrictions I have found in integrating digital media into the early stages. I reconsidered the influences including time, conflicting qualities between tools and design activities, unfamiliarity, context, appropriateness and circumstances.

In response to my initial aim to expand the toolset of the firm I presented a series of diagrams visualising the changes that had occurred to the organisation of documents in Terroir. The diagrams highlighted that new demands emerge for the designer, as to work productively, an expanding designer’s toolset needs to be managed.

Through presenting the proceedings of the Terroir Hobart workshop, I reviewed the integration of digital media into Terroir design practice and the changes that had occurred in Terroir’s practice. I discussed that integration into the toolset of a designer and a firm, such as Terroir, can occur through an ‘organic uptake’ (Appendix E FN Tue 17/07/2006-Wed 18/07/2006) of digital media.

I concluded this chapter with a discussion regarding one of the key outcomes of my research. I have not formed an ultimate or overarching view concerning the integrating digital media. Despite some authors’ and critics’ suggestions of dichotomously opposed paradigms, I do not believe that digital media should take centre stage or be disregarded all together. I have become more aware of a particular relationship that exists between ourselves as designers, and the digital media that we use in the design process. This relationship is mutual and my research suggests
that the designer and their digital media will continue to co-evolve in a mutual relationship, where we not only integrate the technologies, but are also changed through their integration.
CHAPTER 9 PRACTICING DIGITAL DESIGNING

The previous chapters focused on the practical integration of digital media into the early stages of the architectural design practice. An important factor in facilitating this integration is the designer. In this chapter, I explore the implications of integrating the new digital media on the role of the designer, and discuss a deeper philosophical critique into how a designer practices design and a new role in practice. An explanation of Terroir’s organisation is captured in a series of concurrent research studies. Evolutions in design practice are then tracked within the roles of Terroir’s design process. Finally, this thesis describes the characteristics of an emerging new specialised role.

Concurrent Research 1: Office Organisation

Concurrent research was undertaken during 2006 by an external researcher, Martin Kornberger, a Senior Lecturer at the School of Management and the School of Design, University of Technology, Sydney (UTS). The UTS study was commissioned partly by Terroir and funded partly by the UTS, to investigate the nature of creative practice.

Prior to Martin Kornberger’s research, there were no defined roles or responsibilities and no established Terroir benchmark for comparison. Professional architectural industry bodies publish ‘Practice Notes’ to assist directors of companies in the administration and management of their firms. For example, the American Institute of Architects (AIA) has published a useful suite of diagrams to explain the organisations of different architectural offices, including departmentalised, project team or studio structure. Terroir understood that its firm was similar to a studio environment, but had not more rigorously analysed its internal structures, delegated responsibilities or clarified employees under titles.
Figure 69: Departmentalised structured architectural practice.
This diagram is published in the American Institute of Architects practice papers, used to demonstrate departmentalised structured architectural practice (AIA 1998:4).

Figure 70: Studio structured architectural practice.
This diagram is published in the American Institute of Architects practice papers, used to demonstrate studio structured architectural practice (AIA 1998:5).

At an early stage in the UTS research, a workshop was held with the directors on the 1-2 September 2006. An outcome of this workshop was the description of roles within Terroir’s office. A diagram defining the different aspects of practice organisation was drawn up by the directors in conjunction with the UTS researcher. The diagram compared divisions of labour against the stages of the design process. On the diagram, the directors placed the stages of the
architectural process from ideation (or the design process in the early stages) to project management. The names of Terroir employees were placed against the different stages of the architectural process in terms of their most commonly undertaken roles (Figure 71). As a spin-off from the diagram developed by the directors and the interviews undertaken by Martin Kornberger, a number of organisational aspects were clarified, which assisted in my analysis of the processes at Terroir concerning digital media integration.

Figure 71: Staff organisation and skill development occurring in Terroir.

The above diagram is my interpretation of the diagram that was developed by directors at Martin Kornberger’s workshop.

I exchanged data with Martin Kornberger at meetings, interviews and at presentations of his findings. I found the diagram (Figure 3) and outcome of the workshop useful in clarifying the nature and characteristics of Terroir’s organisation. The UTS research became an important cross reference in understanding the organisation of the firm and the design process changes that had occurred in my own study.

What was made visible through the UTS research of the Terroir office employees against the stages of the design process was that generally employees in Terroir were contributing to the design development phase of each project. The majority of staff in Terroir possessed digital
documentation skills and they were advancing towards roles of a Project Architect. The Project Architect role includes responsibilities for contract administration and other legalities and it is a difficult and politically pressured position. The Project Architect commonly engages with the external environment. In addition, a few staff members held 'key' positions, specialising in particular areas of the process and holding higher levels of responsibility. Often, staff working toward a role in the early stages of the design process readily moved to other firms or left Terroir to continue their own research. From the concurrent study, the directors acknowledged that as people moved toward ideation their fallout rate increased. The fallout suggests that ideation roles have a particularly dynamic and volatile trajectory.

While the directors took a managing role in all aspects of the design process, their main focus of management was in the early stages. Alongside the directors, I was the only designer taking a lead role in the early stages of the process—the ideation and concept design stage (Figure 72).

Figure 72: Analysing the diagram developed by directors at Martin Kornberger's workshop.

The above diagram depicts my analysis of the diagram that was developed by directors at Martin Kornberger's workshop.
Resulting from the UTS research, roles in Terroir’s design process including ideation, documentation and management were formalised. In the area of documentation and management, hierarchies were strengthened by the clarification of protocols, responsibilities and divisions of labour. In my area of design ideation the distribution of tasks became increasingly liberal.

The UTS research and the diagram (Figure 72) assisted me in defining the difference in roles of collaboration. Comparing the UTS and AIA research suggested similar office structures, but the relationship shared between the firm’s directors suggested a new diagram to explain the potential of my position in a firm. The designs in the early stages of projects in Terroir are kept closely between the three directors. Team leaders and key employees are accepted into an ‘inner’ design circle shared between the directors on a project-by-project basis. My role engages closely with the creative directors and interacts with the other employees. Depending on the size and nature of the project, the relationship with staff may be directly with project architects or with architectural assistants (Figure 73).

Figure 73: Terroir’s design practice organisation.

I created the above diagram based on the American Institute of Architects diagrams of an architectural studio office organisation (ALA 1998:5). In Terroir the organisation is essentially a studio format with layers of hierarchies from creative directors, key staff to other staff architectural assistants. My role sits alongside the creative directors, and I interact with assistants or other Project Architects.
Analysing the UTS research, there are specialised needs for appropriate media and/or tools for the different roles in practice. The diagram (Figure 5) assisted me to understand that I held a particular position in the collaboration between the creative directors and the majority of the team who develop and document the designs. The diagram correlates to the suggestion and characteristics, discussed in later pages, of an additional role between creative directors and the majority of the office.

**Concurrent Research 2: Heroes and Villains—the Characteristics of the ‘Ideator’ and the ‘Project Architect’ Roles**

Concurrent research was undertaken during 2006 by an external researcher who explored the dynamics of ‘creative openings’ particularly regarding Terroir’s design processes (Balmforth, Benjamin et al. 2007:111). Marcelo Stamm of the University of Tasmania (UTAS), a philosopher who was introduced to the practice, drew on the operation of Terroir in his paper *Topoi of Indeterminacy* (Balmforth, Benjamin et al. 2007:111-150).

Stamm suggested that the history of the design process in Terroir regularly features the dynamics of a dialect as crisis and that the crisis is the ‘acknowledgement of conflicting and antagonistic forces’ (Balmforth, Benjamin et al. 2007:116). These sentiments assisted Terroir directors to understand natures of the roles in their practice. The directors suggested that on any project in Terroir, two main architectural roles, or positions, exist—of an ‘Ideator’ and a ‘Project Architect’. Following Stamm’s idea of conflict and antagonism, Terroir directors identified at an internal Terroir office meeting held on 8 September 2006, that these two positions interplay, through their engagements, as ‘hero’ and ‘villain’, battling and coordinating aesthetics and style with pragmatics and realities. Through discussion at the office meeting, Terroir recognised that the two roles work independently of each other but are simultaneously dependent on each other, and thus the individuals share a sort of duelling co-dependency (Appendix C FN Fri 08/09/2006).

In subsequent Terroir investigations, the positions of ideator and project architect have been formalised into role descriptions (Appendix C FN 11/2006) and examined in a series of projects, including the Maitland City Bowling Club. The formalisations have optimised practice at Terroir. The project architect is understood to manage the pragmatics of projects. On reflection, the characteristics of my ‘Ideator’ role at Terroir revolves around the notions of who designs in the early stages and who guards, protects and speculates the idea of the project.
Through the two concurrent research studies, Terroir was able to understand that two main specialist roles exist within the office, that of ‘Ideator’ and ‘Project Architect’. As a designer in Terroir, I hold an ‘Ideation’ role and work with the directors in a collaborative manner in an ideation process. Ideate or ideation means to imagine, to conceive and/or form ideas. (Australian Concise Dictionary 2004:693). In architectural design, ideation occurs in the design process, but this is not often acknowledged or recognised in the industry body Practice Notes. Ideation is a creative process that balances directed and discursive inquiry (Brady 2003:261). Ideation requires mediation as it is inherently a dualistic process that seeks to bridge two disparate actions, from imagination to rationality or idea to form (Brady 2003:261-262). Often, in architectural practice, an ‘Ideator’ is typically termed the ‘Designer’ who works to devise or execute designs, especially one who creates forms, structures, and patterns (Oxford Dictionary 2001:236). In Terroir, the title of ‘Ideator’ has been coined due to the understanding that the primary parti is the ‘idea’, over ‘economics’ or ‘history’ or other drivers that delivery or service-focused architectural practices (Coxe, Hartung et al. 1986:52-53) might prioritise. The aim of the ‘Ideator’ is to position ideas for each individual project and all other influences take a secondary position.

During the timeframe of this research, partly because of integrating digital media and partly due to my involvement in the practice, there was a transformation in the way Terroir practiced architectural design. Undertaking this research, I was committed to a greater uptake of digital media machines for conceptual designing, and this resulted in an expanded toolset. In response to this expansion, my role evolved to demand and open up new avenues of practice for myself and the firm. This expansion has seen the emergence of the specialist position of ‘Digital Ideator’, which I currently hold. The following study, ‘The Hazards’ project, best represents this evolution.

**Analysis of Change in ‘The Hazards’ Resort Project Study**

**Description of the Project**

This hotel resort project commenced in 2003 and development of the design continued until 2007. The design process involved hand sketches and renderings (Figure 76) and the use of digital media increased over the project timeframe.
Analysis
The design evolved from an interpretation of the key characteristics of the site. These characteristics, geology, landscape form and climate, led to the development of a series of written strategies and diagrams. Key in these strategies was Terroir’s understanding of the Tasmanian landscape. The architectural proposition was believed by the directors to be an essay in monumentality and intimacy, as best explored in the photographs of the late Peter
Dombrovskis, an iconic photographer of Australian wilderness, who helped change people’s perception of temperate wilderness environments (Dombrovskis, Brown et al. 1998).

The design was originally developed from a series of hand-drawn sketches and diagrams created by one of the directors at the firm (Figure 76). Three-dimensional representations of the design known to the directors were outsourced to an artist who worked up a series of three-dimensional renderings. The design for the competition was then ‘set’ at an initial meeting between the three creative directors and me in the Sydney office. I scanned the initial sketches into CAAD software, and programmatic details were developed by the digital media team (Figure 77).

Figure 77: Initial team organization on ‘The Hazards’ project 2003.

I created the above diagram to depict design team organization in the early stages of design in ‘The Hazards’ project.

On winning the competition, a design development team was set up in the Sydney office. Two groups were established to consider different areas of the large project. The competition drawings were reassessed and a series of options developed through sketches, two-dimensional representations, and physical models for further discussion with the client. Computers in design
reproduced the sketches. A large amount of iterations of an option or even a single line could be developed rapidly. Card models gave a more three dimensional understanding.

*Figure 78: Expansion of team on 'The Hazards' project 2004.*

I created the above diagram to depict the expansion in the design team organisation in the early stages of design in 'The Hazards' project.

During this stage, I worked closely with other team members to work up three-dimensional AutoCAD™ models. These became increasingly essential in the design process due to the complexity of the design. We developed a CAAD system to manage three-dimensional renderings to test the impact of a design decision and for use in client discussions.
Due to the complexity of the design and management of the project, there was a high requirement for computers to aid drafting and procurement from an early stage. The documentation team for ‘The Hazards’ project was located in the Hobart office, as it was closer to the site. A project leader managed a team of people to create a two-dimensional documentation set.

Documentation was based on a two-dimensional format. Any three-dimensional design drawings were reduced to the one plane. The project leader believed that limiting the drawings to a two-dimensional format would help to maintain a level of quality assurance, particularly as the documentation team had varying skill sets.

As the project moved into the documentation phase the requirement for three-dimensional models increased. When the directors saw the benefits of this mode of working, the requests for more complexity and more accuracy in the models increased. We were constantly developing new and more appropriate ways of dealing with the integration of the new digital tools (Figure 81).

As the director in charge of the project was based in Sydney, a smaller design team was also maintained in the same Sydney office, of which I was leader. This team’s focus was to test any design-based problems that arose in documentation, mostly using the new design media.

In 2004, the directors and I acknowledged that we desired, but were not able to create, a more ‘fluid’ design for the Hazards Hotel roof as we were limited by our knowledge in digital media (Appendix G FN 00/2004). The directors specifically used the term ‘fluid’ in a conversation in 2004. I understood that they meant a subtler geometry than we were proposing via the use of
Euclidean geometry of plane figures. By 2007, I had advanced skills in digital media design and was able to produce the more subtle geometry version (Appendix G Tue 20/02/2007 16:56). I was also able to produce higher quality images for presentation of our ideas. The images were improved in terms of resolution, colour, materiality, reflections and shadows. We were also able to use digital media to test and generate a more fluid form for the roof alongside traditional methods. For example, we used laser cutting, milling machines and vacuum sealing to generate a physical model (Appendix G Thu 10/03/2007 15:12).

Figure 80: My role in 2007 on ‘The Hazards’ project.
I created the above diagram to depict my role within the design team in the early stages of design in ‘The Hazards’ project. I had advanced skills in digital media, expanded the toolset, operated alongside the directors and communicated to other staff. My visual contributions were influential in the design process in the early stages of the project, alongside other conventional media.
Figure 81: 2006 Presentation Images for ‘The Hazards’ Resort.

I created the above visualisation in the early stages of design in ‘The Hazards’ project.

Figure 82: 2007 Ideation investigations for ‘The Hazards’.

These images were developed by the design team members that included me in both traditional and digital media.

Figure 83: My role as digital ideator.

This image demonstrates my common mode of practice. My practice as an architectural designer during this research study increasingly included translating and protecting the integrity of ideas, conversations and drawings with, and through, various digital media. I coined the term digital ideator to reflect this role.
‘The Hazards’ project is one of the obvious positive outcomes of my research study. This project is important because it clearly demonstrates the evolutions in Terroir arising from the integration of digital media into design practice. Commencing in 2003, the project design began as hand sketches and renderings, and by 2007, we had achieved a much more subtle roof form through a variety of media. Terroir’s manner of practicing design in the early stages retains many of the design techniques that were used three years earlier, including discourse (or ‘words’ as Terroir calls it), drawings and models. To this established design process I added three-dimensional modelling, meaning we, as a firm, have an even greater variety of ways to communicate ideas. However, Terroir faces a greater need, and greater demands: to curate how we use the products of the new media in light of the integration. The firm’s requirements support my suggestion of an emerging new role in architectural design practice.

Analysis of Roles in the Maitland City Bowling Club Project Study

The role that I held in ‘The Hazards’ project correlated with my participation in other project studies during the timeframe of my research. The Maitland City Bowling Club is another example, which presents an additional insight and demands of the role, that of mediation.

Description of the Project

My expanding generative and communicative role occurred in the project for a bowling club. The project began as an invited competition looking for ways to revive the quality of a large community gathering space of an old bowling club in a rural landscape area. The Maitland City Bowling Club project study presented another exemplar for testing the basis that designers and the various media play when engaging digital media in practice (Figure 84).

Figure 84: Maitland Bowling Club image.

I created the above image in the early stage of design in the Maitland City Bowling Club project.
Analysis

The project’s idea was first proposed by one of the design directors, acting as ideator, to be an iconic topographical roof that related to the environment in a particular way. Based on this suggestion, I began working, with the project architect, to formalise the idea in response to the reality of site and brief. I used various traditional and digital visualisation media, as required to find a language for the idea. In the meantime, the project architect completed briefing studies and planning proposals. The invitation for the practice to participate resulted in a competition presentation that included a set of ideation images to complement the planning proposals.

On winning the competition, we repeated the process, distilling the conversations of the team and rationalising the form. My contribution was an iterative process of generating traditional and digital models and images (refer to Appendix I). These were reviewed at daily critiquing sessions with the design team, the creative directors and the project architect, through face-to-face dialogue and the use of email (Figure 85).

![Figure 85: Interactions with Maitland City Bowling Club design team.](image)

*These photographs, taken during early stage design on the Maitland City Bowling Club project, depict my interactions with the design team on Maitland City Bowling Club project. Digital media was integrated into design conversations with directors, project architects, and consultants, and was used alongside other conventional media.*

My interactions with the other employees of Terroir were pivotal (Figure 85). On the one hand, I communicated with directors about design, and on the other, I translated the intent of the design to the staff who then delivered on the design ideas (Figure 86, Figure 87). The process is complicated because of the interplay of architects. The interplay means that a part of my role is mediation between techniques and architectural designer, architectural designer and other architects and techniques and techniques.
In the Maitland project, I acted in an intermediary role—between tools, idea and members of a design team. I was required to mediate the use of tools and to negotiate what was more or less important, in order to maintain the essence and operation of the idea. Mediation is often undertaken by a third party who occupies an intermediate position and settles a dispute. In this case, the need for mediation regards the notion that an idea is at crisis (Balmforth, Benjamin et al. 2007:112), and that an idea in crisis, that is not resolved, could be inadvertently lost forever.
In Chapter 8 a mutual relationship was described as existing between the designer and the digital media where the designer not only integrates the tools but also is changed through its integration. I understand from analysing the Maitland project that mediation enables the optimisation of the mutual relationship between designer and their tools. Mediation enables an operation between the ideas that emerge (usually exploratory, in writing and supported by loose sketches) and more formalised images, which convey the design intent, and which helps the design team focus on the intention of the design. The need to mediate and draw on a variety of media suggests that the role requires a good knowledge of working with digital media and architectural practice.

The additional demands and the concurrent research projects presented in this Chapter suggest an emerging new role, with new demands and responsibilities that exists between directors and the design team. This new role manages and mediates the integration and use of digital media. As the role primarily engages ideation alongside other ideators, and interacts with digital media, I have defined the role as the ‘Digital Ideator’. The following pages explains the various characteristics of this emerging new role, based on my own experience and on the project studies I present in this thesis.

Other Characteristics of the Specialist ‘Digital Ideation’ Role
The results and findings of the UTS and UTAS concurrent studies were extended by my own research at Terroir. The concurrent research projects clarified the organisation of the firm’s architectural practice, while my own project studies expanded the toolset of a designer in the firm. Both the concurrent studies and my own studies have contributed to the development and clarification of the new specialised role in digital media designing. My position as a researcher has allowed me to demonstrate the evolution of the role of a designer across a suite of projects. This research has led to a better understanding of how digital media may operate within the ideation role in the early stages of the architectural design practice and about the new role of ‘Digital Ideator’.

This section is, therefore, a personal account of my role in the firm and how it developed, addressing the question of ‘who am I as a digital ideator, and what is it that I do?’ The section also reviews the history of the digital ideator role to help describe the role’s characteristics and requirements to foster and mediate poetics, individualism, originality, art and style, and to intertwine technique and craftsmanship in the early stages of architectural design.
I began work in Terroir as an architectural designer, although I was not expected to be a part of the generation of an initial idea, as that was task reserved for the creative directors. Rather, I contributed to the development of ideas, primarily through representation. Undertaking this act, at a continually provocative and exemplary level, I became a key contributor to the generation of the initial ideas, alongside the directors.

As an architectural designer, I have held a key position in the majority of Terroir projects over a five-year timeframe (2002-2007). Initially the position resembled that of many other architectural designers, in that I took part in designing buildings, communicating with other staff and consultants and delivering documentation sets for construction.

My experience at Terroir has been an unfolding journey. I have progressed from one project or situation to another, new crossroads continually presented new opportunities, and it has not always been easy to figure out which path to follow. The journey has passed through many stages, including university, participating on architectural projects, forging into a leading role, becoming an Associate of Terroir, and to where I am today, undertaking a PhD research and reflecting on and discussing my specialised role.

The clarification of my role has been assisted by my capabilities with a variety of media. Due to my capabilities and familiarity with Terroir, I gained a privileged position within the design of projects, alongside the creative directors. Design in architecture is often held closely by either a creative individual or a small team of creative individuals (Cuff 1991:49). Before I commenced this research study, this structure was certainly, and in many ways still is, the case with Terroir, but the structure of closely holding design has shifted as the firm has also seen the potential of digital media.

The new role includes specialisations as it involves focusing on the designing aspects and, in particular, the integration of digital media in the early stages of the architectural process. Specialisation in architecture is a topic discussed by other researchers (Cuff 1991:49; Tombesi 1997:17-18). The architectural designer works with, and often against, several demanding influences, including commercialism, professionalism and social responsibilities. Adoption of impressive CAAD systems is occurring in architectural firms, but their negligible application is one failing of the current Australian professions (Service 2000:84). Disintegration of, and symptoms of malcontent within, the architectural practice is plaguing the profession, and these issues have observers suggesting that the development of in-house specialists is one way of re-
empowering the architect (Service 2000:84; Barrow 2002:101; Coyne, McLaughlin et al. 1996:8; Negroponte 1995:228). The pressures have seen firms such as Terroir forge specialised roles to ‘protect’ the aspects of the practice that are commonly under threat, namely the unsubstantial aspect of the idea (Tombesi 1997:17-18).

However, as Cuff highlighted, stratification can lead to ‘unravelling the professional community by increasing internal conflicts’ (Cuff 1991:49-50). Thus, the role of the digital ideator balances increased specialised skills and knowledge in the use and integration of digital media in designing with generalised knowledge and skills in the overall practice of architecture.

I suggest that the specialisation of the digital ideator role is the skill to foster, curate and mediate poetics, individualism, originality, art and style, and to intertwine technique and craftsmanship in the early stages of architectural design. The project studies I have documented in this thesis have demonstrated these qualities. For example in the Prague competition, the architectural idea visualisations and the digital montages used through the design process required artistic talents, the technique knowledge in digital media, professional and craftsmanship awareness of the realities, and regulations of architectural practice to deliver a proposition that may eventually be realised.

The particularities of my specialised role have evolved over time in response to the challenges and successes I have experienced, through my expertise in technologies and through my participation on projects. I have had to address or be involved in issues of artistry striving for originality, the transcending of self-interests, collaboration, fostering the common interests of a society, sympathy and empathy, building and commercialisation.

A designer in a position similar to my own may not be the ideator in a collaborative practice but can work within a team of ideators. In Terroir’s case, my role sits alongside three other creative directors who work in a collaborative manner in the ideation process. At the time of publishing this thesis, I was the only ideator that used digital media in Terroir, in particular three-dimensional modelling software, in addition to the traditional and digital media that the creative directors use. While I also used the traditional techniques that the other ideators use—of words, drafting and card models—I had extended my toolset to include digital media.

The digital ideator role is somewhat comparable to that of an illustrator, where through visualisations I give form to the verbal ideas developed by the creative team. There is a distinguishing importance in these architectural visualisations; they are more than mere
illustrations of stories. These visualisations are important to the process as they act as an active agent in the generation of design and have a design agency. Through them, I productively enhance the story and increase its potentiality through their suggestiveness. The aim of these visualisations is to open up the story, not to shut it down.

The role uses media, both traditional and digital, to communicate and participate in the design process. Through need, the toolset expands, and the role manages its integration into the existing practice. As creativity and design includes aspects of making and conversing with and through drawings, the outcomes of using digital media can become key inputs in the process of design. As the digital ideator produces the work and conveys it to the team of designers, they become influential because of their curation of the work and thus can hold an operative position in the design process. Through curation, I found that the digital ideator can strongly direct the ideation process, and that the digital ideator often can have a final say in the solution to a design problem. This suggests that the hand that holds the digital media is empowered—controlling, curating and contributing to the design.

The role of digital ideator is different to the role of the other ideators in a team of designers. In Terroir the other ideators use discourse and text accompanied by evocative diagrams where needed. My primary task in this team is the translation of the ideas—text and/or diagrammatic—into operative visualisations and suggestive three-dimensional forms using media. My output is largely visual and formal.

The digital ideator mediates between the ‘butter-paper’ works and conversations of the directors and the design production team. The iterative and interactive process that my role undertakes in the design of projects sees that the process become one of living evolution rather than simply an archived preservation of initial sketches or images. The representations that I produced became benchmarking tools that established quality and verified the interests of the client.

This process is complicated because of the interplay of architects and thus part of my role engages issues of collaboration. My contribution to understanding how this collaboration occurs between these roles in practice was clarified through my involvement with a project architect in the Maitland City Bowling Club project, which demonstrated the operation of the digital ideation role.
Figure 88: My pivotal role: combing ideation and digital media.

I created the above diagram to depict my role within the design team in the early stages of design in the Maitland City Bowling Club project. On the one hand, I communicate with directors about design, and on the other, I translated the intent of the design to the staff who deliver the design ideas.

The role results in a pivotal line of communication that revolves around both an ideator’s design conversations and the digital ideator’s visualisations. The digital ideator role is layered, comprising both individual and collaborative responsibilities within a dynamic environment. There is a closely connected relationship between the digital ideator and other ideators (in Terroir’s case the practice directors) and a dynamic relationship between ideators and project architect. The relationship between digital ideator and project architect is dynamic as they are constantly battling and supporting one another over issues of aesthetics and utilitarian ends (Balmforth, Benjamin, et al. 2007:116; Encyclopaedia Britannica 2002:530).

Given the variety of digital media available, and the variety of roles that an architect undertakes, digital media fits well into the role that the architect is playing. As architects play different roles and contribute differently to projects in a mid-sized architectural practice, some architects do, and some do not, utilise certain digital media. In the early design stages, some media are, and some are not, useful for the practice of conceptualisation. The Media Table presented in Chapter 8 presents and categorises some of the available traditional and digital media under the different roles.

In a follow-up meeting to the Hobart Workshop I discussed in Chapter 8, the directors and I discussed how the spectrum of digital media usage coincides with the spectrum of roles in a firm (Figure 89). Coinciding with the dynamic and volatile nature of the ideation role, there is an equally diverse opportunity to explore and integrate a variety of media. The early stages of the
design process are about exploration and discovery that, as seen in the previous project studies, can occur through thinking and making. Exploration can also occur through, for example, using new and unorthodox digital media applications. Thus, through the use and integration of digital media, the digital ideator can draw on a vast range of ‘various media’ (Figure 89) for exploration. This new responsibility suggests that the role of the digital ideator is also to manage exploration, integration and use of ‘various media’.

As the project progresses, increased contractual pressure can occur, and there is a need to begin to shutdown the variety of digital media exploration. While designing occurs throughout a project’s process, the use and integration of media becomes more refined and precise with the decreasing need for vast exploration. At the development and documentation stages, the way that an architectural designer integrates digital media could move into ‘managed’ and ‘focused’ modes (Figure 89).

**Figure 89: Matching the spectrum of roles with a spectrum of digital media uses.**

I created the above diagram to demonstrate how different categories of digital media can be more appropriate at different stages of the design process.

In naming my evolving role as digital ideator, I believe that my research has assisted the firm in articulating this role’s characteristics. It further articulates how this designer engages with an expanding toolset and when the designer can deploy various techniques, particularly as the new
media may not be known or useful to everyone in a practice. The type of new or expanded role, I believe, could offer models in which digital media may be integrated, intelligently and sensibly, into practice generally.

Concluding Remarks and Observations

In Chapters 5-8, I focused on the integration of technology in architectural design practice. The final aspect I explored in this thesis (Chapter 9) was the cultural implications of the integration of new digital media in practice on the role of the designer. Here, I investigated, through a deeper philosophical critique, how Terroir practises design and a new role in practice. I began by explaining Terroir’s organisation as captured in a series of concurrent research studies. I detailed how concurrent research assisted in the clarification of roles at Terroir. I then tracked the evolutions to design practice through ‘The Hazards’ hotel project. I detailed the design process in years prior to this study and the process at the conclusion of this study. I discussed the increased demands for the use of digital media, by the conclusion of the research. I also detailed how two roles in practice, the ideator and project architect, shared a duelling co-dependency. I used the descriptions of Terroir organisation and my own project studies to suggest that a new role had emerged in practice, that I have coined the digital ideator. The new role sits between creative directors, or the other ideators, and the project architect and rest of the design team who manage and deliver the project. I concluded this chapter with a discussion of the characteristics of the role, including fostering and mediating poetics, individualism, originality, art and style, and intertwining technique and craftsmanship in the early stages of architectural design.

In Chapters 5-9, I addressed the series of component questions I presented at the summation of my review of literature, including the practical and cultural implications of integrating digital media into the early stages of design. The outcomes of my research provided Terroir with a wide-ranging insight into aspects of design practice, digital media and the collaboration between architectural designers within a firm.
SUMMATION—REFLECTIONS, OUTCOMES AND CONCLUSIONS

Even though designers seem polarised between championing the role of digital media as part of their design processes (Rahim 2006:1; Winner 1986:6; Steele 2001:13) and patently rejecting it, with Martens, Koutamanis et al. suggesting that ‘the relationship that academia and practice share with CAAD [computer-aided architectural design] can best be described as ambivalent’ (Martens, Koutamanis et al. 2007:524; Sanders 1996:4-5), my research shows that advantages in the early stages of design can emerge from a mutuality between the designer and her or his digital media. Advantages can include generative, communicative and collaborative aspects throughout the process of architectural design. Furthermore, the relationship between architectural designer and the digital media changes in the ever-evolving journey of design. Through the co-evolution of designer and her or his digital media, change can occur to the designer’s practice and the role that the designer holds within an architectural collaboration.

Part 1 overviewed the context of the research. In Chapter 1 Outline of the Study I detailed my research questions, discussed the background of the parties involved in the study—the university, the industry partner firm and myself as the candidate. In Chapter 2 Definition of Terms I presented terms used in the thesis and set out some core values that informed its content. In Chapter 3 Research Design I detailed the methodology employed in this study, and in Chapter 4 Review of Literature I surveyed some of the key foundational influences of the study.

In Chapter 4 Review of Literature I reviewed books, conference papers, articles, reports and journal articles. While my review of literature was extensive, I found it a challenge to locate published information that provided comparative examples to my qualitative participant observation study and topic. In conducting the review of available literature, I especially discovered an absence of recent publications regarding the sociological relationship of digital media and architectural design practice. I believe this lack of cross-referencing material is indicative of an emerging field of study, to which I hope my study would offer something new and important to this under-discussed area.

In the thesis I have not presented a consensus on the role of digital media in the early stages of design, nor have I published an extensive use of digital media in the early stages of design. In Part Two, I presented my own practice fieldwork. Chapter 5 Parametric Designing aimed to test the integration of software CATIA™ into the early stages of Terroir’s established design process. In Chapter 6 Iterative Designing I tested the integration of animation media into the early
stages of design and produced visual iterations of form. In learning from the successes and failures in Chapters 5-6, in Chapter 7 Interactive Designing I demonstrated and expanded positive results through the interaction of a hybrid of digital media into Terroir’s established design process of words, drawings and models. My activities in Chapters 5-7 were collectively considered as the basis for Chapter 8 Integrating Digital Media, where I presented overarching interpretations, reflections and summations of my practical experiences in integrating digital media into the early stages of design. I concluded Chapter 8 with a discussion regarding a key research outcome of mutuality in designing. I also explored the co-evolutions in my own practice fieldwork. Chapter 9 Practicing Digital Designing described the evolution to my role as a designer. Chapter 9 explained the characteristics of an emerging new specialised role, a digital ideator, which addressed the cultural changes that could result from digital media integration.

To evaluate my research, I used the background of Terroir, my role and the issues that I raised in Chapter 4, my examination of available literature, in contrast to my project studies I presented in Part Two, as a method for the testing and assessment of my primary research question: What is the extent to which it might be advantageous to include digital media as part of the designers’ ‘toolset’ in the early stages of design?

To gain new insights into designing, digital media and the role of the designer, I considered a series of component questions derived from personal experience and verified by my review of the literature. The first group of questions addressed an account of practice, which covered practical implications of integrating digital media into the established design practice of Terroir. The questions, and their founding issues, included:

- As the majority of focus concerning digital media has been in production and efficiency in architectural practice (Manley 2004:3), does new digitally supportive digital media contribute beyond merely production and automating devices in the early stages of design?
- Criticism by observers (Coyne 1991:422) suggests that users are focusing too heavily on the generation of a form, so how do digital-media expand conventional design processes of drafting and models beyond merely a focus on form?

I explored the positive outcomes of integrating digital media:

- The various suggestions as to how digital media can be advantageous in designing (Negroponte 1995:223; Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73; Benjamin 2004:54; Chen 2007:582; Glanville 1997:4) and to address concerns regarding the seduction of technology (Pressman c1997:131; Steele 2001:18; Jamison 1985), so
how do conventional media mesh with the new digital media and foster design, which is understood as a conversation?

- Reflecting upon the implications of my research fieldwork, in terms of Coyne, McLaughlin et al.’s suggestion that technology closely interconnects with its surroundings (Coyne, McLaughlin et al. 1996:4), would the practical shifts that occur in Terroir's practice be relevant to other practices, and can my project studies offer an understanding of the relationship between technology and creativity?

In light of the emerging possibility that digital media integration into a mid-sized practice can have larger implications beyond mere practicality, a second group of questions centred on the cultural implications of integrating digital media into the established organisation of Terroir. The questions included:

- Given my role as an architectural designer and being interested in commenting on the changes that occur through integration (Winograd and Flores 1986:6), what are the implications of integrating new digital media into Terroir on the role that I hold within the practice?
- In light of the changes that occur through undertaking postgraduate participant observation research in an architectural practice, what are the shifts in the culture of Terroir through integrating new digital media?

The various projects I participated in and observed over a three-year period, captured primarily through my extensive email archive, provided a generous database of insights. I addressed and analysed the list of component questions within Chapters 5-9 through this database of experiences. At the end of my review of literature, I structured my component questions that emerged in response to my own experience and through Chapters 5-9, I addressed the questions mostly in a sequential manner.
Concerning the component questions noted on pages 230-231, primarily the questions and answers have been presented in this thesis as follows:

<table>
<thead>
<tr>
<th>Question</th>
<th>Chapter</th>
<th>Project Studies</th>
</tr>
</thead>
</table>
| Question 1 | Chapter 5 | *The Hazards’ Resort*  
|           |         | Montpelier Retreat  
|           |         | Peppermint Bay Function Centre |
| Question 2 | Chapter 6 | Fern Tree House  
|           |         | Hobart Waterfront Competition |
| Question 3 | Chapter 7 | An extensive collection of insights across projects including:  
|           |         | • Prague National Library Competition  
|           |         | • Hobart Waterfront  
|           |         | • Maitland City Bowling Club  
|           |         | • George Street Foyer  
|           |         | Various digital modelling examples across these projects  
|           |         | The use of communications systems such as email and WIKI |
| Question 4 | Chapter 8 | Hobart workshop  
|           |         | Reflection upon the complete set of project studies |
| Question 5-6 | Chapter 9 | A comparative analysis of:  
|           |         | Concurrent research projects:  
|           |         | • UTS concurrent research  
|           |         | • UTAS concurrent research paper  
|           |         | My own projects of:  
|           |         | • ‘The Hazards’ Resort  
|           |         | • Maitland City Bowling Club |

The overall trajectory of these component questions led to the key outcomes of this study, including the mutuality in designing with digital media and an emerging new role in architectural design practice (Chapters 8-9).
Evaluation of Research

In the following pages, I evaluate my research and contributions to my field of enquiry. I assess my own practice fieldwork in response to the structured component questions, derived from my own experience, background of Terroir and my role at the firm, and issues that I found in the available literature. My reflection of these questions contributes to my conclusions on the primary question:

*What is the extent to which it might be advantageous to include digital media as part of the designers’ ‘toolset’ in the early stages of design?*

I seek to demonstrate design process as grounds for my conclusions and acknowledge the influences of such processes on this research.

Contribution to Field of Enquiry

Based on the list of component questions presented and the methodology employed, a series of achievements in the field of enquiry are set out under the following headings:

- Integrating digital media into architectural design practice
- The influences on integrating digital media
- General outcomes of this study
- The mutuality between designer and their digital media
- Change to Terroir practice: the digital ideator role

Integrating Digital Media into Architectural Design Practice

Investigating CATIA™ in the early stages of architectural designing addressed the question of whether the architectural industry’s focus on using digital media for production and efficiency (Manley 2004:3) could lead to innovative advances (Rahim 2006:1) and contribute results beyond merely production and automating devices in the early stages of design.

The first project study successfully generated form; however, I was unsuccessful in using the tool at the early stages of the process, as the nature of the project was too ambiguous to be defined into explicit rules required by CATIA™. The first project studies I undertook, after starting the research, initially offered a negative response to the primary question. The first project study confirmed a potential danger that, unquestioningly introducing ambitiously sophisticated sets of digital media to established modes of design practice, may inadvertently
hinder the design ideology of that practice. At worst, the unthinking application could thwart that practice from realising its aims.

On further analysis however, the first practice fieldwork into CATIA™ still offered insights into the design process despite the ‘failures’, because of the potential benefits arising from the adoption of CATIA™ and its concepts within the existing design processes in Terroir. This revelation opened up a new opportunity for exploration into the role of iterative designing and led to my second question. Instead of force-fitting digital media, my second examination explored criticisms concerning ‘a readily observable phenomenon engendered by computer use that there is a tendency to focus on form’ (Coyne 1991:422). My second investigation demonstrated two benefits: the generative benefits of using digital media, and that users could integrate digital media to expand conventional design processes of drawings and models.

There were certainly some concerns from the directors at Terroir involved in my process of generating iterative designs, about the validity of the resulting digital models. Confusion also resulted from members of the firm finding the imagery unfamiliar. However, despite these initial reservations, the digital media integration in this second practice fieldwork project study, the Hobart Waterfront urban design competition, successfully allowed the collaborative design team at Terroir to see ideas in new ways through digital iterative and diagrammatic animations. One clear advantage of digital media was not the generation of an original object to be revered and preserved, but the making and manipulation of many iterations. This recognition of the validity of many ‘originals’ confirmed that expansion was highly effective at the early stage of the design process, where the designer aimed to use their digital media not to close down, but to open up potentialities.

Reflecting on the first two project studies and observations in the available literature, regarding meshing conventional media with the new digital media and facilitating ‘new architectures’ (Lindsey 2001:12), I undertook a series of new project studies to find additional positive outcomes of integrating digital media into the early stages of a design process in a mid-sized Australian architectural firm. I tested various suggestions found in available literature including transience of the digital image (Binkley 1997:115; Boyman 1995:viii; Erdman 2004:73-73), developing more approximate models of design (Lawson 2006:184-185; Lawson 198282; Steele 2001:14; Stamm 2007:103; Balmforth, Benjamin et al. 2007b:100-109), augmenting computation with curation (Binkley 1997:112,114) and using a hybrid of media (Chen 2007:582) ‘where plurality pertains from the start’ (Benjamin 2004b:54). The findings were detailed in Chapters 7,
including examples of when integrated digital media in the early stages can assist, and thwart, aspects of design.

Resulting from collective interpretations of my project studies, in Chapter 8 I presented overarching interpretations arising from my new design intelligence that accounted for the fears and concerns of integration. I presented a categorisation of digital media to assist the designer in the integration of new digitally supportive media. I reconsidered the influences, including time, conflicting qualities between tools and design activities, unfamiliarity, context, appropriateness and circumstances of the media put into play at ‘the right time’ (von Fange 1959:5). I presented a series of diagrams visualising the changes that can occur in expanding the designer’s toolset. In Chapter 8, I also recognised that, by concisely articulating existing practices, designers and their collaborative design team may organically coalesce the uptake of digital media and established practice, minimising inadvertent hindrance to the design ideology of an established collaborative design practice. I concluded Chapter 8 with a discussion regarding a key outcome of my research, that digital media neither should take centre stage nor or be disregarded all together. The designer and their digital media are connected in a mutual relationship and co-evolve, where the designer not only integrates the technologies, but also changes his or her practice through their integration.

The above outcomes do not offer a definite view on whether digital media should be integrated or inserted into architectural practice. The significance for my role as a designer is a more informed understanding of design practice and the differing operations of digital media. From my studies I am aware that the extent to which it might be advantageous to include digital media in the early stages of design covers generative and communicative uses. I also recognize that an established firm can and will expand their repertoire in an organic manner.

During the study, I recognised that it was difficult to distinguish clearly the extent to which the integration of digital media actually advanced Terroir’s design practice. The project studies, however, clearly showed that generative, communicative and collaboration factors can be advanced in integrating digital media into the early stages of architectural design.

The Influences Leading to the Integration of Digital Media
From my observations, integrating digital media into architectural design practice is dependent on an intricate number of influences. In this thesis I aimed to describe many of the internal
influences acting on the early stages of architectural design through each project study. These factors, or influences, are summarised below.

One influential factor is time, where in some circumstances the pressure of the realities of practice and having to deliver design on time can restrict the exploration of a digital media. Digital technologies were found to be ‘tools’ (Glanville 1992:213) with certain programmatic qualities that conflicted with design activities, too cumbersome and in opposition to the lighter design processes normally used by a practice for the working-up of a design, as demonstrated in the Montpelier Retreat project. Thus, digital technologies became tools that were ‘restrictive’ (Glanville 1992:213).

A designer’s unfamiliarity with the processes of a tool can limit integration. That unfamiliarity can limit the ability to appropriately exploit or integrate digital technology as a generative or communicative media. In addition, unfamiliarity with the visual aesthetics of the digital media can sometimes distract the team, resulting in miscommunications and limiting the tools uptake, as demonstrated in the Hobart Waterfront project. I found that the context, design influences and/or sensibility of a particular designer could influence her or his uptake of the technology; for example, when the designer acquires the additional responsibility of mediation in order to manage the interactivity of design thinking and making, this includes the use of digital media.

I found that the integration of digital media needed to correspond with the established values of a firm. The primary generator of an architectural firm’s design process influences the uptake of digital media; in Terroir’s case this was their ideology and value in ideas, particularly in culture, landscape and an interaction of words, drawings and models. I found that designs can advance productively when there is a strong, clearly communicated or commonly understood idea. The project also advances when it is supported by digital visualisations that can explain, comprehensively, the operation of that idea, as demonstrated in the George Street Foyer project. At a mid-sized architectural design practice, the integration of digital media also depends on the varying skill sets and the role of architectural designers, which vary from design to project management. The integration also depends on the surrounding industry. Depending on the skills and drivers of the architectural, engineering and construction industry, these can influence whether the digital media is useful or understood in the practice of design.

Generally, the integration of media is dependent on using the appropriate tools at appropriate times. The integration of digital media can occur over time through an organic uptake, which can likewise see the designer’s tool set expand and the roles of designers change.
General Outcomes of this Research and Future Change

The general outcomes of this study indicate a greater intelligence concerning the design process. Because I had undertaken participant observation research in an architectural firm and analysed it through a project study mode, the available literature was not very helpful to my research study area. This study fills a research gap on the integration of digital media into established mid-sized architectural design practices. As a result, Terroir knows more clearly as a practice that the drivers of its designs in the early stages are not merely the tools themselves or the tools’ preconceived or typical application, for example, mathematical or computational applications used to generate form. Digital media has not killed off creativity or conventional design processes per se. Digital media has offered many positives to the creativity and established design philosophy at Terroir.

Ultimately the conclusion that should be drawn from my research and project studies is that a variety of digital media has become commonplace in Terroir’s practice, and concurrently Terroir’s comfort with digital media has improved. My studies correlate with Zajonc’s findings, the more people become ‘familiar’ with a new thing, the more the new thing, and the new change, becomes accepted and integrated (Zajonc in Sternberg 1995:20). This process transpired in Terroir, in an organic transformation, that recognised the existence of mutuality between digital media and a designer’s practice. It is clear that Terroir as a practice and I as a designer have gained worthwhile shifts and expansions in the processes and techniques of designing, and have grown more aware of how we practise on a daily basis. The advancements that have occurred in Terroir’s design process and the changes in practices at the organisation will continue to evolve, particularly through a mutual relationship between designer and digital media. Thus, the process is not only integrating new digital media, but through this integration also changing the architectural designer’s practice.

The benefit of a mutual approach to integrating digital media into architectural design practice is the highly effective layering of technical support that integrates the beneficial aspects of new technologies with the techniques of the past, producing new systems for evaluation.

The Mutuality between Designer and Their Digital Media

Debate exists on the use of digital media in the early stages of architectural design. Designers seem polarised between advocating a greater integration of digital media as part of the design processes in the early stages of design (Rahim 2006:1; Winner 1986:6; Steele 2001:13) and the downright rejecting of those promotions (Martens, Koutamanis et al. 2007:524; Sanders 1996:4-5). In this thesis, the issue for examination became less a question of whether a designer needs
to engage in the use of digital media, but how the designer masters an expanding architectural design process that draws upon ideas, conventional media and digital media. I wanted to address this question as to the extent to which it might be advantageous for the mastery of the design process to include digital media as part of the designers’ ‘toolset’ in the early stages of design.

This thesis concludes that the extent of how advantageous the integration of digital media depends on the mutuality that exists between the designer and their digital media in the early stages of architectural design. Through individual project studies, this mutuality was demonstrated, with digital media both assisting and thwarting the development of a design. Based on these findings, digital media within a mid-sized Australian architectural practice does not automatically generate design for the early stages, and can thwart the communication of design due to its seductive and realistic nature. An architect’s ideas can benefit from the generation and communication of design through digital media in a process that involves the working-up of design knowledge through aspects of both design thinking and making.

In this thesis, I have captured through the firm’s projects this mutual connection between a designer’s role in practice and the approach and limitations of a designer’s use of digital media. By outlining the explicit and implicit designer practices, I have detailed a series of outcomes, protocols and sensibilities to assist me to advantageously balance and/or exploit the relationship. An outcome I detailed in this thesis, which has increased since commencing this research, includes the recognition that design is a circular process and is furthered by repeated acts of thinking and making. Additionally the research has indicated that architectural design is influenced by a wide-ranging layering of issues, from the architect’s design ideas, site, regulations, clients, and the tools architects select for expressing the design.

Furthermore, relationship and process changes can occur in a firm through the co-evolution of the designer and their digital media. Terroir and I have been changed by the digital media itself, and conversely, we have opportunistically further improved on conventional design practice. From the review of the limited literature and my direct experience within a dynamic practice, I have become aware of the particular relationship that exists between us as designers and the digital media that we use in the design process. This relationship is mutual and my research suggests that the designer and the digital media he or she uses will continue to evolve through a mutual relationship, where we not only integrate the technologies, but also are changed through this integration.
Mutuality does not position digital media centre stage or disregard it completely. Through mutualty, an architectural designer and the various media that he or she uses, both conventional and digital, can expand the way the designer generates and communicates design. Through use, architectural designers and their various media can change the fundamental values that they and their collaboratives practise concerning the primary and secondary drivers of design. New responsibilities also result for the architectural designers to mediate their expanding toolset within the existing values and practices of a mid-sized firm.

**Change to Terroir’s Practice: The Digital Ideator Role**

In my final practice fieldwork project study, I investigated the implications of integrating new digital media into Terroir on the role that I hold within the practice. As Kvan, Mark et al. suggest, the integration of digital media can influence the way the firm practices (Kvan, Mark et al. 2004:np). From this study, I learned the tools that I use in this role, and the way that I approach them is different to those used by other architects in an architectural firm, for example creative directors or project architects. Some digital media can offer generalised off-the-shelf techniques that are applied and used by the different roles, and these digital media become a common tool used across a mid-sized firm. The generalised techniques suggests that there are commonalities in how architectural teams approach the creative process, but within the practice in which I am an Associate Designer, the approach to using digital media is inevitably highly dependent on the role and highly personal, and both informs and is informed by the make-up of the design team. The differences of use suggest that customised digital media applications are necessary adjuncts to off-the-shelf techniques.

Given the different demands of roles and the additional demands resulting from integrating digital media, in Chapter 9 I suggested the emergence of new roles for the 'Digital Ideator' within design practices, founded on the impacts that certain digital media have on the way designers communicate. Prior to the arrival of digital media in practice, such curatorial opportunities were not possible. In Chapter 9 I suggested that specialisation in these tasks could well become a new arm of architectural design practice. If a designer expands his or her toolset, this greater capacity may alter other modes of practice. Specialised roles of a digital ideator, who uses digital media alongside the more conventional methods, will reflect the expanding modes of practice. These new specialisations could become pivotal in acting as a bridge between the more traditionally large divide that exists between creative directors that design and the team that delivers the design.
The research study has assisted me in articulating the characteristics of the digital ideator’s role. These characteristics include how the designer engages with an expanding toolset and when to deploy various techniques, particularly as they are not known or useful to everyone in the practice. This type of new or expanded role, I discuss here in relation to myself and my firm, offers a model by which digital media can be integrated, intelligently and sensibly, into practices generally.

This type of postgraduate research, namely participant observation in an architectural practice, has resulted in shifts in the culture of Terroir as a firm through the integration of the new digital media. The desire to uptake new digital media has seen Terroir make a space in the design process for testing unfamiliar technologies. If traditional design practice has been centred on the creative individual, today that practice can be more collaborative. Terroir encourages this contemporary understanding of shifts in practice. The significance of my integration of digital media as a component of this study has been in the evolution of practice in this firm. Now the ideology of Terroir no longer is solely delivered by the creative directors of the firm. The design practice in Terroir can accommodate digital media design contributions from other architects in an ideation process that is facilitated by digital media. Furthermore, a new role has been established, which mediates these contributions, alongside the creative directors. These shifts in practice have seen a reduction in the archival preservation of sketches or ideas generated by the directors of the firm. The designs may now unfold through an interactive process that accommodates a building-up of design intelligence or living bodies of knowledge, through the design development and procurement process. The process of design at Terroir that accommodates a building-up of design intelligence is documented in the appendix (Volume 2) of this thesis and in a book published on the practice in 2007. The book demonstrates a phasing-out of the hand-drawn sketches by directors, replaced by other material, often digitally generated and developed by staff (Terroir 2007c).

Reflection on the Participant Observation Postgraduate Research in Architectural Design Practice

This section addresses the merits of research in practice and considers what added benefits the postgraduate position yielded to the firm, than simply continuing the status quo practice.

In the three years of the participant observation research in architectural practice, I integrated a greater variety of digital media into a collaborative practice whose drivers extend beyond a computational interest in digital media. The participant observation methodology in
architectural practice offered the opportunity to frame my thoughts around questions that exist in architectural design practice, which I had experienced through my involvement in architectural firms. The Spatial Information Architecture Laboratory (SIAL) program at RMIT University gave me the opportunity to discuss and research the concepts in a more expanded, penetrating and analytical framework than the usual ‘hasty manner that often occurs’ (Maher and Mewburn 2007:252). The academic study offered the space and time for further research and analysis beyond just solving problems. The academic study allowed the investigation of the issues as they emerged in my own practice and in the practice of other Terroir staff working on projects.

As SIAL recognised in their proposal for this program, architecture and structural design practices are ‘unlikely to sustain dedicated research and development to capture what is known formally as 'tacit' or inexplicit disciplinary knowledge’ (RMIT University 2005a:np). This postgraduate research ensured an authority and focus to recognise, facilitate and document tacit disciplinary knowledge. The recognition of my role as researcher by Terroir, reinforced by my extended reading and research, meant that the uptake of digital media occurred faster and in a more wide-ranging manner than it would have occurred in normal circumstances.

In addition, I have been able to mesh existing academic studies into the process, as documented in Chapters 4-9. The fears and scepticisms of the profession generally, and within Terroir, have been addressed provocatively and/or cautiously through integration of the various media. Terroir was given access to my final outcomes and reflections on the broad cross section of documentation of architectural experimentation and testing around the issues in my research. Participating in the program brought academia into Terroir practice on a daily basis, to a level that would not have occurred in the status quo, supporting the dissemination and generation of knowledge.

The focused and rigorous research process within an academic framework of postgraduate study, and the research vetted through direct processes of testing and evaluation such as presentations before panels of peer group experts, senior academics and the architectural practice field, has also tested established practices within Terroir. The established practices have either strengthened or adjusted because of the new knowledge delivered through my research and through application of this research via my role as digital ideator. The benefit of my research was in creating an environment that confronted the pressures of production schedules (RMIT University 2005b:np) and to capture and expose the daily cultural shifts emanating from the introduction of digital media in design practice.
Reflection on the Validity of My Research

The practice of Terroir guided the direction and approach to the case studies. The mode of working in Terroir with digital media offered a rich field for research, untapped and unfamiliar source material, and a provocative range of pertinent project studies worthy of investigation. For example, the firm’s architectural projects and its design process have received international recognition, have been discussed in the international architectural press and have been commended and recognised by international architectural commentators. Terroir’s rigorous research based, idea-focused, as opposed to delivery or service-focused (Coxe, Hartung et al. 1986:52-53), mode of practice complemented my quest to investigate design practice, and my integral role and privileged position alongside the creative directors afforded me, as the researcher, access to the inner workings of a mid-sized architectural design firm.

The validity of the insights detailed in this thesis is demonstrated in Terroir by the increased use of digital media by designers who hold positions similar to my own. The validity of the insights at a broader scale, outside our practice, will be confirmed as the range of tasks thrown up in an office during an architectural project evolves. The validity will also be confirmed as others engage in the use of the expanding toolset of digital media for designing purposes. My research could offer insights for those who seek to develop dedicated digital media for architectural-based applications or clientele, by offering case studies of the type of dynamic conversations that avant-garde-practising or creative-practising architects may have around the deployment of digital media.

Possible Future Research

This thesis is a small contribution towards understanding relationships between architectural designers and their digital media and establishing a basis on which to assess future change. Future research could open up more detailed research into the integration of digital media into architectural design practice. I have documented a few detailed project studies in this thesis concerning integrating specific tools of CATIA™ and 3D Studio Max™. Other programs I have not explored in this thesis may result in similar, or possible different, generative or communicative outcomes or provide further insights or comparisons into the way designers practice. I spent two-and-a-half years considering the role of email in Terroir, overviewed Terroir’s use of email and presented protocols of use. I spent two-and-a-half years considering and integrating the use of digital visualisation media into Terroir practice. Due to the limitations of time, appropriateness and circumstances that I found in integrating media, other research results may follow this research study.
New tools that are emerging and other existing tools may present opportunities for an extension on this research study. Future studies could continue examining shifts to conventional design processes, such as the role of diagrams and drawing in a design process that has expanded to include new digital media in the early stages. Future studies could examine the operation of Terroir’s conversational design process or follow the transfer of ideas to form an understanding of the role of interpretation in the designer process. Further critique and comparison of architectural design practices may also result in additional contributions to the nature of creative domains. Based on my experience in this postgraduate research program, I am aware of the value of engaging with issues and questions around expanding practice in both a practical and academic situation. I understand that these suggestions and contributions can benefit and emerge from continued critical and participant observation engagement.

**Summation**

This postgraduate program presented an opportunity to investigate how an architectural practice’s existing work processes could be integrated with new digitally supported, and supportive, ways of working to understand better the factors that may lead to change and innovation in architectural design practice.

My participant observation research focused on the internal work processes of the architectural designer as they were increasingly supported, and sometimes thwarted, by an assortment of digital media for designing and its communication.

The view I have presented in this thesis of digital media uptake acknowledges that the computer has a legitimate place in designing but equally should not necessarily take centre stage. What I have found through my participant observation practice fieldwork, and demonstrated in my various project studies, is that a designer and digital media the designer uses share mutuality, which co-evolves in a progressive journey. Not only does the designer integrate new digitally supported, and supportive, ways of working with existing practice, but also the design process of the designer in the early stages, and the role he or she holds in a collaborative architectural practice, can also be expanded and transformed in a process of mutual and evolving digital media integration.
THE ARCHITECTURAL DESIGNER AND THEIR DIGITAL MEDIA

An investigation into the extent to which it is advantageous to include digital media as part of the designers’ ‘toolset’ in the early stages of design

VOLUME 2

A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy

Sarah K. Benton
B Sc(Arch) B Arch

School of Architecture and Design
Design and Social Context
RMIT University
March 2008
DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; and, any editorial work, paid or unpaid, carried out by a third party is acknowledged.

Sarah Benton
4th October 2008
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THESIS

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LITERATURE ON TERROIR

BOOK SECTIONS


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**ONLINE MEDIA**


**PODCASTS**

APPENDIX

The following appendix material includes unpublished material and project study material that I have referred to in Volume One of my thesis.

I have included unpublished material on my industry partner firm, TERROIR, that clarifies aspects of the practice and verifies the observations and references that I make in Volume One.

Appendix D-M includes various reference materials of my project studies that I discuss in Volume One. I have codified each piece by the type of material and the date of creation. A full list of these codes and the material is provided at the start of each project study Appendix. I have included a brief project description to contextualise the project studies. I then include file notes and emails that I refer to in Volume One.

The emails included in this Volume were made in private conversations. Although I have filtered the highly personal information, they may contain jargon and familiar synonyms coined within the TERROIR design team.

The project study appendices have been censored at various levels.

As per RMIT ethics requirements I have removed the identification of team members and I asked permission to include the sensitive material.

As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director's identity. I have sought and gained their approval for this inclusion.

As this is a study focussing on practice within an architectural firm, I have not included client or consultant information. The project names are included as publicised on the website of my industry partner firm, TERROIR.
APPENDIX A TERROIR SELECTED EXHIBITIONS AND AWARDS

EXHIBITIONS

TERROIR have participated in various exhibitions featuring projects from the practice, as well as artwork and installations produced specifically for exhibitions and larger scale installations in the landscape. These exhibitions include:

Living the Modern - Australian Architecture - Berlin, DAZ (Deutsches Architektur Zentrum) September 2007

TERROIR was selected as one of 25 Australian architecture firms to showcase the tradition and transformation of the architecture of modern Australian housing.

OUT FROM UNDER: Australian Architecture Now
March – April 2007

TERROIR were selected to participate in OUT FROM UNDER: Australian Architecture Now, an exhibition of young Australian Architects who are ‘establishing unique new trajectories in design that combine innovative material and spatial research with high quality building’. The exhibition included work by: TERROIR, Dale Jones Evans, Neeson Murcutt Architects, Sean Godsell, John Wardle Architects, Kerstin Thompson Architects, among others. Curated by Anthony Burke, Senior Lecturer and Director, Masters of Digital Architecture, University of Technology, Sydney.

Second Nature Exhibition - Nanjing China
October 2006

TERROIR were selected to participate in Second-Nature – Australian Modern Architectural Design Competition, Nanjing Planning and Architecture Exhibition Centre. This exhibition, curated by Peter Davidson of LAB Architecture Studio, featured the work of 9 Australian practices, of which TERROIR was the only practice featured from outside Victoria.

AAA Young Architects Exhibition - Customs House, Sydney
October 2005

The AAA’s Young Architects Exhibition was opened by founding president Glenn Murcutt and Gerard Reinmuth. Gerard curated the exhibition. The Young Architects Exhibition was a display of innovative architecture being held to mark World Architecture Day and Architecture Week.

Venice Biennale, Australia’s “Virtual Pavilion”
August 2004

TERROIR was selected as one of ten Australian practices working in the public realm to feature in Australia’s contribution to the 2004 Venice Biennale of Architecture. TERROIR were one of only three young practices from across the country to be selected, while the remaining seven practices were well-established firms. The Biennale exhibition was hosted by www.lab.3000.com.au.

ALTS + ADDS
August 2004
TERROIR’s Ryde House was selected for a travelling exhibition as an example of contemporary alterations and additions to housing in Sydney.

2007
2007 Kenneth F. Brown Architecture Design Awards:
Honourable Mention: Peppermint Bay

SELECTED AWARDS

2006
Tasmanian RAIA Awards:
Residential New Commendation: Liverpool Crescent House
Interior Architecture Commendation: Fish 349
Interior Design Awards:
Emerging Practice Award: TERROIR
Commercial Interior Design (Tasmania): Fish 349
Residential Interior Design (Tasmania): Liverpool Crescent House
Commendations:
Hospitality Interior Design: Fish 349
Residential Interior Design: Liverpool Crescent House
Colour in Residential Interior Design: Liverpool Crescent House

2005
Tasmanian RAIA Awards:
Commercial Award: Peppermint Bay
Residential New Award: Tolman’s Hill

2004
Tasmanian RAIA Awards:
Interior Architecture Commendation: Peppermint Bay

2001
Tasmanian RAIA Awards:
Residential Award: Tranmere House

2000
Tasmanian RAIA Awards:
Interiors Awards: Hobart Boutique Hotel
Appendix B includes file notes that I have made in lectures that I attended in 2006 and 2007. I have highlighted specific notes that I refer to in Volume One.

The following table categorises and codifies the material included in this appendix:

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<td>FN Tue 01/08/2006</td>
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Andrew Benjamin gave a lecture at Tusculum entitled “Architecture Theory & Practice in the Digital Age”.

- He discussed digital use in architectural education. His main points were that “we” should develop a “philosophy of software” (I used this phrase in this thesis and in reference to what I aim to do in my own research)
- He also argued that we should look at the inherent qualities of materials to validate digital forms and to question whether it they are architecture. This discussion leads to an understanding that within TERROIR materiality is not a driver or validation for the architecture. Detail is important but it exists as a secondary informant as it is the idea that is primary.


In Martens, Bob; Koutamanis, Alexander; Brown, André presentation of their paper Predicting the Future from Past Experience mention argument that digital media should have either ‘no place’ or ‘centre stage’ in the architectural design process

This conference was aimed at ‘challenging the conventions of architecture and proposing how our cities may look in the future’

Through watching the three main presenters Lars Sproybroek (NOX), John Bell, (England) and Andrew Benjamin (UTS) it seemed as though there was also a conversation going on about an apparent schism between using digital to seek a form that is ‘pre-existing’ versus using the digital to provide abstraction, representation and ‘potentiality’ and therefore provide radical de-contextualisation which can then be translated into architectural interventions.
LARS SPUBYBROEK

Lars Spuybroek was the first of the speakers.

He started out with ‘The digital is full of impossibility’, noting that anything goes in the digital and therefore it can be up to the users to choose a moment to freeze the program and capture an architectural form but, more importantly, architecture is about habitation. In regard to the designing of cities there is the architecture of default, that is, what happens when no architect is present. The question then becomes about freedom and about pre-formation and the pre-existing form. ‘We generate form; we do not design it’

That emerging from his experience of a video and installation artist for years was his approach to architecture: "Architects can misconceive habit for use...What I learned through art brought a different experience: how do you feel and what are your moods, rather than what are you supposed to do."

He suggests "Architects are divided up, if you do technical things in architecture, you are more like a determinist, like (leading British designer, Sir) Norman Foster, whose architecture is very functional...If you are a conceptual architect, normally your interest is not in technology, so we are actually mixing things that are culturally very separated. That makes it very new”...

ANDREW BENJAMIN

Has an arts and philosophy background and teaches the masters of digital at UTS. Here he discussed narrative, context and time in paintings. He discussed the development of perspective and how digital is basically set up on the premise of these done hundreds of years earlier.

He referred to Klay and Mondrian: where the work over the 1908/1930 and constructivism developed and created the line as internally regulated, ontological & static.

Whereas Malevich's work with lines, and artwork is marked by “potentiality and allegory” suggesting an after life.

…So how is relevant in architecture?

Benjamin again noted Semper in discussing meaning vs production. Talked about digital images and the potentialities created in working on them via various software packages & programming. I.e.: software packages have a language of their own. So not about using digital for process but by using mixed processes the outcome and transfers between packages create the potential of the line and an allegory. The software packages are sites of potentiality. And this realization has radically changed what we do and these changes have reconfigured the relationship between practice and digital.
(Reference: ‘Author as producer’)

He suggested we need to rethink the definition of:

- technique
- technology
- machine
- practice

Noted that the ‘image not abstract because it lacks substance but is abstract because it contains potentiality’ and that this provides a radical de-contextualisation and an application for architecture.
APPENDIX C VARIOUS TERROIR UNPUBLISHED DOCUMENTS

Appendix C includes file notes and unpublished material gathered from various conferences. I have highlighted specific notes that I refer to in Volume One.

I have included PowerPoint presentations made by TERROIR directors. The PowerPoints include the images projected. Notes made by directors against these images are also provided.

I have also included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.
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<td>Richard Blythe; Gerard Reinmuth</td>
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<td>Scott Balmforth; Richard Blythe; Sarah Benton</td>
<td>some sial feedback from today</td>
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Good evening everyone, my name is Dale Jones-Evans and I welcome you all to another Monday evenings architectural discourse.

Tonight I have the pleasure of introducing the architectural practice, TERROIR, geographically a Tasmanian and Sydney based practice, started in 1998. It’s run by three good looking hunks, who on a first name basis, go by the names of Scott, Richard and Gerard. S, R, and G are a Trans-Tasman, via the Pacific East Coast operation – with deep roots to Tasmania. A practice, glued together by aeroplanes and emails, and a tri-polar configuration of intra-state minds.

It’s easy to introduce people through their achievement-data. I don’t need to do that, after all, the reason TERROIR are present tonight, is because their achievements are high. Besides - we know they’re smart, we know they have accumulated a ‘nice little bag’ of institute awards, we know they take the ‘discourse’ and ‘making’ of architecture seriously. In short, they want to make a mark. Not bad for a mob with only a 6 year trajectory.

So the professional, academic and media reverberations suggest they are wanting to tell us something. Imagine, a bunch of Tasmanian architects appropriating the French word TERROIR as their mantle. I mean, what is that about - this – you give me a French word and I’ll tell you, what it means, in Tasmanian, in fact – in ‘architectural’ Tasmanian. This is confident and cheeky stuff, and we all know wine from French soils are good. So is this a reference to their boquette – of course it is. This is the need for a younger generation to flesh out a new Tasmanian architectural language. Their architecture is about their story of their landscape. And it is made from the conscious intersection and manipulation of three ingredients; Culture / Architecture / Landscape.

Their’s is not a monochromatic reading of land - the New South Wales formula, its definitely not, the humidity blowing through the slatts stuff – Queensland, nor is the discourse inscribed ‘in and of’ the architectural body – Melbourne. It is, east coast, but its neither exclusively ecological or psychotic, its richer and may be wiser than that, with a leg in both understandings. There is a monumentality and delicacy in their contextual swipes. Their line-traces and buckled architecture can traverse the most delicate tree or force the ground to rise in a chorus of mountainous reflections. Specificity of site is critical, but lets not overly-romanticise this – it’s not everything.

I think, TERROIR are experimenting, setting up the template for future urban work. I believe their buildings are acts of architectural erudition, urban constructs, rooted in the core discipline of architecture, and stage set to meet the tamed-wilderness locations of Tasmania. Though they do have, an eye - on land art. They reach out to the land and the land reaches back, while the viewer looks in awe, at both.
TERROIR is a space we shall watch, sharing their growing pains and highlights. Tonight we look at Tasmania and that State's global search to underpin a natural asset – ecotourism investment.
And that requires exceptional architecture.

Could you warmly welcome TERROIR's Sydney persona - the 6' + man –
Gerard Reinmuth.

REFERENCE /DATE:
FN Fri-Sat 21-22/10/2005

AUTHOR:
Richard Blythe, Gerard Reinmuth, Marcelo Stamm, Jeffrey Malpas.

SUBJECT:

ABSTRACT:
Designing in architecture is a 'pli' activity, always multiple by virtue of its interests: site, budget, use, legislation, context etc. The modernist role of architect was singular - to unite the multiple in a single expression, and therefore style and design were understood as singular. The multiple was consequently defective and multiple authorship excluded from the modernist canon.

The practice of TERROIR began as, and is sustained through conversation and is thereby fundamentally pli and in which designing occupies the space between interlocutors. In this form of practice, the question 'what is designing?' reveals a condition, which is both specific/bounded and multiple/light.

Designing, it will be argued, can be understood as occurring in a place. This paper will explore this notion of the place of designing through an exploration of the overlay of the concepts of chora and TERROIR and in consideration of the plied nature of emergent architectural practice.

These theoretical concerns underpin the work and design practice of the architectural firm TERROIR. A reflective critical review of this body of work and practices will test the proposition that the place of designing might be understood as multivalent and nested and therefore that at the level of design there is a legitimate correlate to cosmopolitanism.
Andrew Benjamin has referred to TERROIR as a "truly digital practice" due to the remote nature of the directors and their means of communication. The SIAL PhD then, is a prime opportunity to fully explore the potential of the "digital practice" idea as suggested by Benjamin and make it a reality at all levels of the practice.

What are the 3 corners of the debate WITHIN TERROIR?

Proposition for the three aspects TERROIR operate under;

- **Client/Brief/Program etc.**
  Usually locale dependent
  Usually singular (ie GR or SB. Nb. Others coming through but still operating under guidance of GR or SB)

- **Site**
  Where to stand/How to stand?
  Singular or Plural, ie sole Director (ie especially of late in busy times) or at times all 3 (refer Hazards, Bronte etc)

- **The Story**
  Zone for “weak intelligence”
  This zone is where our sensibilities are aired.
  Aspect that needs to be shared and understood between all 3

The point of engagement by the other(s), ie those with no role to play on points 1 and 2 (generally refer GR on Hbt projects/SB on Syd projects)

RB generally ALWAYS engages with “3”, ie refer early stages referencing of;
- Peppermint Bay; Bacon/17c gardens;
- Bronte; Batholith image, Gregotti
- Sal’s; Jam-making history

How we’ve generally answered the question of “how we work” is a version of the above, i.e.;
- Director in charge in location is usually responsible for project management, ie “1”
- We often come together on site and reach a consensus on what position we take in relation to the site
- “Richard floats in and out on key projects”...some input in fact arises on projects different from it’s intended original proposition...refer ‘weak intelligence’ as being able to make connections between seemingly unconnected elements.

REFERENCE /DATE:
FN Fri 08/09/2006

AUTHOR:
Sarah Benton

SUBJECT:
Internal TERROIR office meeting held on the 8th September 2006

NOTES:
- This meeting debriefed staff from the workshop held with Martin Kornberger on the 1-2 September 2006.
- The aim of the meeting was to provide a general reporting and to get further inputs from the staff on the UTS concurrent research.
- Director noted that on any project in TERROIR, two main architectural roles exist of an Ideator and a Project Architect. Following Stamm’s idea of conflict and antagonism TERROIR directors identified that these two positions interplay, through their engagements, as ‘hero’ and ‘villain’, battling and coordinating aesthetics and style with pragmatics and realities.
- Staff generally agreed/discussed that the two roles work independently of each other but are simultaneously dependant of each other and thus the individuals share a sort of duelling co-dependency.
1. POSITION SUMMARY
The Ideation staff are required to undertake design tasks within the practice in collaboration with Directors; work towards further developing the reputation of the practice via its design work, nationally and internationally; work with other members within the practice taking into account their inputs; continue research and development of ideation techniques within the practice.

2. SUPERVISION
2.1 Immediate Supervisor
Director

2.2 Direct reports to this position
Junior Ideation staff and other team members as required.

3. PRIMARY TASKS
3.1 Listening
As TERROIR continues to be a conversation between people it is the ideator’s role to listen very hard to the conversations surrounding the project.

3.2 Reflection, Positioning
Upon gathering this body of information it is the ideator’s role to act on this information and reflect and distill it into a position that they present to the team. The ideator needs to defend and argue the position against the propositions of others in order to critique and verify the quality of idea.

3.3 Guarding
As the design develops the ideator needs to manage and maintain the essence of idea throughout the project and continue to remind and critique the team’s documentation.

3.4 Mediation
The ideator needs to be open and approachable so as to gather the most out of the contributions of the team. The ideator needs to mediate between the parties so as to effect an agreement or reconciliation.

3.5 Designing
In designing, the ideator needs to think intelligently about the modes of representation used and work through item 3.1, 3.2 in determining which modes of representation are best for a current design investigation.

3.6 Speed
The ideator should endeavour to work at the speed of the conversation.

4. LEVEL OF RESPONSIBILITY
4.1 Level C:
You will undertake ideation work on projects in direct contact with the Directors. In doing this work you will make an independent contribution through your understanding of the TERROIR design process and
your involvement in it, and co-ordinate and/or lead the activities of other team members, as appropriate to the task.

4.2 Level D:
You will make a significant contribution to the ideation process at the practice. In doing this work you will make original contributions, which expand the knowledge of the practice in your discipline area. You will make a significant contribution to the advancement of the design agenda of TERROIR and will be able to articulate these advancements back to staff. You will also play a major role or provide a significant degree of leadership in these activities across the whole practice and in the public realm via lectures and/or wider study, to a national level of recognition.

5. POSITION RELATIONSHIPS
The appointee must relate effectively with:
• Directors
• Staff members
• Students
• Members of other practices with whom we collaborate
• Members of the public and clients
• Industry members and leaders.
Marco Frascari’s workshop, Recto Verso conducted at the University of South Australia 2004, challenged participants to consider the difference between the drawing on paper, a three dimensional object, and drawing on the computer screen which was described as two-dimensional and having no depth. How does the data-set nature of the digital mark affect notions of authorship normally associated with marks drawn on the three dimensional piece of paper? Do questions of artistic authenticity and authorship impact on architectural designing? Do traditional drawing techniques predicate the idea of the individual designer-genius over collectives? Are there examples of drawings made by collaboratives that are highly valued in designing? If drawing is understood as delineation of something or as drawing forth then are marks on paper the only ways in which things can be drawn in architectural designing? These questions form the basis for a discussion of the work and practices of TERROIR (Blythe Friday, June 10, 2005 11:59 AM book chapter proposal on the architectural drawing)

…a kind of productive agency…

‘…an elegant system of marks…’
The canova contraption is interesting in relation to the technological projection in computer/Evan example…
At this point, need to explain that, the system has been presented as a lineal one when in fact it is of course iterative.

...three different locations...

| Gerard | Sydney |
| Scott  | Robert |
| Richard | Peugeot |
WHY is this interesting? Temporal – fast and instant response Diagram -insistent to explain things, which helps drive a larger practice. With time – process has become more formalised and understood. Ownership – diagram becomes part of “ether” and is multi-owned. Important opposite of our training – separate partners doing separate things.
Hi,

Going to start a conversation about the surface stuff, very uncertain on my part so accepting there will be a range of reinforcement and challenges as we work through it. I will also probably run foul of Richard in terms of nomenclature so his critiques will be helpful no doubt.

RB/SB and I have been mulling over our recent theoretical realisations and coincidence (in that the material we are all working through intersects and intersects and this week all trains seemed to arrive at the station). It has opened up possibilities of what a set of research might be, from our perspective, into the way in which we project forward our work in a digital context (this was not the reason the theorisation but a byproduct).

We have been circling a number of issues, the inner/outer, the double skins of the houses and hazards, the way in which our line is a productive tool that yields to surfaces/walls, the bluntness of the exteriors, the uncanny, the acceptance of a decorative quality within the logic of the formal actions that produced these surfaces etc etc.

Andrew Benjamin’s surface stuff has been a profound moment (RB and I can’t stop banging on about it) as it ties together nearly all these issues in one bundle. As per my previous notes, Andrews’s descriptions of the productive line and surface may as well be a discussion of the yellow-trace sketches we have relied on so much in the past. A clear and analytical look at their structure, formal relationships and so on will reveal that they are exactly aligned with Andrew’s text. Andrew then, has explained to us what we do, what is significant about the way we draw. We could never do this as clearly before. What is also of interest is that Andrew’s essay was written to contextualize the digital paradigm and the interest in the surfacing ability of software.

The question then arises, is there something we can learn from this in how we approach digital tools? Is AutoCAD the best design tool, given its need to construct things from lines (not the conceptual Lines I talk of but small “l” lines – 4 of which bare needed to describe square column). When I see fidgeting by say, TM12, in 3D studio, I see lines adjusting and cluttering but not the smoothness of the yellow trace sketches... Not a conceptual awareness or operational accommodation of the surfacing of spaces that forms according to spatial or landscape logic. What is interesting is that in AutoCAD you have managed very well to retain the spirit of the sketches, have discovered the value of the quick “dump” and the like, but is this software working “operationally” in the correct way give a meditation on the nature of our work?

Is Maya worth a more focused look? Or is it all in AutoCAD and 3DS but we are just not operating in the correct way...

A lot of questions. I am interested in how we can move forward and get into the ideation abilities of the digital tools as they can reinforce and expand upon what we already do well, and make it better?

G
...the question is, how does the computer assist, until the computer gets to the point that it understands that it needs to create something uncanny?

...so, how does the idea of SIAL intervention/PhD get worked into this Sydney comp? There are some interesting issues in here about the computer and its potential...

the sial opportunity seems to be twofold- how can sarah illustrate to us how all this technology may affect our work (at a conceptual and technical level) and secondly, how can sarah simultaneously think about communicating her newfound knowledge back UP the tree to directors and DOWN the tree to staff, so that what she is doing is relevant for the directors and understandable to staff who then take over her projects

I’ve used design techniques or actions as headings listed in chronological order and because of this it’s quite repetitive. The repetition though is indicative of the way we move across different fields and methods of inquiry and often repeat similar processes at various times… i.e. wasn’t a linear process of completing one stage before moving onto the next. Also I’ve been quite brief and there are some chunks that I’ve skimmed through when the process we were going through when the design process was similar. Going back through the emails I’ve realised not much of the drawing that we were doing down here in the Hobart office was being communicated…

Analysing the Site
Director produces a diagram sketched over a photo to describe initial site issues.
**Drawing on Precedents**  
Imagery of other similar architectural projects

Projects dealing with similar problems of making a project out of nothing

I don’t think this precedent and ensuing email discussion went anywhere – perhaps because they were very much derived from a CAD process

**Investigating the Site – Directors conversing – Transcribing Directors conversation**

I suppose this site visit and conversation formed the basis of where to ‘start’.

**Discussing (verbal)**

Individual words are associated with ideas and start to gather meaning.

Around this time I think we had a phone conference where we discussed the nature of the site ‘apron’ and it’s relationship to the city… key words emerge such as ‘turbulence’ and ‘triangulation’.

Also discussed connection of the ‘apron’ to the city as a ‘hook’ movement as opposed to an axis.

**Diagramming**

Words such as ‘turbulence’ which have emerged are diagrammed (using CAD drawings and 3D models) as a way of investigating their potential.

Prompted by these visual representations a discussion ensued involving the directors of what to investigate and what methods to be used in investigation. I suppose this is the important thing here that the diagram in itself might not be as important as the discussion which occurs around it…

**Reviewing (brief)**

Not really yet understanding what the project is the brief is reviewed to work out what the problem is.

**Defining (words)**

Key design trajectories are listed which prompts further discussion from Directors e.g.

‘The concrete apron is extremely artificial, and hence it’s “nowhereness” is at odds to Hobart generally where the landscape PLACES one…’

‘I wondered whether the rivulet is not in fact the 3rd element which in a way completes the triangulation between mountain and harbour…’

KEY focus is starting to shape up here… in words.

**Researching**

Search for images of metaphors or key words which have appeared in conversation to date - ‘umbilical cords’, ‘water’, ‘spillways’, ‘estuaries’ etc.

The descriptions / images found in this research were not really picked up as I think they were too detailed and strayed from core ideas. Later on however imagery of estuaries was incorporated into diagrams.

**Recap-ing**

recapped comp requirements and design issues (in words). Imagery was then used to investigate key ideas.
Representing
At this stage the first series of presentation imagery emerges which attempts to represent
the key design issues.

Drawing (hand)
Testing various ‘stylistic’ approaches to working over the site some referring to earlier
researched precedents.

Diagramming
Further diagramming incorporating various design ideas together.

Investigating (Physical Models + Photomontage overlay)
Used to test the word or idea of ‘turbulence’ in an architectural outcome.

This worked well I think because it was a simple method of testing whether an idea
can be transformed into an architectural element.

This imagery prompted a request to go to the Prague project and test some elements from
there.

‘use Prague form as a quick-n-dirty object, transform it by mirroring to get the kick action to
gesture the landscape valley shown following and then set in relation to an image of the
landscape valley (either a picture or cad topography)….the point being to render an image to
present to US (the project team) to describe the action of working the dunn st apron to
reference the greater landscape bowl’

This is then developed as a series of cad images.

Investigating (New tool – software)
New water modelling software is used to test flooding the site – still thinking about the word
‘turbulence’.

A discussion on the accuracy of the model then ensues – this is more to do with the capacity
of the software.

revert to a more poetic area of discussion and uses other metaphors to describe the essence
of our site and its characteristics ‘glacier’ and ‘lava’.

Researching
Internet research into words ‘glacier’ and ‘lava’ produce descriptions and imagery.

Imagery of the metaphor ‘lava’ strikes a cord with the Directors.

Drawing on Precedents
Images of Chillida sculptures provide an interesting precedent for a particular architectural
manoeuvre:

‘An image showing the turning up of a monumental element’

Drawing
Testing an architectural response which is conceived as a composition on the site though
drawing.

Presenting
A discussion over many emails ensues about the final layout / quality of the presentation
panels. produce imagery for the ‘main image’ and discuss it’s relevance to the key design
ideas. I think the production of this image is hindered by the communication channel set up
... attached my take on the process. Many of the words that you identified were the same as what I had, although I did put some of your extra words into it.

The thought was to write about the characteristics of undertaking the role

ASPECTS OF THE ‘IDEATION’ ROLE

The role is twofold; conversation and visuality

CONVERSATION
The role of Ideator is a social activity requiring an Ideator to collaborate, which includes the ability to listen, mediate, facilitate and articulate.

LISTENING
1. To make an effort to hear something
2. To pay attention; heed

As TERROIR ideation is a conversation between people it is an Ideator’s task to listen very hard to the conversations surrounding the project. They need to take it all on board ...

MEDIATING / MEDIA-TING
1. to settle disputes as an intermediary between parties; reconcile.
2. to bring about an agreement as an intermediary between parties by compromise, reconciliation, removal of misunderstanding, etc.
3. to effect a result or convey a message by or as if by an intermediary.
   –verb (used without object)
   4. to act between parties to effect an agreement, compromise, reconciliation, etc.
   –adjective
   5. to occupy an intermediate place or position.
   6. acting through, dependent on, or involving an intermediate agency; not direct or immediate.

As an Ideator I mediate within an intermediate position between technology and idea to effect a result/convey a message. I also bring about agreement by compromise/misunderstanding through the ‘production’ of certain images. So what is settling the dispute? As in law it is the third party that mediates the dispute being between the directors and the idea – I act with the image/technology to convey image.

EG: Maitland, Prague, 86-88 GEORGE STREET
I also can act with judgement to progress the debate.
EG: Prague
I also can act without judgement to progress the debate.
EG: Maitland, Hazards

FACILITATING
1. to make easier or less difficult; help forward an action, a process
2. to assist the progress of

Acting without judgement is a part of my facilitating.

By doing this it removes unnecessary debate to allow the idea to develop and be presented (necessary part of completing an architectural presentation) and reduce frustrations in conversation
Eg: Newcastle didn’t work well as my ‘weak’ facilitation (assisting the progression) didn’t make the process easier/ successful. However in Prague etc facilitating other peoples comments into images assisted the progression of the work by not contending the issue – like the dump, just getting the work done so that one can critique it visually.

ARGUING
1. to present reasons for or against a thing
2. to contend in oral disagreement; dispute
--verb (used with object)
3. to state the reasons for or against
4. to maintain in reasoning
5. to persuade, drive, etc., by reasoning
6. to show; prove; imply; indicate.

I don’t often enter into the argument and persuasive aspects (ie: form a judgement) but examples do exist…
EG: Prague, Hazards

ARTICULATING
1. expressed, formulated, or presented with clarity and effectiveness
2. made clear, distinct, and precise in relation to other parts
3. having parts or distinct areas organized into a coherent or meaningful whole; unified
4. Zoology: having joints or articulations; composed of segments.
--verb (used with object)
5. to utter clearly and distinctly; pronounce with clarity.
6. to give clarity or distinction to: to articulate a shape; to articulate an idea.
7. to unite by a joint or joints.
--verb (used without object)
8. Anatomy, Zoology. to form a joint.
--noun
9. a segmented invertebrate.

Having clear precise relations to other parts is a part of my task to ‘project manage’ a design. I’m not sure how significant this is in terms of Ideation. However making connections is a part of networks and remembering, which some would suggest is a part of creativity.
EG: Prague, Hobart I increasingly reiterate the conversation to establish the links and assist the development of the story. However these tasks are then finalised by the directors as I move into the development of the images.
EG: Prague images (attempt) articulate the idea clearly and distinctly. They are also conveyed in a (romantic) style

DISTILLING
1. To separate or extract the essential elements of: distill the crucial points of the book.
2. To fall or exude in small quantities.

As with articulating separating the conversation into essential elements is a task of distillation of the information.

VISUALITY
In the Prague case study I identified 3 ideation stages: conversation, speculation, presentation. The Hobart competition reinforced these stages.

The speculation and presentation stages are more visual than the conversation stage.

In Prague, I thought that the process held a level of linearity such that by the end of a project one shut down and ‘not-think-just-produce as work has to be done’. In Hobart this was not correct. Rather whilst someone did need to sit and produce the work at the end of the day, an overlapping and ongoing interaction between the stages of conversation, speculation and presentation occurred all the way through the project’s development. This suggests a circularity to the stages.

SPECULATION
Speculation includes ideas generation, form generation, and presentation.
IDEAS GENERATION
For each new project this is typically undertaken and derived by the directors. On commencement of the office they agreed that the practice should develop a consistent body of work and continue to address (and re-address) their founding interests. So whilst there is not an aspiration for TERROIR to do a particular work, they have an aspiration to make the best of a place or a situation no matter where it is and try to “strip back a problem to an understanding of where it is in the world and how it can relate to that place, as a way of then scribing some sort of meaning to the problem that then might unite people around that place”. So there is a considerable body of work that has already been undertaken in scribing a TERROIR ideology. This mass of work, and its ever-evolving nature, makes it challenging for any new Ideator to enter into a conversation about the higher ideology of the practice without a dedicated and thorough training and engagement. But the Ideator needs to gain an understanding of this and the sensibilities of the directors and learn how to operate within it whilst continuing to critique it in a productive way - such that they do not fall into a pattern of trying to guess what the director may do but rather to present what they believe would be the appropriate TERROIR proposition in respect to a current project and its own constellation of ideas.

Due to the complexity of the existing body of work, projects in TERROIR undergo a process of ‘idea setting’ prior to the project being shared with a larger team. At an everyday level Ideators are invited into the first conversations with the directors in order to brainstorm and distill an initial idea set.

COMMUNICATING (DRAWING ON PRECEDENTS, RESEARCHING)

1. to impart knowledge of; make known
2. to give or interchange thoughts, feelings, information, or the like, by writing, speaking, etc.
3. to express thoughts, feelings, or information easily or effectively.
4. to be joined or connected

My research is normally given as an interchange and an expression of my own thoughts, connected to the conversation. However it is not a time for judgment to be made.

FORM GENERATION
There is then a period of idea cultivation where initial comments are extrapolated, passed around, added to and critiqued. During this time it is their responsibility to ensure that potentialities behind the metaphors of the ideas being discussed are investigated and provided. It is also their responsibility to ensure that the information is managed and continues to address the initial set of questions.

The Ideator is key in the evolution of a formal response in a manner appropriate for the project and the construction of representations. Through this stage the Ideator needs to seek, develop and present the idea. The Ideator is much like a role of an illustrator that works alongside an author, they bring richness to the storyline of a TERROIR project. This richness may not just be an articulation of the story, but may project this story in a speculative way, seeking out potentialities, insights or abstractions that fit within the scaffold of the idea that bring forth new possibilities and provide the team with new ways of seeing.

REFLECTING

1. To give back or show an image of (an object); mirror.
2. To make apparent; express or manifest
3. To give evidence of the characteristics or qualities of someone or something
4. To think seriously.
5. To express carefully considered thoughts:

Mimesis is a (contentious) part of representation. I do sometimes reflect objects in images but they are normally used in an abstract way.

In terms of thinking I do think seriously about the conversation, which helps me to develop the appropriate image

EG: Most images

TRANSCRIBING / TRANSLATING

1. to turn from one language into another
2. to change the form, condition, nature, etc. of
3. to explain in terms that can be more easily understood; interpret.
4. to bear, carry, or move from one place, position, etc., to another; transfer.
5. Computers. to convert (a program, data, code, etc.) from one form to another
In translating verbal conversation into a visual format. Not necessarily to understand easily but to translate into a new form. 

Eg: SHFA, Currant

CREATING/INVESTIGATING
1. to cause to come into being, as something unique that would not naturally evolve or that is not made by ordinary processes.
2. to evolve from one’s own thought or imagination, as a work of art or an invention.
3. Theater. to perform (a role) for the first time or in the first production of a play.
4. to cause to happen; bring about; arrange, as by intention or design: to create a revolution; to create an opportunity to ask for a raise.

–verb (used without object)
5. to do something creative or constructive

Sometimes I act creatively without direction. 
EG: Bicheno, Prague

PRODUCING
1. to bring into existence by intellectual or creative ability: to produce a great painting.
2. to make or manufacture: to produce automobiles for export.
3. to bring forth; give birth to; bear: to produce a litter of puppies

I definitely produce representations/images to bring into existence. But not only to make but to bring forth in a way that provides new insights to a conversation. 

Includes 
Physical Models, Photomontage overlay, New tool – software, Diagramming, Drawing (hand)

Ie: operational images (going back to cofa interior image is a good example of this), like most card models we make and the dialogue that happens between us, would not contain people…for arguments sake just like they would not contain representation of ‘everyday’ things, but;

PRESENTATION
The Ideator can be used in the realization of the form’s ideation image and or the project’s descriptive images. Rendering’s for descriptive purposes are also needed…eg: some by moritz for shfa …

DIRECTING
Next would be directing…? This would be contentious and a part of the next step. However I am currently directing the production of works by people
APPENDIX D PROJECT STUDY: COMMUNICATIONS

Appendix D includes file notes and email conversations gathered over the research timeframe. I have highlighted specific notes that I refer to in Volume One. I have included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

The following table categorises and codifies the material included in this appendix:

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NOTES:

1. Reasons for questioning use of email
GR mentioned that he agreed that Mark Burry's suggestion that the office may be complacent or are you just relying on the system was useful to question. One question was 'are there any disadvantages' in the system.

2. The interface.
We discussed the different interfaces for commenting and editing wiki. I suggested that directors had an easy tool for adding comments but for the upload of information they would need to engage in another language. GR said that they want to use it properly and will agree to use and learn the manual interface. But it should be acknowledged that this will be a frustration and if it becomes too cumbersome then email would be reverted to.

3. Heterotopia of Information and Weak Intelligence
The project will just be a competition. The office system allows for emailing in regard to not only design but project management; admin, client, consultants. But for this project the wiki will be only be used for design discussion.
GR noted that this is a 'heterotopia of discussion and this allows for a weak intelligence', that is, in one sentence many things may be covered or uncovered.
'It is a precise process that is not overt'. As it is for design a certain type of intelligence ensures and means that you not want to put yourself in a box (or segregate the information into managed folders). You want to keep it flat structured and open. You do not want to 'thwart the discussion'. Not boxing it up. If you look at the email there is a level of 'flick back and forth' on one issue.
So GR imagined that the 'front page of the wiki would be similar to that of an email inbox' which is just a long page of discussion.

4. Searching
The good thing with email is that you have search facilities. So if you want to find something you can search by date or use the title which the team has appropriately or approximately named.
There are high importance and hierarchy marks that can be used to make a notification of a particular comment.

5. Scrolling
In email the interface allows you to scroll over the discussion and get an overview of its development. This link to chronology shows and reminds the team of how the story unfolded and how it may be repackaged. In wiki you would want to be able to scroll back and see the chronology of the discussion.

6. Legitimacy of Information

7. Parallel Conversations
We discussed that directors and team members use separate lines of emails to have private conversations that are separate to the main discussion. GR noted the beauty of this is that these are not explicit.
Although in the WIKI you can create separate pages for these to occur the problem is that their link can't be invisible. So whereas on the email, and with our system that is not linked by exchange, all conversations are hidden and private.
Without these hidden links the team would need to accept the social reality of private conversations.
Main issues that were agreed:

- 'Tablet PC' hardware facilitates scribbling
- 'Windows Explorer' gives file management and is quick and easy to navigate.
- 'Microsoft Outlook' facilitates conversation
- Basically many hybrid tools exist to do a lot of different things. It is not a database approach
  - Senior people use curation and manage the process through agreed and evolving office protocols

Other Issues raised:

- Some communication media assists a mode of operation that is a flat structured, open sharing and 'collaborative' resource.
- However TERROIR process is arguably more 'conversational'. TERROIR uses email to hold design conversations.
  - In the set up of TERROIR design emails it is common that one travels through many programs to make all sorts of adjustments to images and texts, including marking up or colouring images sent through by another.
  - Noted that there was a level of 'trustworthy' collaboration and individual control at TERROIR. One gets shown and shared into what another wants to show and share.
  - In email each person has there own version of the conversation, each individual has their own control of events and access to all the points of the conversation for them to refer back to if necessary. It is not collaboration in an open sense. A hierarchy is required and exploited.
  - There is a human component in the curation and presentation of emails to get a point across.
    - There is an editing process in the emails including deleting, editing via copy and paste of other peoples versions.
    - The chronology of the conversation is important. Having an interface that allows the user to sort and rearrange the conversation visually is useful in the re-curation of an argument.
    - Email automatically saves old versions. Then one copy and pastes from old versions to put a point across.
    - Three discussions can occur at once over sequential emails. Different issues or areas of a building can be discussed simultaneously across parallel email banters.
    - There is a self management available for those that chose to enter conversation
    - No email folders are shared across the office. This has been due to having no exchange services. Discussed that this has facilitated a privacy and individualistic approach to the email process.
    - There is personalization, self management, organization and interpretation in the email program as each user can set up the filing systems as it suits there own individual practice.
    - Noted that the interface of Google images was useful for viewing images. But it is a rarely used tool in the development of a design.
    - In WIKI there is an effort to replicate in a similar manner to the email and someone needs to decide for the team when a version is old. Someone needs to be positioned to manage it
The amount of “innovation” bought to the office is in Sarah’s hands. There is no Directorial view that we should not explore new innovations. But, where we have existing systems (email communication for example) that works well, we are not going to enact changes unless Sarah makes a case for us to do it. If she does not introduce innovations such as the wiki we simply assume that she is too busy, or has thought it through and has decided it would not help. This is totally Sarah’s department and does not involve Directorial meddling. I suspect some of these decisions will come out in her case studies. For this reason, I support the enablement of systems such as a wiki in the interests of a more rigorous research process and thus more justifiable conclusions…

(There is a) suspicion that the office is complacently under the illusion that email is a system that is working.

There seems to be two issues:

1. That the office uses email (this is convenient and reliable but it could be any web based application) to generate, moderate and manage designing – in particular discussion and representations. This is an INTERNAL process for TERROIR in the interests of holding, protecting and manipulating the idea/story of a project.

2. That the office – especially on bigger projects – needs to start to more rigorously assessing how EXTERNAL contributors engage in this interest in the priority of the project idea/story.

So I would like to debate the finer details of this…
Yes, I think this would be a good move forward. I find that not being the one of the top players in the design process, I get left out of a lot of emails and design discussions which means that when I’m asked to model something, part of the idea or story is missing and the results aren’t quite in tune with the latest design discussions. If the communication was centralized such that I could access it, this would solve the problem of what g referred to as a forgetting of ideas. I question the value of the hierarchical discussions because if the bottom people don’t know the ideas or story properly, the documentation won’t reflect them.

Further, having access to these discussions could greatly help in educating the younger members of the office in how the design process works and how ideas develop and translate into design.

As a very quick answer I’d say YES! Definitely needed!
The storyline in a project gets lost easily due to the given reasons!
As you are jumping back and forth between projects there is simply no way that you can keep track of what was happening (hazards...2-3 years?)
And I have the suspicion that the directors with the large variety of projects they try to handle lose the overview as well!
Things get forgotten and lost...time and quality is wasted!
Don’t know much about wikis...but I assume it has sort of a blog-structure which would already solve some problems as everything can easily be accessed via a timeline. U scroll through and or pick stages of interest. So...YES!
APPENDIX E PROJECT STUDY: DIGITAL MEDIA IN THE EARLY STAGES

Appendix E includes file notes and email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

The following table categorises and codifies the material included in this appendix:

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FILE NOTES

REFERENCE /DATE:
FN Thu 12/07/2007

PRESENT:
Sarah Benton, Gerard Reinmuth

DISCUSSION:
Review of Presentation for Digital Media in TERROIR

NOTES:
Gerard in discussing 86-88 George Street Foyer:

‘Looking at the imagery as an operation, we are operationally working on them and we need to look at them in their totality...’

REFERENCE /DATE:
FN Tue 17/07/2007-Wed 18/07/2007

PRESENT:
Sarah Benton, TM08, TM11, TM01, TM05, TM06, TM04, TM07, TM10, Scott Balmforth

DISCUSSION:
Digital Media in TERROIR

NOTES:
Scott Balmforth: On a general level...I think the last 12-18 months we have probably – or the past 2 years – we are getting better as a collective and that is lead by Sarah and her ‘SIAL’ stuff but its also naturally seeping through. People can invent ways of showing things that it doesn’t matter if you want to do a bit of performance dance to explain something its all about using tools which is what ‘SIAL’ is using tools and knowing when technology isn't going to give you that tool. To back away. And that’s probably the best position to be explain that we are not searching for answers solely by technology so what has happened is the general skill set which once upon a time used to be cardboard has grown as a family. Cardboard models still stay there as a valid toolset – as Sarah will attest; velvet and plasticine, we've actually got better at producing the quick and dirty images – internal images to convey design...so what has happened is that skill set is growing exponentially and – I’ve spoken to Sarah about this before – that even I sarah wasn’t doing ‘SIAL’ that would still grow...and that was even happening before Sarah did ‘SIAL’. For example on Hazards there is an evidentiary account of just day one we were just making funny cardboard models by just before Sarah entered ‘SIAL’ – which to me is an important aspect – we were doing cardboard models and – a cut across the office - and getting into some early spa images .. .to me that becomes the raw case of saying that unaided we are developing skills happening through this office...

TM11: On the same token, I think the Hobart office has become more rigorous than the Sydney office in terms of everyone wanting to do it the same way and there being some sort of standardised foundation in the way that we document...

Scott Balmforth: Yeah I am away from the 2D traditional documentation sense I am more turning putting that aside momentarily to developing a design project, there is various ways

TM01: Its actually seeing what’s been produced by various people and working out what skills are required to do that thing
Scott Balmforth: Yeah everyone being able to reflect and look at someone not because they choose greens and salmons, pinks it’s more being able to see that that person is different but that will have a particular strength in some circumstances. We were talking about it with TM10 and Sarah on UWS (another competition project) (it was) understood that TM10 and Sarah have completely different presentation techniques, Sarah’s is graphically strong but of a particular quality, TM10’s can be seen in North Sydney competition. And what we were talking about was overlapping those. Each one, TM10 and Sarah know what there strengths are and the others strengths are to ultimately get the best version. (Its) not (about) trying to jam TM10 into Sarah’s presentation and I think graphic presentation in AutoCAD also has that quality or ability….

TM05: Id say at the moment in terms of documentation we are all at a certain level and its probably happening like you say certain people and certain things and areas…id say in the design side, especially as we step into the 3D stuff we are probably not at that stage at the moment where we can have a conversation about how you would potentially do it cos I don’t think enough people know about it and I think at the moment its more a case of so how did you do that and then you go and do it yourself rather than you did it this way…and I think that will come in the stage

Sarah Benton: A Hobart generalisation has been the ‘documentation office’….and in Sydney we are looking at design with 3D tools…so, its not across the board, but some of us are at a similar level in terms of how we do it and our own personalities are coming through in the way that we are using it. So now, I think because of the pressure and the way that the office is moving we are trying to integrate the whole office across the two sites. (Sydney) downloading a bit more of ‘design’ to you (Hobart) I think will relieve pressure

TM11: Designing tools have probably been less computer orientated in Hobart in a 3D sense

Sarah Benton: At one sense it’s a bit of a problem that you’ve got to have your own personality and fostering that is great for presenting your ideas and the way you work and we like to see that but at the same time not using the same languages is a problem as well. There is benefit in being able to do the same things so I don’t know how that works in terms of – if UWS went ahead – I would want TM10 to be able to do exactly the same brazil renderings that I could do not because I expect it to be exactly the same but because if need be he can interpret it in his own way

TM08: I think that is exactly what Scott is saying. We’ve got AutoCAD as TM11 was saying is a general program and powerful program which gives you a common platform and I think or what I would see is that we give everyone that basic platform to work from and each person will develop that platform in the way that they want to do it. So it is about standardising things at a very base level and lay down the foundation, what then comes out of that foundation is something completely different…if we lay down those sorts of analogies…if we lay down a solid foundation building and the thing that we get off those foundations will be strong but strong in their individual ways.

Scott Balmforth: There is another good point in the things you were saying Sarah. 12 months or so or whatever there was a sense that there was an imbalance in the tools being taken up. Now there is not that sense. In the end that is the optimum for the way we operate. Not be constantly worrying that everyone doesn’t share your Rhino or Brazil knowledge and confident that there is an organic take up in a way. So for instance as you say on UWS if there was a reason why it was valuable for TM10 to become conversant in Rhino it would be an urgency to at least introduce him to it but acknowledge that he has been on it after one day. Where as you have been on it after 1000 days and acknowledge that its not panic stations if his immediate skill set and that is almost a natural way of doing things…if we all know that to sit down here for 2 days and a presentation on Rhino and walk out of here and not use it on a real project you are just going to forget about it…

Sarah Benton: The pressure is on us in Sydney to use Rhino when it is probably more appropriate for you to be using it …

Scott Balmforth: Taking that point up that is a way of explaining that if via a project TM05 needs to pick up Rhino – its probably a comment to both Sarah and the office in general – TM05 has taken up Rhino and we wake up in a couple of months to find TM08 knows Rhino via another discussion we have had where its almost by osmosis he has taken it up. And TM06 has taken it up Rhino and something else. You get to a point there to think hang on we do need to come in and fix up those that do not know the basic level of Rhino. Because all of
a sudden we go from specialists via circumstance to a general base level in Rhino that TM08 said. And you will always have the peaks because TM05 has been on Rhino for 3 months already and things like that…. Id say that is a lot of how our computer take up has been anyway. Someone becomes a specialist, then we have three specialists and then everyone just hovers themselves up to that base level and it goes on from there. So that is probably just a general circle. As soon as you people on the ground or someone from afar notices hang on I thin the remaining 30% people need to know Rhino that’s when it becomes a surgery and we get in there and fix that and then that is fixed
Sarah Benton: And that is what I would say is how we look to continue the ongoing discussions on CAD stuff

TM08: How we keep that base level at its optimum, which will naturally develop, and the more we actually invest in keeping that base level. It’s almost coming up in a line together rather than having gaps in the system. We are all coming up together. We all know where we are with the program so we can just handball it off and its not going to be, you know, you are not going to drop it, you know everyone is going to be at a similar stage.
TM01: It seems that the surges that occur are project related. So one person might introduce to a project but then because of, and generally the larger projects, with two or three people then become users of that tool then a surge happens then because so you’ve got three people talking about and really refining it to a particular point and that tends to be where you get people and certain groups who will be very articulate
TM08: I think that is where this is valuable where you then bring everyone in so if there is a tool that has been discovered via a larger project those sorts of things and those should be trickled down to the smaller projects because if it is going to be used in a smaller project then of course you are going to want to – that is where it has to filter down where I don’t think it necessarily does trickle down and that is the thing of trying to keep everyone at a base level and making sure that everyone is sort of on the same playing field…

REFERENCE /DATE:
FN Thu 26/10/2007

FILE NOTE:
DigitalMedia In TERROIR Summation

NOTES:

Ideation
- The process seems to falter prior to submission
- How much should one be a generalist/specialist particularly if the culture of the office is to have a common level of knowledge

Development
- The role of the digital model simulation versus the reality on site. Noted that documentation act to convey design intent and on site one must acknowledge changes will occur

Documentation
- Which tool should the office take up

General
- Discussed the culture of the office
  - Generally:
    - we are not searching for answers solely by technology
    - the general skill set which once upon a time used to be cardboard has grown as a family
    - got better at producing the quick and dirty images
  - Standard of Office
    - We are getting better as a collective and that is lead by Sarah and her ‘SIAL’ stuff but its also naturally seeping through
    - There was a sense that there was an imbalance in the tools being taken up. Now there is not that sense.
- We are trying to integrate the whole office across the two sites.
- It's almost about coming up in a line together rather than having gaps in the system. We are all coming up together. We all know where we are with the program so we can just handball it off and it's not going to be, you know, you are not going to drop it, you know everyone is going to be at a similar stage.
- Hobart has reached a general standard
- **New tools**
  - being able to see that that person is different but that will have a particular strength in some circumstances
  - seeing what's been produced by various people and working out what skills are required to do that thing
  - we are probably not at that stage at the moment where we can have a conversation about how you would potentially do it because I don't think enough people know about it
- **Knowledge transfer/Uptake**
  - We don't want to be constantly worrying that everyone doesn't share your Rhino or Brazil knowledge and confident that there is an organic take up in a way.
  - Question is how we keep that base level at its optimum which will naturally develop and the more we actually invest in keeping that base level
  - Someone becomes a specialist, then we have three specialists and then everyone just hovers themselves up to that base level and it goes on from there. So that is probably just a general circle
  - Large projects are the key to knowledge transfer however it isn't necessarily trickling down to the smaller projects and that is the thing of trying to keep everyone at a base level and making sure that everyone is sort of on the same playing field.
- **Required:**
  - How we look to continue the ongoing discussions on CAD stuff
  - Sydney high skilled employees need to download a bit more of that design to you guys I think will relieve that pressure
  - Sydney skill sets lags behind the standard
EMAILS

REFERENCE /DATE:
Thu 9/08/2007 16:35

DETAILS:
From: sarah benton
Sent: Thursday, 9 August 2007 4:35 PM
To: TM09; TM08
Subject: sial

CONTENTS:
…a criticism (to the integration of media in TERROIR) was that the skill sets that I was aiming for – seemed somewhat boring and very traditional in response - my conclusion is reinforced by an external researcher who clarified the way TERROIR wanted to practice….TERROIR is not trying to be pioneering in a technological sense. they prefer to focus on the idea, delivering that idea at a reasonable cost, operating with a collaboration of people that have different roles to play that don’t all need to be revolutionary in the entire use of digital tooling –they actually have various skill sets and skill sets in more influences on architectural practice, for example how to construct or design the thing – and that we are ultimately working in an industry that is mostly traditional.

…even though the trajectory and structuring seems rigid - any employee can extend into other areas to put together my conclusion I spoke with the three people here in Sydney office that have high skills in this stuff and we all put that together. I spoke to the directors and gained their support and then presented it to the office for confirmation

REFERENCE /DATE:
Thu 9/08/2007 16:45

DETAILS:
From: TM09
Sent: Thursday, 9 August 2007 16:45
To: sarah benton; TM08
Subject: RE: sial

RELEVANT CONTENTS:
- Just had a discussion with the project manager on site … how the industry is generally "lackluster"…So I would say that we are in fact revolutionary in the sense that we are using the appropriate tools at the appropriate times…
APPENDIX F PROJECT STUDY: FERN TREE HOUSE

Appendix F includes file notes and email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included file notes and various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

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<td>Fri 16/09/2005 23:47</td>
<td>Sarah Benton</td>
<td>Gerard Reinmuth; Scott Balmforth; Richard Blythe</td>
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<td>Sun 18/09/2005 18:06</td>
<td>Gerard Reinmuth</td>
<td>Sarah Benton; Scott Balmforth; Richard Blythe Cc:TM11</td>
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<td>Sarah Benton</td>
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Wed 05/10/2005 21:44 | Scott Balmforth | TM11; Sarah Benton | Re: FERN TREE
Thu 06/10/2005 17:17 | Sarah Benton | 'TM11'; 'Scott Balmforth' | RE: FERN TREE
Fri 07/10/2005 14:08 | Sarah Benton | 'Scott Balmforth'; 'TM11' | RE: FERN TREE FACADE
Tue 11/10/2005 22:22 | Scott Balmforth | TM11; Sarah Benton | Re: FERN TREE

PROJECT DESCRIPTION

The site for this project is located on the escarpment of a hilltop at Fern Tree, a suburb located in the foothills of Mount Wellington, Hobart. The site has two significant views to the waterways of the Derwent River mouth and North West Bay. The project design draws inspiration from the ‘winding and weaving nature’ of the approach road. The house itself explores the idea of ‘poche’ space, which is created between a main timber wall and a dark-coloured metal-clad wall beyond.
FILE NOTES

REFERENCE /DATE:
FN Wed 06/04/2005

PRESENT:
Scott Balmforth, Gerard Reinmuth, Sarah Benton

DISCUSSION:
Fern Tree House

NOTES:
Visit Hobart Office
Discussion regarding the redesign of Fern Tree House
Sarah Benton:
Mention redesign to Scott and comment to Gerard as to whether I will work on the project again given my involvement in the previous two versions.

Scott Balmforth:
Scott acknowledged my involvement and noted that TM11 in Hobart office was already in line to undertake the project

REFERENCE /DATE:
FN Tues 05/07/2005

PRESENT:
Scott Balmforth, Sarah Benton

DISCUSSION:
Fern Tree House

NOTES:
Scott Balmforth
Visit Hobart Office, discuss TM11’s developed design. Scott Balmforth noted however that the design was not achieving the directors’ intentions. Scott noted ‘… my sense is that the answer lay somewhere between the previous two designed versions …’
Hi TM11

I was wondering if you could send me some files for your design on FERN TREE house?

I wanted to see what happened if you built a model of old version then one of new and put it in Maya or 3DS and pressed transfer from old to new and it came up with a design that was exactly halfway between yours and mine...

Sounds kinda silly but im trying to run in as much software as I can before RMIT review in OCT.

Thanks
S

Subject: THIS ONE NEEDS SOUND
Attachments: currant_0002.wmv
From: Gerard Reinmuth  
To: Sarah Benton; 'Scott Balmforth'; 'Richard Blythe'  
Cc: 'TM11'  
Sent: Sunday, September 18, 2005 6:06 PM  
Subject: RE: THIS ONE NEEDS SOUND

CONTENTS:

Wow
Amazing little thing, and the last couple of images seem better than the “current” design . . !!

From: Scott Balmforth  
Sent: Sunday, 18 September 2005 20:53  
To: Benton, Sarah; Gerard Reinmuth  
Cc: TM11  
Subject: Re: THIS ONE NEEDS SOUND

CONTENTS:

yes, very interesting
is the last still image a half-way point of the transformation?

From: Sarah Benton  
Sent: Monday, 19 September 2005 09:43  
To: 'Scott Balmforth'; 'Gerard Reinmuth'  
Cc: 'TM11'  
Subject: RE: THIS ONE NEEDS SOUND  
Attachments: currant.avi

CONTENTS:

Hmmm, well yes the last images are half-way point of this transformation. But there are of course many paths of transformation.
From: Scott Balmforth
Sent: Tuesday, 20 September 2005 20:46
To: Sarah Benton
Cc: Gerard Reinmuth
Subject: Re: THIS ONE NEEDS SOUND

CONTENTS:

can you send through a suite of static plan views of this original transformation (from original to new) in particular I’m looking at the intermediate moment you’ve captured in the last couple of still shots at end of this first video

REFERENCE /DATE:

Wed 21/09/2005 09:59

From: Sarah Benton
Sent: Wednesday, 21 September 2005 09:59
To: 'Scott Balmforth'
Subject: RE: THIS ONE NEEDS SOUND
Attachments: PLAN-8.jpg; PLAN-9.jpg; PLAN-10.jpg; PLAN-11.jpg; PLAN-1.jpg; PLAN-2.jpg; PLAN-3.jpg; PLAN-4.jpg; PLAN-5.jpg; PLAN-6.jpg; PLAN-7.jpg; 50%-1.jpg; 60%-1.jpg; 60%-4.jpg

CONTENTS:

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REFERENCE /DATE:

Wed 05/10/2005 07:03

From: Sarah Benton
To: 'Scott Balmforth' ; 'TM11'
Sent: Wednesday, October 05, 2005 7:03 PM
Subject: FERN TREE

CONTENTS:

Just a couple of renderings

I have been playing with the terrain which wasn’t working….after a bit I figured out the problem. So tomorrow ill look at the model images and make the adjustments to suit the STUDENT’S model and perhaps an email or something from you may assist in clarifying what you want.

I wouldn’t mind doing a series of animations that change parts of the building around…particularly the roof line and the deck …and then perhaps one or two that move between the option where the glass goes to ground to where the ground comes up…
Refer attached for some comments/suggested investigations.

s, TM11 will need to fill you in on some things referenced, also we had a good discussion late today re;

how the triangle front corner is carry over from original formal model but has yet to be ratified against
the building's 'diagram'...animation may wash something out on this too?

Attached is a version I think worth testing but not solely

I think front concept of crumpled 'windscreen' locking in the ground formed up to form deck is strong.
Windscreen thus enters a dialogue with the view....refer attached for some of these images as
inspiration also.

elsewhere, primary 'shed' remains generally as is but the thinking we have to bedroom side wall
windows as stuck ons but that subtlety misalign to wall line (get TM11 to explain...subtlety as per 349
glazing)...the stuck ons thus engage with adjacent trees etc.....this concept is carried over to treat
garage door and egress from living (formerly the canted wall/deck)...both as sliding elements across
the surface and may be offset from primary wall or just their 'head' lines?
CONTENTS:
I had a play with the deck and morphed tender into the modified and suggested earth movement. The first series of still images start addressing the comments in Scott’s last email and then the final still images are snap shots from the morph...

CONTENTS:
This is a collection of the front façade investigation, for your information and comment. I realise they are abstract and not quite right but I am just trying to understand what a crumpled façade would be…
A few mapping investigations
Internal view
Just seeing what happened when overlay two images. One inlayed in glass and then the view beyond…

Living
Pretty much the façade used on Cameron the other day… the big verticals tend to break the view up and don’t really match the sketch that you draw of the horizon view?
Wondering whether the façade should emphasis the line of trees somehow

Externals with majority verticals and a bit of a horizontal starting to look at line to view
This one starts to be a lot more horizontal than vertical as per Cameron House model. Bit more Pepp bay This model isn’t complete ... the glass is a mistake but it looked interesting and the horizontal is a bit simple and doesn’t match the rest of the building ... but I thought the interior shot looked more interesting esp. with such a low ceiling?
So perhaps this image is interesting if you look at the cracks… it picks up horizontals and some verticals and really is a broken windscreen…

Any preferences on where I should go from here?
Thanks
S
very good!
in conjunction with what TM11 and I discussed today I think we're getting there!...I think there's clarity in understanding/accepting the objects (bathroom, kitchen block etc) that are crafted and generated by key building lines (not always 'built')

refer attached for comments in line with this and others...relevant to both (with TM11 needing to fill sarah in on some things)

meeting with CLIENT at 1pm so priorities:

- finalise plans
- modify 3d cad model in line with comments herein
- also get STUDENT doing a 'tag along' card model to explain overall form, connection to ground, grafted on windows etc
glass still on outside million
still part of glass flush but prob.

can you still be outside to work?

start glue to here
metal to work through
information lines below
Appendix G includes file notes and email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included file notes and various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

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<td>Sarah Benton</td>
<td>Gerard Reinmuth</td>
<td>HAZARDS ROOF</td>
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<td>Thu 10/03/2007 15:12</td>
<td>TM02; Sarah Benton</td>
<td>UNIVERSITY; Gerard Reinmuth</td>
<td>Model Making Hazards</td>
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<td>Mon 23/07/2007 19:11</td>
<td>TM02</td>
<td>sarah benton; Gerard Reinmuth; Scott Balmforth Cc: TM08; TM05</td>
<td>RE: HAZARDS: roof form</td>
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<td>Mon 23/07/2007 19:51</td>
<td>Sarah Benton</td>
<td>Gerard Reinmuth; Scott Balmforth Cc: TM08; TM02; TM05</td>
<td>RE: HAZARDS: roof form</td>
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PROJECT DESCRIPTION
The project proposal consisted of a monumental copper roof plate which crowns the site, providing an abstract and iconic synthesis of the site and the characteristics of the natural ‘Hazards’ granite mountains which the site faced (Terroir 2007d, Thursday, 8 November 2007).

Hazards Resort is a 100 room, $35M, 5-star hotel in one of Tasmania’s signature landscapes. The project was won in a limited design competition in mid 2003 with a design that addressed the market’s requirements for a responsible design within a site with a precious environmental condition (Terroir 2007d, Thursday, 8 November 2007).
FILE NOTES

REFERENCE /DATE:
FN 00/2004

PRESENT:
Gerard Reinmuth, Scott Balmforth, Sarah Benton

DISCUSSION:
Hazards design

Travel to Hobart office to discuss Hazards design. During meeting directors discussed the overall form of the roof. Suggested it needed to be more 'fluid' and 'subtler' than the design based on planes and fillets. A project had just been completed with another architectural firm and directors speculated on the potential in digital media to assist in ideas of fluid forms

I mentioned that I did not have the equipment to support such an investigation and that I would need to investigate new processes to accommodate such an investigation.
As per a discussion with Gerard the roof designing has arrived at two clear character options for progression. We require conversation/debate/analysis on these options.

OPTION 1:
Amorphous Character

The conversations about applying a greater fluidity into the Hazards design has produced an amorphous roof form.

This form started with the plasterboard studies:
which were taken in to digital 3DS studies sent through last week,

and finally reproduced in a more controlled Rhino environment by TM02 yesterday,
This form attempts to keep the façade to the agreed tight elevation that we have been seeing for the past 3 years and then intuitively morph backwards to hit a rear elevation line that angles its way over the entry. The theory to the shells has been to get them as splayed at the rear as possible. This results in a mostly curved and fluid form.

Digitally it is based on a FIELD concept where a continuous surface has been created and any curving and filleting is complete dependant on the relationships of any adjacencies. Basically it is problematic to convey this as a series of flats and curves as per our old Hazards geometry.
Going forward we would be able to use Rhino to analyse any areas that are, for example, lower than 4 degrees and rebuild according to construction constraints…

OPTION 2:
Euclidean Version
We have the option to take the amorphous version and reduce it into a series of flats and straight geometries as per our old Hazards 1 design.
Digitally if this is chosen we would need to spend sometime approximating the fluid curves that we see in the amorphic version. Thus potentially ‘rationalising’ the form into a series of standard fillets and curves similar to our old design ‘roof rules’.

We have already had a conversation about the geometrical issues on such a roof, that is, the junction where the shells hit the roof creates a complex intersection that geometrically would need some thought and debate…

REFERENCE/DATE:
Thu 10/03/2007 15:12

DETAILS:
From: TM02
Sent: Thursday, 10 May 2007 15:12
To: UNIVERSITY
Cc: Gerard Reinmuth; Sarah Benton
Subject: Model Making Hazards
Flag Status: Red

CONTENTS:
Hi!
… Below is a description of the journey that Sarah and I mentioned – moving out from our digital models to make a physical model of the latest Hazards Hotel.

Some background:
The Hazards Hotel has been in design development for the past 4 years.

In 2004 Gerard, Scott and Sarah acknowledged that we desired, but were not able to create, a more ‘fluid’ design for the Hazards Hotel roof as we were limited by our digital toolset. Fast forwarding to today we have advanced those skills and have been able to produce the more fluid version however, as we found about a month ago, we were faced with the problem of how to make a physical version.
We needed the physical to check the proportion and form of the current design which had been developing in the computer for the past 6 months. I had done some initial investigations for the Prague competition, which although we didn’t use, allowed us to see the potential for the Hazards. Below is a summary that Sarah initially put together to explain our process to the office.

Some initial images of the design:
An early hand made plaster model.

The digital model
Then I made some investigations into Milling
We then organised file formats and setup tool paths

In order to make some initial foam tests
The aim was to create a vacuum formed plastic plate of the roof molded from the foam part. We quickly learned that rigid insulation melts under the heat of the plastic forming.
The next solution was to mill directly into a block of laminated poplar, but after 12 hours the collet heated up and the tool slipped down causing a motor lock. We also found that the timber debris needed to be cleared away regularly so leaving the machine unattended was problematic.
The key was to mill the negative quickly out of blue foam at a high quality then cast directly into the foam.
We used 50mm foam – next time we would use 100mm thick foam so that we don’t end up with the unsightly and unintended joint detail.
The final plaster cast. At this size, plaster takes a while to set.

The 3mm plastic before we took to it with the bandsaw. Again you can see that the surface finish is a direct result of the part finish. You get back what you put in.
The laser cut timber
The final model – just a working model with a level of accuracy, but the very exciting thing was that, by getting it out of the computer and into the office, it allowed everyone to see and interact physically with the design in a way that we weren’t getting from the digital versions.
As we continue moving down the digital road, it is becoming more and more necessary to complement our digital tools and techniques with equally sophisticated techniques for physical modelling. As you can imagine, the problem is getting access to the tools to enable the exploration…. 
This is an example of the problem area. I know that everyone is familiar with this.

The image shows a Gaussian curvature analysis. It highlights areas of compound (double) curvature.

The blue area has negative Gaussian curvature – i.e. it is like a hyperboloid or saddle.
The red area is positive – like a sphere.
Areas of zero Gaussian curvature are flat.

Note this area is quite contained - it is slight and occurs over a very small area. The reason for this is because most of the double-curvature is spread (or diffused) along the whole of the surface. This strategy was implicit in building the original surface (a rational creation).

When we reduce this area to three filleted planes all resolving themselves in a point it concentrates all of the curvature and deposits it in an area that is problematic to resolve and will result in some strange junctions as can be seen in the image below:
The problem
As far as I understand the problem, we are rebuilding the curvaceous roof as a collection of planes and surfaces based on arcs and cones. The purpose of doing this is to make it easier to describe and build.

The problem area
This area can be minimized or covered, but it won’t go away. Any strategy will result in a hole or a gash where the planes intersect. This area can be minimized by decreasing the radius of the fillets; however, this will also make the whole roof more angular.

Also, it is worth noting exactly what is being rationalized by rebuilding the roof out of conic / cylindrical sections: it means that the surfaces used are developable. This means that they can be unrolled to a flat piece of material that can be re-bent to form the drawn surface.

It does not mean that any material will bend into the particular radius we have chosen. Neither does it mean that the sections drawn through the “rationalized roof” will be composed of straight lines and arcs. When you take a section through a tilted and angled cone you get a parabola.

TM02
CONTENTS:

Hazards roof investigations:
As we discussed we are trying to move the roof from the fluid surface we have been looking at to the rationalised version made up of a series of planes meshed together by arcs, cones and other Gaussian geometries

The first thing we have done is to check over the constraints we are working with including:

The Constraints
Thickness of roof: 800mm
RL at entry is RL 20.70
RL to underside of roof at entry needs to be above: RL 23.80 (+3.5m)
RL to underside of roof at the roof tail : nom RL 20.30
MAX RL to roof shell: nom RL 32.00
Min 4d to flat plate of roof

We used this to draw a frame that forms the underside of the roof – which sits against the plan below-against which to compare the fluid version and the new versions.

The first thing we found was that the flat plate needs to be 1.8d
We then offset this base framework by 800 to get the upper side of the roof.

The next thing we did was create 2 versions:
1. Creates planes that sit perpendicular to the Hazards:
2. Creates planes as per the fluid version – this means that the planes have no real logic to them and ultimately the elevation will be quite dynamic...
We continued on with Option 1 as that was based on an ongoing concept to see what happens. We then started creating the fillets to match the old roof.
And have looked more closely at the **junction points**:

**Attempt 1:**
In this version you can see that it is not possible to resolve the junction in arcs – some cones need to appear. And the arc that connects the flat plate to the shell at the rear is unresolvable by a curve – we would end up with an odd surface – see impossible area outlined below.

**Attempt 2:**
Similar to the old hazards roof we have a main arc (which turns to a cone so that it becomes more fluid that hits the flat plate and another cone to resolve the valley curve again its impossible to resolve the rear fillet this way.
Attempt 3:
To resolve the rear fillet we would need a patched infill that curves in two directions – TM11 suggested it would be based on a ‘Gaussian’ geometry or a piece of a sphere. TM11 is modelling this up at the moment.

It seems to me that if we can get an idea about the Gaussian’ geometry piece or the series of cones to make up this piece we’d be able to work our way around the shells and create the rationalised roof based on the fluid form….we would then have another problem to solve which is where the last shell over the restaurant folds down over the terrace.
APPENDIX H PROJECT STUDY: HOBART WATERFRONT URBAN DESIGN COMPETITION

Appendix H includes file notes and email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included file notes and various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

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<td>Sarah Benton</td>
<td>TM02</td>
<td>06218 waterfront</td>
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<td>TM02</td>
<td>'Sarah Benton'</td>
<td>RE: 06218 waterfront</td>
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<td>Sarah Benton</td>
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<td>Gerard Reinmuth</td>
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PROJECT DESCRIPTION

The project, Hobart waterfront urban design competition, was an ideas only competition. The brief for this project requested innovative ideas for a master plan for a site surrounding the city of Hobart's dockland area and the brief was very open in terms of pragmatic limitations.

TERROIR's idea for the project was derived from the directors' own personal experience and knowledge of the Hobart area. TERROIR's idea for the master plan was to create a sense of connection on the dockland concrete apron to this mountain and recognise on site the significance of the outlet. Furthermore, the idea was to reinforce the 'uncanny' nature of the existing dockland concrete apron by further differentiating the apron to the adjacent Hobart city (Appendix I Sat 25/11/2006 18:57).

Figure 1: Final competition panel
The Invitation
Hobart's historic waterfront, Sullivans Cove, faces south towards Antarctica and is bordered by the River Derwent and the imposing Mount Wellington Range. This dramatic backdrop creates a natural amphitheatre and at its lowest point, where water meets land, is a unique opportunity to revitalise this part of the city.

The Hobart Waterfront International Design Competition seeks visionary design proposals for one of the city's historical sites, an area where cultural importance is reflected in a unique collection of heritage buildings.

The Competition Area is a broad band of space framed by the street-grid of the city. As the place where the Hobart Rivulet met the cove, it played an important role in Aboriginal life. The safe anchorage and fresh water supply were a vital factor in the early occupation of Tasmania and the foundation of Hobart.

The Competition Area is located on the least active side of Sullivans Cove and is currently the weakest connection between the city centre and the waterfront.

The creative challenge is to embrace the area's rich history and design a contemporary cultural hub to revitalise the space.

This web site provides an overview of the competition. The complete Competition Brief is available as a free download, if however you would like to receive a hard copy of the Competition Brief, please send your name and address and a A$50 cheque or money order, made out to the Sullivans Cove Waterfront Authority to:

Competition Registrar
Hobart Waterfront International Design Competition
C/- Sullivans Cove Waterfront Authority
GPO Box 2114
HOBART TAS 7001
AUSTRALIA

Download the Competition Brief:
EMAILS

REFERENCE/DATE:
Thu 28/09/2006 12:41

DETAILS:
From: Sarah Benton
Sent: Thursday, 28 September 2006 12:41
To: Gerard Reinmuth; Richard Blythe; TM02; Scott Balmforth
Subject: Hobart Waterfront - Initial Meeting

CONTENTS:

Hi

Gerard TM02 and I met on the Hobart Waterfront this morning and the project is now underway. A summary of our discussion is as follows:

Coffee Meeting Minutes (28 Sept):
  • Brief breakdown
    We haven’t found a clear list of detailed requirements from the brief as yet. It seems to be an ideas only competition and so is very open in terms of pragmatic limitations.
  • Research recent international urban planning competitions
    As the brief seems very vague TM02 is starting to collate some other examples of International standard urban design projects for comparison. These include Hadid but focus more on the works of Pinos (who is a judge) and whose work seems more appropriate for the vast expanse of the Hobart waterfront (versus perhaps issues of density, networking and porosity as in the works of Hadid and even Goodwin…)
    • Jurors:
      o Carme Pinos
      o Wiel Arets
      o Catherine Bull
        Juror for previous competition – looking for something subtle
    • Site and climate issues:
      Pulled from the brief and knowledge of the place:
        o Concrete apron – “wall of the cove”
        o Rivulet (and the recovering of) and turbulence – check with Scott
      Gerard mentioned that Scott has some opinions on this issue and that we should ask him to forward them for our information…
        o Vastness
        o Danish Black wall – dealing with the weather
        o Coal

Timetable for TM02:
We discussed the operation of the project and whilst I will be working on this as well over the next month the focused work will come via TM02 whose schedule is as follows:

  October: ½ day per week – Thursday / Friday morning
  November: Full time

Competition Timetable:
We discussed our overall schedule of works for the next 2 months:

  October: Research and initial ideas
  November: Weeks 1 – 2: Full time
            Weeks 3 – 4: Tweak
            Week 4: Print

  December 1: Hand In
....The waterfront presents an interesting conundrum. SIAL has allowed me to be more aware that in TERROIR the idea is primary and all else supports it. My occupation is ideation which is considered and encouraged to be separated from the realities of pragmatics, brief, and materials. TERROIR’s primary interest is in the architectural idea and utilizes abstraction and the process of divorcing oneself from practicalities to push the idea to its limits or into new potentialities. Digital seems to suggest that we are missing something. That we need to 'reassess' or 'change' the way we think about our way of designing as digital technology presents such an amazing opportunity for generation and potentiality...

....I am not researching production and material and architectural structures...The origin of TERROIR’s ideas emerges from their readings and reinterpretations of place and experience. The theory of nature and digital techniques are not what the directors would consider primary order questions....

Of course, to a level, a house style is unavoidable. So there are a series of prerequisites and parameters that are characteristic to every project and there does become a series of characters for each individual project. It is these characters that become the ‘rules’.

In previous case studies I’ve undertaken, particularly idea competitions, I’ve found that the quality of these rules are too implicit and lightweight to be applied and mapped onto digital technology such as CATIA, which demands considered, articulated and complex explication of interrelationships. In early stages of design studies the idea is abstract and undetermined.

In the Hobart competition we have started to talk about ‘turbulence’ which I basically think is complexity due to an overlapping of many things. So seems perfect for some algorithmic or complex layering of digital data. So my question is what are the limitations of the rules because as I understand it its these characters that should be able to become the parametric or algorithmic machine?

If nothing else I would like to know what program it is you have used before where you have managed to generate form and complex relationships...
CONTENTS:

Complex relationships:

Maya scripting (basic)
Rhino scripting (basic)

I think I would need about three months (of fooling around at night) before I felt comfortable writing scripts on a project specific basis.

Other ways include:

RealFlow (www.nextlimit.com) - great for turbulence and flow studies; might be like using a sledgehammer to open an egg. Researched and used it for Richard's porosity.

I think you can build in a lot of complexity – and keep it organized, ie. within a rule-based relationship, using the animation and dynamics tools found in Maya and studio max (the poor person's scripting).

One benefit of this is that is does give you real-time graphical feedback of what is happening.

CONTENTS:

Just spent hours this morning trying to create the Hobart terrain
First the rhino join went swimmingly well
Second the contours don’t have numbers so I spent hours figuring out where Mt Wellington is.
Particularly as google earth has its aboriginal name as default
Then I finally got all the contours to the right level (mt Wellington is at 1270m) and the bloody computer crashed
So I am back to start point
Damn it
S
From: Sarah Benton
Sent: Thursday, 9 November 2006 12:17 PM
To: TM01; Gerard Reinmuth; Richard Blythe; TM02; Scott Balmforth
Subject: HOBART WATERFRONT: first flood

CONTENTS:
This is Hobart flooded via Real Flo…cool stuff and I guess if we were suckers we could take the mesh
that its created over the pier and turn it into something…

From: Scott Balmforth
Sent: Thursday, 9 November 2006 12:45 PM
To: 'Sarah Benton'; 'TM01'; 'Gerard Reinmuth'; 'Richard Blythe'; 'TM02'
Subject: RE: HOBART WATERFRONT: first flood

CONTENTS:
Hmm…but my dubiousness would lead me to ask;
why the confluence over the foreground was created where in fact the barren topography once was
(and presumably would still allude to) a swampy mess in and around our competition site, hence the
flood would be completely dissipated beyond the CBD…???

Scott

From: Sarah Benton
Sent: Thursday, 9 November 2006 1:15 PM
To: 'Scott Balmforth'; 'TM01'; 'Gerard Reinmuth'; 'Richard Blythe'; 'TM02'
Subject: RE: HOBART WATERFRONT: first flood

CONTENTS:
Yeah totally - the confluence is computer calculated based on nerd principles.
There are so many other adjustable and non sensical parameters that are just as dubious like
the thickness of the water
• The inaccuracy of the site contours limited by computer power
• The inaccuracy of site materials that effect things like water soaking into the ground
• The number of meshes created that effects the location of the form generated
• The location of the origin of waterfall

These simulations have provided me an insight into the fall of the land – the valley folds that surround
Mt Wellington which were a little difficult to read without this overlay
The other interesting thing is that yes the water would have dissipated and I’ve used the image below
to suggest that dissipation – a zone between the solid ground and the salt water which is the flattest
space in that area - is visually expressed / appropriated or formalized as the concrete apron. The way I’ve drawn it shows Dunn place as the mixing point between waterfall and dissipation area… This means - not much? - but it was an interesting experiment…

REFERENCE/DATE:
Thu 09/11/2006 13:30

DETAILS:
From: Scott Balmforth
Sent: Thursday, 9 November 2006 1:30 PM
To: 'Sarah Benton'; 'TM01'; 'Gerard Reinmuth'; 'Richard Blythe'; 'TM02'
Subject: RE: HOBART WATERFRONT: first flood

CONTENT:
Yes, all good.
Some other equally nature-inspired quirky ways of thinking about it are;
- the apron as last remnant of a receding GLACIER, or
- the apron as solidified lava having flowed down from Mt Wellington and fused having hit the water….?
Mt Wellington: The mountain's past includes an igneous intrusion in the Jurassic, and is the site of periglacial processes: igneous rocks that have cooled and solidified from a magma (a largely molten fluid formed within the crust or upper mantle) below ground, e.g., granite. So I guess saying the following is ok. The flat blunt nature of the concrete could be explained by Lava + Water = 'megabomb'. Lava and water don't mix. They can explode like a giant bomb. The blast wave of steam, volcanic ash and rock flattened everything in an area of almost 4 square kilometers, killed animals over 300m…

REFERENCE/DATE:
Thu 16/11/2006 16:02

DETAILS:
From: Sarah Benton
Sent: Thursday, 16 November 2006 4:02 PM
To: 'TM01'; Gerard Reinmuth; Scott Balmforth
Subject: HOBART WATERFRONT: paper tests

CONTENT:
Trying a few ways to find an overlay for the bigger gestures of the concrete apron like a Chillida image but it's a bit difficult. I just seem to keep drawing the same crosses. But this was just a first attempt so…
Thu 16/11/2006 16:50

DETAILS:
From: Scott Balmforth
Sent: Thursday, 16 November 2006 16:50
To: 'Sarah Benton'; 'TM01'; 'Gerard Reinmuth'
Subject: RE: HOBART WATERFRONT: paper tests

CONTENT:
Just as a “painting” this image is very alluring. Not necessarily taking it too literally, but it is a good reminder of the sensitivity/beauty we should be aiming for in the 2nd panel in particular
Well done!
S

Mon 20/09/2006 22:47

DETAILS:
From: Scott Balmforth
Sent: Monday, 20 November 2006 10:47 PM
To: 'Sarah Benton'; 'TM01'
Cc: 'Gerard Reinmuth'
Subject: RE: HOBART WATERFRONT: panel requirements

CONTENTS:
Sarah
Quick comment is the angle of presentation of the concrete apron in ideation part looks good. It all loses something in the city on to landscape…I’ll give you a call in the morning to discuss but in interim look to simply finding the best landscape image (may be real photo or digital) and placing in as a simple collage between it and the apron you currently have
Scott

Tue 21/09/2006 12:40

DETAILS:
From: Gerard Reinmuth
Sent: Tuesday, 21 November 2006 12:40
To: 'Scott Balmforth'; 'Sarah Benton'; 'TM01'
Subject: FW: HOBART WATERFRONT: panel requirements

CONTENTS:
Are they either A0 size, or 2 x A0 size?
I am not sure that the image yet captures this “drain” quality – it’s a bit too ephemeral at the junction between the city image the apron such that there is no sense of the “forces” at play.
Also, I think using a real photo and manipulating it might be better than the composite which looks a bit dinky in some way. If a real photo is no good I would make the whole thing abstractly digital
REFERENCE/DATE:

DETAILS:
From: Sarah Benton
Sent: Wednesday, 22 November 2006 10:13 AM
To: Gerard Reinmuth
Subject: HOBART WATERFRONT

CONTENTS:
Scott said the drain was the red line
Look at the real flow, which is a bit of a visual description…

REFERENCE/DATE:

DETAILS:
From: Gerard Reinmuth
Sent: Wednesday, 22 November 2006 10:20
To: 'Sarah Benton'
Subject: RE: HOBART WATERFRONT

CONTENTS:
That is fucking amazing

Can Scott get VPN access to download that? Is it email-able? Is it extendable to the docks?

REFERENCE/DATE:
Sat 25/11/2006 18:57

DETAILS:
From: Gerard Reinmuth
Sent: Saturday, 25 November 2006 18:57
To: 'TM01'; 'Scott Balmforth'; 'Sarah Benton'
Subject: RE: WATERFRONT
Attachments: hbt_waterfront_design_statement_(7)-GR.doc

CONTENTS:
Hi
This is the latest version of the txt I have seen. Its Scott’s turn so put this one on the panel and await further versions
Cheers
G
Hobart exists within the landscape. The “phone book shot” best typifies this; the city held (and negotiating) between mountain and river. The Hobart rivulet – often a poetic reminder of the link of Mountain and water – is understood as the ‘centre-line’ or ley line within this (greater) action of the landscape BOWL. And a literal umbilical cord connecting these two dominant elements of the landscape. Further, the development of Hobart as a city occurred in a FOLD in the landscape, between ridges and offcourse dictated by the line of the rivulet...Thus the city occupies a CREASE at the bottom of the landscape bowl...this also defines an interesting difference between the Murray/Elizabeth street “Axes” – which cut across the natural ridge to connect city and cove, with a hook-like movement formed by the greater landscape bowl (intensified by the city nestled in the valley) meeting the cove of the city (think from say the mall swooping down – akin to course of the rivulet – to around dunn place and then adjusting course to connect to the river).

II. The concrete apron has historically and continues to be the site of transience, a threshold between worlds (ie the apples arriving and being distributed). The concrete apron fills a sensory and spatial VOID...it in fact generally fills IN that which the natural topography has never. The natural topography is still sensed; refer walking down from the city, there’s a moment of transition where one feels they’re stepping from the LAND on to the APRON.. this is particularly so at this point where the impact of the city is at its least.

(Panels 2)

(given the 2 panels are joined, we don’t have to reintroduce ideas from panel 1 text in to panel 2, so here we could jump straight in)
The location of the apron at the delta and its uncanny nature suggest opportunities - working with inherent patterns and qualities, and revealing these with greater veracity, rather than imposing new ones. Firstly then, the character of this place as the "delta" of the larger landscape and historic entry point to the city can inform new work. In detail, the juxtaposition of the monumental and intimate so characteristic in the Tasmanian landscape is evident here in the points of intensity and use that punctuate this broad uncanny field.

I. Inhabitants on the apron need a variety of systems to define place on this otherwise desolate, "OTHERNESS" plane.....when in the landscape and/or able to feel/understand/see the landscape, people understand their place.....except for a few places such as where one can get near the water and orientate oneself to the natural or built (which in fact in it's better light accentuates the natural order, i.e. by providing a built definition of the Macquarie st ridge and adding another layer to the amphitheatre behind the cove etc) form, the dock's apron is UNCANNY (unhomely), and our intervention/insertions reinforce this sense. The layering of systems/orders is about finding one's place on the vastness of the BLUNT APRON.......this could be an intensification and betterment of current uses; carparking, recreation, relaxation, commerce, marina etc.......?? The point on the apron is to retain its uncanny and placeless quality while using new elements to reinforce the greater triangulation. The triangulation issue here takes it out of the specific and thus retains the uncanny.

Left over text;

Dunn Place is the DRAIN of the landscape beginning at the pinnacle of Mount Wellington then "dishing" down to ooze out in the Derwent around the former swamp-land of Wapping etc, i.e Dunn Place. Our action on Dunn Place – in understanding it as an extension of the apron – is the point where the APRON MEETS THE NATURAL TOPOGRAPHY and thus is a "key" between the water and land. The place where the harbour folds in to the landscape. This validates our site of intense action TO the apron FROM the landscape interface as a key junction of potentiality and turbulence

(THIS IS HANG OVER FROM A PREVIOUS ANGLE WHERE WE WERE LOOKING AT DUNN PLACE TO BE CENTRE OF ACTIVITY OF OUR SUBMISSION...THIS IS NO LONGER THE CASE)

• City Hall's historic use is one of general purpose hall FOR THE CITY. It's firmly anchored and should stay so on Hobart's ceremonial street; Macquarie St which in turn is located beyond the original junction between the rivulet and river
• Using the concrete apron over Dunn Place locks away the archaeological concern's with this site (this could be a big player and one that from an understanding of peter freeman's latest report could sink many a wilful development on this site...have TM01 researching the key findings of freeman's report further)
• Our initial proposition for action to Dunn Place is to harbour a dramatic new landscape, one incorporating a body of freshwater in some manner, that relates to the nearby existing docks...passing through (and importantly OVER the apron now, as opposed to it's current typical Hobart street status) on Davey Street between sea (docks) and fresh (new Dunn Place) is an intensification of place.
• Future development on Dunn Place is a further intensification of the energy of the apron meeting and harnessing the landscape, in the form of a gallery extension to TMAG.....to complete the BLOCK as a cultural precinct etc...this new gallery could focus on the link to Southern Ocean and Antarctica (the OTHER), one that is burgeoning and successful in a recent permanent TMAG exhibit.
• Further action on to the apron (ie in opposite direction, out to where the current marina is) is less clear...don't have the impetus to CHANGE it for a reason.....perhaps the answer lies in not pulling the apron out in to the cove – accept this was of a former time when multiple piers prevailed for numerous ships – to accentuate our action of PUSHING the apron further IN to the city (dunn place etc)?
• This series of independent but potentially interrelated elements cast across the apron is where I see the "turbulence" aspect of the land-meeting-water also of assistance as a
metaphor...this is potentially interesting where BOTH key actions are given character by the meeting of land and water/freshwater meeting sea water/local meeting the “other” etc; but keeping them blunt so not turbulent in a “busy” sense but how little can we do that is blunt but deals with turbulence. TM01’s symbiotic stuff might help here.

- Primary; blunt apron with intensification where we’re most jamming it in to the landscape (dunn place)
- Secondary; scattering over the apron of place-making elements.
REFERENCE/DATE:
Tue 28/11/2006 13:49

DETAILS:
From: Sarah Benton
Sent: Tuesday, 28 November 2006 1:49 PM
To: Scott Balmforth; 'Gerard Reinmuth'
Cc: 'TM01'
Subject: HOBART WATERFRONT

CONTENTS:
Animation stills

REFERENCE/DATE:
Tue 28/11/2006 13:59

DETAILS:
From: Scott Balmforth
Sent: Tuesday, 28 November 2006 1:59 PM
To: 'Sarah Benton'; 'Gerard Reinmuth'
Cc: 'TM01'
Subject: RE: HOBART WATERFRONT

CONTENTS:
Cracker!

REFERENCE/DATE:
Tue 28/11/2006 14:03

DETAILS:
From: Gerard Reinmuth
Sent: Tuesday, 28 November 2006 2:03 PM
To: 'Scott Balmforth'; 'Sarah Benton'
Cc: 'TM01'
Subject: RE: HOBART WATERFRONT

CONTENTS:
Yep, I think these are really really good
REFERENCE/DATE:
Tue 28/11/2006 14:07

DETAILS:
From: Scott Balmforth
Sent: Tuesday, 28 November 2006 2:07 PM
To: 'Gerard Reinmuth'; 'Sarah Benton'
Cc: 'TM01'
Subject: RE: HOBART WATERFRONT
Importance: High

CONTENTS:
They’re going to nestle in well after the second para of main text (which describes the folds turning in to delta etc). each still will be about 40mm x 40mm to suit text block.

Last minute query is whether this run of stills warrants more prominence…wondering about a string along the top of panel 1 (above the ideation mountain range) similar to Prague panels’ btm string.

Thoughts?...is this possible at 11th hour in Indesign etc?

REFERENCE/DATE:
Tue 28/11/2006 14:12

DETAILS:
From: Gerard Reinmuth
Sent: Tuesday, 28 November 2006 14:12
To: ‘Scott Balmforth'; 'Sarah Benton'
Cc: 'TM01'
Subject: RE: HOBART WATERFRONT

CONTENTS:
I think that given some of the issues with ramming home what the ideation image really means so someone other than us, more prominence would be good as they would ram it home . . .if it can be made to look good etc
Appendix I includes file notes and email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included file notes and various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

The following table categorises and codifies the material included in this appendix:

<table>
<thead>
<tr>
<th>TEAM MEMBER PARTICIPANT CODES</th>
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<tbody>
<tr>
<td>Team Member No 2</td>
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<th>FROM</th>
<th>TO</th>
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<tr>
<td>Fri 21/10/2005 17:27</td>
<td>Sarah Benton</td>
<td>'Gerard Reinmuth'; TM09 'Scott Balmforth'</td>
<td>Hunter Club</td>
</tr>
<tr>
<td>Mon 24/10/2005 18:05</td>
<td>TM09</td>
<td>'Gerard Reinmuth' Cc: 'Sarah Benton'</td>
<td>Progress on slides</td>
</tr>
<tr>
<td>Tue 25/10/2005 10:49</td>
<td>Gerard Reinmuth</td>
<td>'Sarah Benton'; TM09'</td>
<td>RE: landscape</td>
</tr>
<tr>
<td>Tue 25/10/2005 11:09</td>
<td>Gerard Reinmuth</td>
<td>'Sarah Benton'; TM09'</td>
<td>RE: landscape</td>
</tr>
<tr>
<td>Thu 12/01/2006 10:22</td>
<td>Sarah Benton</td>
<td>TERROIR</td>
<td>MAITLAND</td>
</tr>
<tr>
<td>Thu 02/03/2006 18:31</td>
<td>Sarah Benton</td>
<td>TM09; Gerard Reinmuth; TM07; Scott Balmforth Cc: Richard Blythe</td>
<td>MAITLAND: side tracking...</td>
</tr>
</tbody>
</table>
PROJECT DESCRIPTION

An existing bowling club requested a significant transformation to address energy and occupation issues while providing an iconic new form that signalled a new identity for the club. TERROIR won the architectural competition with a submission that proposed a re-branding of the Club and a master plan that could be implemented over a five to ten year period (TERROIR 2007f, Monday, 17 December 2007).

Three key design elements emerged as essential to the initial phase of work: a new roof, new servicing, and a new façade to the bowling greens. Functionally, the roof acts a new ‘backpack’ of sorts, enabling and containing new and more efficient building services, while also acting as a giant rain harvester, and as a solar parasol protecting the building from the harsh Maitland sun. The elevation of the roof to the Bowling Green mimics the line, which a bowled ball should take along the bowling green in plan. The topographic roof plane ties the building complex to the rolling hills of the surrounding Hunter Valley (TERROIR 2007f, Monday, 17 December 2007).
EMAILS

REFERENCE/DATE:
Fri 21/10/2005 17:27

DETAILS:
From: Sarah Benton
Sent: Friday, 21 October 2005 1727
To: 'Gerard Reinmuth'; TM09
Cc: 'Scott Balmforth'
Subject: Hunter Club

CONTENTS:
What’s yr thoughts?

TM09 and I have discussed and think it could look something like this…

We looked at the thick pink line at the edge of the roof and thought that the craggy edge suits the topographical idea

We moved away from the constantly parallel lines in favour of the more fluid contour lines in pink as we thought it represented almost contour lines
Alternatively I thought there could be a bit more solidarity to the building

or where the solid pink is could just represent a higher density of louvres…(which is maybe the better option??)
We discussed the constructability of it and I started drawing not plate louvres but something of a significant triangular section (more like saw tooth roof) this could become just a triangular truss clad to one edge or if necessary reduce right back down to pure pepp bay with just a crazy application of hi-ten decking.

REFERENCE/DATE:
Mon 24/10/2005 18:05

DETAILS
From: TM09
Sent: Monday, 24 October 2005 18:05
To: ‘Gerard Reinmuth’
Cc: ‘Sarah Benton’
Subject: Progress on slides
Attachments: Maitland progress.pdf

POWERPOINT SLIDES:
Here is a history and a bit on the topography.

My understanding is that Maitland is located on the plain of the Hunter River. It is a clay base and the hills literally move and it is quite unstable. I would imagine it would also suffer from mine subsidence. It used to be quite a lovely place until it was cleared of all trees, the war and industry moved in and slagged up the river.

The bowling club sits on the edge of east Maitland. So it sits on the edge of the city next to horse and wheat paddocks. If the roof is mimicking the topography then it should be pretty flat unless it’s looking out toward the ranges of sugarloaf to the south (the best mountain in Newcastle) or north to the rosebrook range.

…it used to be beautiful, probably will start to upgrade its standards in the next decade (Newcastle has started so it will surely infiltrate down the river) and Morpeth (a close suburb) has great lollies and pulls a lot of tourists.
Maitland...flat

Map of the River Hunter and its branches
Geology and soils
The topography of the Hunter catchment is strongly controlled by the underlying geology. A major fault line separates Carboniferous rocks exposed along the northern side of the catchment, coal measure sequences of Permian age in the central and south-eastern areas, and Triassic sandstones in the south.

The Carboniferous rocks have been extensively faulted and folded, and form the steep rugged country leading up to the Barrington Tops. The Permian rock sequence has been eroded to form the main corridor of the broad Hunter River Valley. The Permian rocks are derived from ancient marine sediments and contain salt. Consequently, many streams of the central valley floor are naturally high in background salinity. A thick Triassic sandstone layer lies over the coal measures in the southern areas of the catchment, forming a plateau with heavily dissected tributary valleys.

Soil types are dependent on parent rock type and rainfall levels. Floodplain soils include alluvials, podzolics and cracking clays.
Aboriginal history
The Wanaruah ("people of the hills and plains") have occupied the upper Hunter for at least 30 000 years, with traditional knowledge holding that occupation extends back to the early stages of the Dreaming. The Dreaming, in Aboriginal culture, is the period of creation.

Wanaruah tradition holds that, prior to creation, the Hunter Valley was a vast empty flat plain devoid of life. The Creation Ancestors awoke and moved across the landscape, caressing it to life through their activities. In so doing, they left their imprint upon every living thing and non-living feature of the landscape.

European history
The Hunter catchment was one of the first settled for agriculture in Australia, with rapid expansion occurring between 1820 and 1860. Prior to this, between 1804 and 1820, coal and cedar were the primary economic pursuit of local settlements. The region now produces 80% of New South Wales' coal and 35% of Australia's aluminium, and 40% of NSW's electricity.

Agriculture including thoroughbred horse studs (particularly in the upper Hunter), vineyards and wineries are key contributors to the economy of the upper Hunter.

Hunter vegetation
Prior to clearance the floodplains and rolling hills of the Hunter Valley were probably dominated by ironbark, grey box, white box, yellow box, and forest red gum (all Eucalyptus spp.) over an understorey of grasses and shrubs. The river margins were dominated by a dense corridor of river oak (Casuarina cunninghamiana) and river red gum (E. camaldulensis)
REFERENCE/DATE:
Tue 25/10/2005 11:09

DETAILS:
From: Gerard Reinmuth
Sent: Tuesday, 25 October 2005 11:09
To: 'Sarah Benton'
Cc: 'TM09'
Subject: RE: landscape

CONTENTS:
As well as being bloody quick that is quite useful. Thanks…will brew on it and get into the spiel

I think it is ok to play with this gradual wobbly roofscape that does look out toward sugarloaf I think TM09 and I saw some mountain range in the distance and in a way the unsettled nature of the topography with moving wobbly hills

REFERENCE/DATE:
Thu 12/01/2006 10:22

DETAILS:
From: Sarah Benton
Sent: Thursday, 12 January 2006 10:22
To: TERROIR
Subject: MAITLAND

CONTENTS:
REFERENCES

Thu 02/03/2006 18:31

DETAILS:

From: Sarah Benton
Sent: Thursday, 2 March 2006 18:31
To: TM09; Gerard Reinmuth; TM07; Scott Balmforth
Cc: Richard Blythe
Subject: MAITLAND: side tracking...

CONTENTS:

I have done the following as a result of trying to articulate the design story of Maitland:

Export information into hard core Excel spreadsheet which meant that repetitive iterations of the form could be cardboard modeled based on the 3d model that I had created in digital space. This is delegation allowing the design to be seen.

Upgrade the way we use ‘blocks’ to extract that raw data from AutoCAD into three Cartesian points in space (x,y,z) the building starts to be understood as the relationship of joining points in space

Need to give form to those points – to address the fundamental requirements of architecture ie:
shelter/enclosure/quality of space
Need to produce a flexible approach to the design to accommodate the consultant requirements

Being aware of the tool of programming – create a script to draw the points in space:

Find that this allows the production of a 2D drawing but need to start adding the 3D, which means that I need math to work out angles and find that excel can calculate it and create a flexible model that means I will be able to create repetitive iterations of digital models which presents an avenue into VB scripting and linked files … AutoCAD promote the idea of Small Drawing = Fast Drawing. It becomes both this:

And this
Currently I have found that if I turn my architecture into textual information it does two things: 1. **PRO:** is exportable and transferable to others. 2. **CON:** it is no longer architecture it creates data – and if you refer to 86-88 George Street you can see that I am grappling with that…I am raising this as just an example of what is happening. To me it in no way rejects the diagram but does facilitate a controlled and directed flexibility.
Appendix J is a paper I submitted as a part of the HomoFaber 2007 exhibition.

Homo-Faber: Modeling Ideas

SARAH BENTON

Embedded Practice PHD Candidate - TERROIR

‘TERROIR began as a conversation between 3 people and the model emerged early on as a tool for giving material form to ideas emerging from that discussion’. We reached the conclusion (at HomoFaber 2006) that physical models were conceptual and sought to capture an idea rather than to represent a building. We found they related closely to our conversations (words) and diagrams (lines) that were used, they allowed for very rapid adjustments and that in making these models the project was understood in new ways and in a manner that cannot be achieved in the absence of this iterative process. See Image Set 1: Burns MacDonald models

Over the past few years TERROIR have cautiously integrated digital modelling into the design process. Through my involvement in SIAL’s ‘embedded research within architectural practice’ program the firm as a whole has gained a greater awareness of the implications of expanding the conventional toolset of an architectural designer. This experimental stage has challenged the office with ideas about how and why this form of modelling may enhance or indeed impede the ideation design process. See Image Set 2: Various idea models used in the process of design

Early experiments gave us confidence in the potential of the digital where a digital model/animation resulted in a conceptual breakthrough in a project and presented a way of seeing the project’s concept with greater clarity. See Image 3: Fern Tree House Animation

These modelling explorations enhanced contained design exercises in the ideation process and we became aware that certain digital techniques were not about to become formulaic or their usefulness easily reproducible.

So again we faced the question of what exactly is the benefit of the digital media to our design process. After focusing more closely on how we design we became aware that media can be far more than merely tools to be deployed for already determined ideas. Rather media can begin to be interactive, be understood as operative and play a role in shaping our intentions. Thereby, whilst TERROIR design remains driven by overarching ideas that result from the collective conversation and that these are held as primary, the role of the model, both traditional and the digital, can play a part in working up the idea.

For example in a project for a New National Library in Prague ideas began through gathering a comprehensive and wide ranging body of information about the project. One of the first visualisations of the project was an abstract speculative physical model that I constructed in response to an idea about how the building could be an articulation of a violent landscape rupture. This idea was based on the team’s assumption that there needed to be a visual and circulation link to the existing Prague Castle. See Image 4: Model 1 Prague Library Competition

This physical model was complemented with a digital model in which it was possible to work with a larger and more accurate context. Through the digital model it could be seen that the fall of the land and the circulation patterns through it differed from our initial readings. The previous idea was thereby built upon a somewhat distorted and contrived understanding of the landscape and a debate ensued. See Image 5: Model 2 Prague Library Competition

In TERROIR, particularly in response to multiple people’s opinions, the firm often works through ideas and models to look for the best outcome. In the Prague project, the physical and digital models were integrated into the conversation to assist at points of crisis. Resulting from differing readings of the site a contrary idea was put forth to build upon the site’s immediate context; a park with a smooth velvet character. Iterations of both of these ideas were modelled and compared. Ideas about mysterious cases rupturing from below the park, to house the archive section of the library, were added to the mix. In the Prague competition the final design for Prague was critically selected from this pool of many ideas and models. The
project’s final idea intertwined this mix resulting in rupturing cases shielded under a velvety roof. See Image set 6: Models Prague Library Competition

As the firm continue to integrate digital tooling into the ideation process, it is becoming more necessary to complement those digital tools and processes with equally sophisticated physical modelling techniques. The idea of the velvet parkland was modelled in a digital simulation by locating control points across the site, applying a surface to those points, and then modifying the smoothness and fall of that simulated surface with the computer. Due to the many controlling factors and the laborious nature of the task the digital simulation seemed to suppress the potential of the idea. On viewing the digital iterations attempted the design team was not convinced that we were gaining any understanding into how such a material may want to operate. At this point physical models were used to investigate the operation of actual velvet material. These explorations were much more convincing and the knowledge was taken back into constructing the digital model. See Image set 7: Models Prague Library Competition

In TERROIR, where designing occurs during an email conversation, representations of the digital models sit alongside photos of physical models. As such the firm fully integrates the traditional craft and more modern modelling methods. In TERROIR today the term model is used abundantly and ambiguously to describe physical and computational explorations. The final image of Prague was modelled in the computer, rendered and then manipulated. It is both a digital model that holds a high level of information and an ambiguous image that presents a strong idea framework but which could go onto be modified within the confines of that idea framework. See Image 8: Final Image/Model Prague Library Competition

The Prague competition called for a physical model to be submitted. Having designed the building with an exterior form with the characteristics of smooth velvet in a digital model we faced the problem of translating that into a physical form. Our first attempt produced an average quality vacuum formed model. Seeing this result the team looked for other methods. See Image 9: Presentation Model Attempt 1 Prague Library Competition
In working up an idea a body of work goes into finding and visualising the idea and an equally important body of work goes into presenting that idea. If it is done well, the production of the representation can become a continuation of the ideation process. With the time constraints of the competition the team agreed to create a Perspex laser cut model. This was not meant to directly mimic the images on the presentation panels rather by being abstract the presentation model maintained a sense of a working model. It was meant to maintain a level of ambiguity and thereby reinforce that we were presenting an idea framework upon which the client and TERROIR could build on in the future. See Image 10: Presentation Model Final Prague Library Competition

TERROIR acknowledges that the exciting thing about a working model is not accuracy and beauty rather it is the understanding and discoveries that happen through the process of making. Through modelling our own ideas, or a team member’s idea, we can see that a level of interpretation occurs. Only by making the idea can the TERROIR design team see and interact with them. This interaction can result in unexpected results and this ultimately expands our ideation design process.

APPENDIX K PROJECT STUDY: MONTPELIER RETREAT COMMERCIAL BUILDING

Appendix K includes email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

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<tr>
<td>Fri 02/09/2005 10:24</td>
<td>Gerard Reinmuth</td>
<td>TM13; Sarah Benton; TM14; Scott Balmforth</td>
<td>montpelier - position</td>
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<tr>
<td>Sat 03/09/2005 19:43</td>
<td>Gerard Reinmuth</td>
<td>Sarah Benton; 'Scott Balmforth'</td>
<td>RE: montpelier</td>
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<tr>
<td>Mon 05/09/2005 15:56</td>
<td>Scott Balmforth</td>
<td>Gerard Reinmuth; TM13; Sarah Benton</td>
<td>Re: MONTPELIER VIEW AND BOX STUDY</td>
</tr>
<tr>
<td>Mon 05/09/2005 16:09</td>
<td>Scott Balmforth</td>
<td>Gerard Reinmuth; TM13; Sarah Benton</td>
<td>Re: MONTPELIER VIEW AND BOX STUDY</td>
</tr>
<tr>
<td>Tue 06/09/2005 01:42</td>
<td>Sarah Benton</td>
<td>Gerard Reinmuth; 'Scott Balmforth'</td>
<td>RE: mont image</td>
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<tr>
<td>Tue 06/09/2005 08:59</td>
<td>Gerard Reinmuth</td>
<td>Sarah Benton; 'Scott Balmforth'</td>
<td>RE: mont image</td>
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PROJECT DESCRIPTION

Montpelier Retreat project brief requested a commercial building design to house commercial offices and carparking. The site is on Montpelier Retreat near the popular Salamanca Market site in the city of Hobart Australia. The final TERROIR proposals included two building options, the first was a tower format and the second was a low-rise design.
FILE NOTES

REFERENCE/DATE:
FN Tue 22/06/2005

AUTHOR:
PROJECT DEVELOPER/TERROIR

DETAILS:
Design + strategy for Montpelier retreat
Outcomes generated from Workshop 22 June 2005

Urban + architectural.
Building form generated from “protection” of key vistas.
1: Salamanca (knoopwoods and beyond)
2: Sandy Bay Road
3: Salamanca mews

New building mass to respond to the smaller scale of urban context as opposed to the single heroic gesture. Avoiding big box, through scaling and fragmentation.

Building to respond to controlled and calculated views. What do we want to see? What do we want to hide? Buildings and mountains. By cutting we add to public amenity.

Topography driven architectural massing. “climbing the hill”. Instant city vs. topographic response.

Competing connections from Kirksway and Sandy Bay Rd to Salamanca place.

Design by rules - not by composition.

Political Strategies
Public destination point.

Solving the urban design problems of the whole site due to possession of adjoining site. A single vision can be achieve to resolving issues of height, scale, views ,interface, car parking etc etc etc.

Multiple options. Some commercial value adding, where we offer back to the public.
Emphasis on the “locals” rather than the mainlanders. (architect + developer)

**Programmatic Desires**

1 cross over only.

Flexibility in offering multiple options. Not locked into single vision. We can accommodate all and offer many solutions.

Flexible office spaces to allow for multiple of end uses. Maybe SOHO edge liners.

**Proposed programme options + outcomes:**

Full car park + Edge liner. With 2 levels underground, 1200 cars.
800 Cars (equal to Alis maximum). Office + Public programme incorporated. We now match Alis best option + add greater amenity.
Less Cars better public and commercial amenity. Flexibility in the programme.

Need to demonstrate clear flexibility in submission through diagrams.
Strong architectural vision and language to compliment the apparent flexibility.
Our advantage is “we control the whole site” and therefore………………

Alis scheme -
educated guess - car park and serviced apartments. Max Cars approx 800. 5 floors above ground + 3 below.

Need to clarify how many car parks exist today.

**Random quotations from workshop.**

“Unlock future potential”
“as part of the overall cove not just the site”
“maximise the benefit within the cove”
“public amenity vs. private”
A series of previous studies (to be summarised by TM13 for next week) have resulted in the establishment of some basic principles in regard to the building size, layout, core split, etc etc etc. This results in a “blob” that we now understand.

In addition, thoughts regarding the potential of a taller element to exist on site (again, a series of arguments that can be outlined by TAM) has resulted in this also appearing as an option.

So, the only question now is how this thing forms into a building appropriate for a site and not a commercial exercise where the “blob” is developed via pattern-making etc etc.

We are evolving a set of design principles:

1. An understanding that the building site BEHIND the wall of the Salamanca Place. So, while the building may dimensionally need to relate to this wall, the building location is more reminiscent of the sheds that site behind this wall (a plan could be drawn of these and STUDENT or TM01 take pics).

2. This typology (behind the wall) is a “shed” typology of numerous angled roofs that results in a texture and detail that is familiar to Hobartians. This complex rooftescape is a key characteristic of the city. Therefore, the funnel building adjacent is considered as bad practice as its bulk and scale do not attempt to reconcile with this textured rooftescape.

3. This rooftescape, like the trad indurctlra rooftescape, would be driven by “pragmatic” concerns (getting light in) and we can expand this to programmatic and view and environmental and core issues that will mould this.

4. Under this rooftescape sits topography. This topography infiltrates Salamanca at numerous point (Kelly Steps, Quarry) and suggests a “built up” base that reconciles this topography and the need for humans to move around it (so again, a complex platform based upon human scale is proposed rather than a wall of commercial building).

5. This combination (roof and base) provide an armature around which our building can form. A middle layer (the standard building walls) may exist but we can think about this and look at stretto house.

When we get into the tower, this same diagram negotiates either an extra element, or a modification of an existing element from above. I go for the latter where the ground plane is simply chiseled away from the tower so it all reads as a major landscape elements modified. See pic coming through from TM14.

This element then would be chiseled as organ pipes etc etc etc.

G
REFERENCES/DATE:
Sat 03/09/2005 19:43

DETAILS:
From: Sarah Benton
Sent: Saturday, 3 September 2005 7:43 PM
To: 'Gerard Reinmuth'; 'Scott Balmforth'
Subject: Montpelier

CONTENTS:
Layers of building in different materials
Matches mountain beyond
More cuts could be inserted to respond more to the views

- Layers of building in different materials
- Matches mountain beyond
- More cuts could be inserted to respond more to the views

Started with metal at top with glaze shop front at bottom level
But could be flipped etc so top glaze to views and base a masonry base...

REFERENCE/DATE:
03/09/2005 20:10

DETAILS:
From: Gerard Reinmuth
Sent: Saturday, 3 September 2005 20:10
To: Sarah Benton; 'Scott Balmforth'
Subject: RE: Montpelier

CONTENTS:
This is starting to look quite promising – Scott send any comments if you see this overnight/early tom...

REFERENCE/DATE:
Mon 05/09/2005 15:56

DETAILS:
From: Sarah Benton
To: TM13; 'Scott Balmforth' ; 'Gerard Reinmuth'
Sent: Monday, September 05, 2005 3:56 PM
Subject: MONTPELIER VIEW AND BOX STUDY

CONTENTS:
CYAN INDICATES PRIMARY VIEWS EG: TO WELLINGTON AT TOP LEVEL, DERWENT AND PARK AT MID LEVEL AND DERWENT AT LOWER LEVEL
REFERENCE/DATE:
Mon 05/09/2005 16:09

DETAILS:
From: Scott Balmforth
Sent: Monday, 5 September 2005 16:09
To: Gerard Reinmuth; TM13; Sarah Benton
Subject: Re: MONTPELIER VIEW AND BOX STUDY

CONTENTS:
first impression is that it wiggles in all directions a little too much?...might have to reign in the differences in developing?
S

REFERENCE/DATE:
Tue 06/09/2005 01:42

DETAILS:
From: Sarah Benton
Sent: Tuesday, 6 September 2005 1:42 AM
To: 'Scott Balmforth'; 'Gerard Reinmuth'
Subject: RE: mont image

CONTENTS:
...I hope these are useful. The bottom images start to look at linking panels etc and I would prob continue on with this a little more. The glass is a toughie. It could be conceived as part of the rock base but if you agree that it is almost a third material (steel fold roof over rock base) the glass infill could
become an interesting installation in the elevation—for the glass I quite like the first couple of images as there is a bit of delicacy in the break-up/ and then the last images start to indicate a rock bracket…
These are starting to look good – thoughts Scott?
APPENDIX L PROJECT STUDY: PRAGUE NATIONAL LIBRARY COMPETITION

Appendix L includes email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

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<tr>
<td>Tue 04/07/2006 10:17</td>
<td>Scott Balmforth</td>
<td>TM11; Gerard Reinmuth; Sarah Benton</td>
<td>library; public space</td>
</tr>
<tr>
<td>Mon 07/08/2006 22:29</td>
<td>Scott Balmforth</td>
<td>Gerard Reinmuth; TM11; Richard Blythe; Sarah Benton</td>
<td>Re: PRAGUE: bg_velvet</td>
</tr>
<tr>
<td>Mon 28/08/2006 14:11</td>
<td>Gerard Reinmuth</td>
<td>'Scott Balmforth'; 'Richard Blythe'; Sarah Benton; TM11</td>
<td>prague progress</td>
</tr>
<tr>
<td>Mon 28/08/2006 18:51</td>
<td>Gerard Reinmuth</td>
<td>'Sarah Benton'; 'Richard Blythe'; TM11; 'Scott Balmforth'</td>
<td>RE: prague progress</td>
</tr>
<tr>
<td>Mon 28/08/2006 20:31</td>
<td>Gerard Reinmuth</td>
<td>'Sarah Benton'; 'Richard Blythe'; TM11; 'Scott Balmforth'</td>
<td>RE: prague progress</td>
</tr>
</tbody>
</table>
PROJECT DESCRIPTION
This competition project based in the city of Prague requested a building design for a new national library to house a modern library space, protection for an archive collection and a series of public gathering spaces. The site was situated on the periphery of Prague’s historical city, on the corner of a flat park called ‘Letna Park’. The park sits on an escarpment overlooking the old town and adjacent to the historical medieval ‘Prague Castle’.

The TERROIR competition entry was submitted to the Prague competition panel, passed through four rounds of assessment. The TERROIR entry made it through to the top 16 of selections in the international competition against a jury that included the internationally renowned architect Zaha Hadid.

Figure 2: Images used on the competition panels
EMAILS

REFERENCE/DATE:
Tue 04/07/2006 20:17

DETAILS:
From: Scott Balmforth
Sent: Tuesday, 4 July 2006 10:17 PM
To: TM11; Gerard Reinmuth; Sarah Benton
Subject: library; public space

CONTENT:
Have previously mentioned the importance of delivering a public space that manages climate, connection to landscape etc

refer attached journal note, where it's proposed our ground plane is a 3dimensional interweave of public open/closed spaces...rather than defined open plaza or enclosed plaza looking out on to adjacent landscape.

This arctic painting by friedrich explains (in a heavy-handed manner!!!!) the cracking open of the upper 'crust' of the hill in which the competition site occupies;

not only is this in the tradition of other TERROIR projects seeking landscape actions to articulate a response to site - something akin to Hadid's manner of seeing a site as an "alien" in a similar manner, i.e. neglecting that which is not important in favour of a 'fresh outlook" - it also articulates, pointed out by matt, the energy and effort involved in the mega-tunnel vehicle system to which we are adjoining (especially where the cars will spiral out of the ground and "pop up!!" next to the library. This influence deserves acknowledgement.
the shape/attachment etc of inside box's is a hard one...if we go with velvet lid and cars anchoring ground plane (as per my previous email on knotted carpark ground-scape inside) i think they should engage with both lid and base...get's back to a sort of porous section like an aero bar but with more defined enclosures...as for their shape/size, dunno....but if i think too hard after reading kafka's Metamorphosis (a weird story about a bloke waking up as a man-sized bug for those who don't know) i'd suggest a cranky jumbo-scaled cockroach cocoon!!???

REFERENCE/DATE:
Mon 28/08/2006 14:11

DETAILS:
From: Gerard Reinmuth
Sent: Monday, 28 August 2006 2:11 PM
To: 'Scott Balmforth'; 'Richard Blythe'
Cc: Sarah Benton; TM11
Subject: prague progress
Importance: High

CONTENT:
Have been discussing this with Sarah, quick update is as follows:

- Sarah has a good handle now on the roof geometry. She is triangulating it, which I like in Czech cubist sort of a way
• The eggs are running behind and she will send more stuff in the next day or so
• As the eggs and roof triangulation need to relate, they need to fuse together before more work occurs. We are hoping this “set” occurs by Thursday …

REFERENCE/DATE:
Mon 28/08/2006 17:38

DETAILS:
From: Sarah Benton
Sent: Monday, 28 August 2006 17:38 PM
To: ‘Scott Balmforth’; ‘Richard Blythe’; Gerard Reinmuth; TM11
Subject: RE: prague progress

CONTENT:
I am looking at the eggs at the moment and trying to understand them so that I can take that back up the tree to influence the roof sensuousness. But in doing so I needed to understand the basic panel that it derives from. So I started looking at concrete – as cubism is based on looking at the material logics of conc/crystals etc /also Andrew Benjamin argues that material logic is a basis for generation of form – so in doing so I came up with the following images
Zooming in on a stratified composite material…
So it doesn't tell me how the eggs look in elevation but as a language in plan is it starting to align ...? Thoughts, -- and there are answers to your question below.
All good

Keep going with the KEY driver being the relation of the eggs to the roof plate at top, so they ultimately need to be sorted in relation to the building/interiority as opposed to the source image/exteriority.

Then TM02 might be able to enter the frame and adjust the geometry to enable a familial presence between eggs.

G

I suppose the trick is tick-tacking until the eggs relate more to the top . . still a way to go?

Might try and draw later to assist
SYMPOSIUM NOTES

REFERENCE /DATE:
FN Fri 03/11/2006A

AUTHOR
Gerard Reinmuth

DISCUSSION:
PRAGUE IDEAS

NOTES:
The slide above is from a summary sent around our team at a critical point in the design process for a recent competition project, a new library in Prague. I put it on the screen not so you might engage with the issues, or even read them, but at the very least you might count them. These contexts lie in the specificity of that project and thus are worked through as a result of a body of research carried out in response to that project.

The broadness of the list in this particular case – a list developed through an extended discursive process taking 6 weeks of the competition process – is typical. Subsequently, we have investigated various constructs over the past few years to try and understand and to describe how to best harness the potential of this approach. Words like indeterminacy and multiplicity have become common while Andrew Benjamin’s suggestion of the cosmopolitan as a potential frame have provided windows through which to view what we are doing.

As Andrew explained back to me earlier in the week, any practice with a name like TERROIR is inevitably going to be concerned with a broad range of contexts around a specific project. He has noted that the “development of place must be specific” but that “specificity is not just the evocation of place . . . but pertains to that which will always have been involved in the thinking of place, of the location of a site.” This, indeed, is a broad project.

So, each project is specific and each contains multiple contexts: the geology of the place, the way people move through the site, the weather, economics, precedent, and histories long and short. There is an ethics at play in the sorting of these issues: which ones will become the project which ones will be abandoned. This is not a case of bricolage but of choice. The choice happens in the discovery of resonances that emerge between certain instances in their elongation and synthesis, the way in which a world of relations opens up between them.

PRAGUE EMAIL DISCUSSION

How do we find these resonances? Andrew suggests that “writing about place – any place – necessitates that the place will be identified, that it be located and thus that it be placed” He notes that “each of these moments is an activity: identifying, placing, locating, and that as activities, they being with them the ineliminable mark of mediation.” It is this process of mediating that I will turn to now and which Sarah will focus on in her talk.

I will start with a quick summary, and an extension. It is our position that architectural works should emerge from a broad set of contexts and issues, and awareness of these multiple contexts emerge and are mediated in practice via a discursive process embedded in the structure of a practice which has 3 Directors who are all designers. Thus, in TERROIR, the multiplicity inherent in the project is extended to the authorship of the project.

What has all this got to do with things digital? Well, in the reality of architectural practice, these issues – multiple Directors, multiple ideas, multiple locations – led us down a very pragmatic path – the early digitization of our practice. That is, from the very beginning, we used email as a core component of the design process as it was absolutely necessary if the multiplicity I have referred to was going to exist. So, while we watch other practices consider a range of communication techniques as an optional
attempt to refine or tweak their design process, in our case, these issues were present and essential to address at the very beginning and came not through an evangelical position or even curiosity in regard to digital technology but through the pragmatics of constructing a viable circumstance within which we could operate.

This use of email within the practice is now so “second nature” that its constraints and weaknesses are well understood. This is not to say we may not develop improvements to the system or test alternate systems, but that the complexity, time delay or acceleration, conversation stream, dystopia, robustness, and overall structure of the communications that emerge via this medium are used with great confidence and to productive effect.

EMAIL JOKE RUN

An important part of this conversation – for the medium is used with the lightness of a conversation – is in the way that the personalities and skills of the players remain central to the design process. So again I can return to Sarah’s role and her use of her skills and sensibility to stake out a place within this process which has been a successful part of a widened collaborate design undertaking.

TOLMANS HILL

So, this interest in multiplicity - and the deployment of digital technology to enable this multiplicity in both a project context and collaborative context - has resulted in the completion of a body of work over the past 6 years. However, due to their economy and constraints on procurement, they have been delivered using fairly standard forms of contract, documentation, and construction. Critical feedback to the work would suggest that these constraints have not led to “lesser” work necessarily, but it is of course clear that we are not at the vanguard in terms of new geometries, new delivery methods and so on.

TOLMANS, PEPP BAY

Peppermint Bay does contain a range of other collaboration and digital issues – the relation between our CAD files to the engineers files to the subcontractors use of XSTEEL and so on - that had to be worked through and which of course need working through to limit inconvenience and to expand what is possible in these areas. But the critical potential of the architectural project lies in its conceptual framing of specific places in response to understandings or readings of those places and projections to desire outcomes. We have then deployed projects that have been formed in response to these concerns rather than in response to some geometric novelty or new delivery technique. Personal virtuosity or novelty, or the simplification of interdisciplinary collaboration is interesting enough but it is a second order issue when seen from our position.

So, with this realization of what we do, and a desire to test what we do against a greater engagement with a wider range of digital techniques, the opportunity emerged to work as an industry partner with Mark Burry and SIAL on a new ARC-funded program. Our position was, and is, that the value of this program would be in enabling a greater understanding of what we do and the potential to overlay digital technologies onto this existing process with the aim of extending or amplifying the potential of this process – as opposed to thwarting or distracting it.

Given this position guided our assessment of the potential value of this program, we agreed with Mark that Sarah might be the one to do it – an invitation she accepted. In Sarah having opportunity to evolve a greater understanding of what she does and the specific role she has carved out in the practice, we also had the potential for an expansion of knowledge about ourselves and about the way our practice designs.

There is a key aspect of Sarah’s work that is gaining note, both within the practice, but also outside it - via a diverse range of people such as Dennis Sheldon who dared to suggest last week that her work could change the way design practice is understood and thus change practice itself – that is Sarah’s feeding of a discursive process with carefully curated material that assists in the refinement of that discursive process.

In particular, it is in Sarah’s ability to use a range of media – from the analogue to the digital – to explore, illuminate or extend the range of conversations at the speed of the conversation itself which is key. Thus, Sarah’s work constitutes an intense exploration of the role and nature of representation in this digital age – or non-representation as that may be and which I am still to fully clarify with Andrew! The issue of authorship is equally complex and happily unresolved – for power structures and the
reality of Directorial vetoes are ameliorated somewhat by the fact that the very material being assessed is supplied by and pre-curated before by Sarah herself before she enters it into the email conversation.

RABBITS BOOK PHOTO

We have used a range of descriptions for this but the strongest one in my mind is that of the illustrator in a children's book. With these images a discursive mode becomes specifically described, or focused, and this focus results in further mediation – via the confirmation or rejection of the image, of the discussion, or both, as they are measured and re-measured against the multiple contexts within which the project is taking place. Further, with the production of these images in the digital realm an information or data set is simultaneously developed as an outline description of the project.

So, I will now hand you over to Sarah who will provide a review of her PhD work to date and will show a specific exemplar project in the form of the recent Prague competition I mentioned at the start. Importantly, as with our design process, Sarah's work is fully embedded in what we do but of course is being explored through a perspective which is not Richard's, Scott's or mine but is her own – which of course is an essential part of a design process tending to the cosmopolitan.
INTRODUCTION

This paper discusses the role of representation in the TERROIR ideation process and how they act as not only reflections of a building but as productive devices for idea generation. As an architect and designer embedded in a design firm undertaking research into mapping Digital technology onto modes of practice I have seen a transformation in the attitudes that we have in the tools that we are using. As the ubiquity of Digital tools and our familiarity with them increases, I have seen the fascination in the instrument reduced such that our creative discipline is exploiting the tools instrumentality. One outcome of this has seen the forms of our representations expand and their nature transformed beyond an interest in the act of making and into spaces for mediation and accommodating questions about signification. The neutralization of the instrument sees our focus return from understanding the act of making to investigate the affect and potentiality of the ‘drawing’ not just as a representation of a prospective building but as a fundamental productive operative design tool.

My view of negotiating these representations as a productive concern is fashioned by the ideation role I hold in TERROIR which sees me using visual representations, which are increasingly Digital in format, as a way of communicating my opinion within a four way conversation taking place in an architectural firm about what architecture and its intention is.

As someone who operates within a practice, as a designer, at the front end of the architectural process, rationalization and procurement concerns are just an effect of where my main interest lies. That is my interest is to understand how to communicate in the pivotal position that I operate in, communicating to directors about ideas and communicating to staff about how to deliver and protect those ideas and it is the representation that is a key tool that I use.

Discussing these interests, and the transformation of our focus from instrument to instrumentality, is the intention of this paper. The paper will firstly overview the debate surrounding the representations and go onto present TERROIR’s position within this debate through one case study that shows the representations as a productive technique in a generative, poetic and creative design process, how representations bring about a progression in our collaborative design process and finally how those representations stand as a description of design intent to guide and protect an idea through the design development process.

REPRESENTATION

The context of representation in architecture includes a debate that has continued for millennia between philosophers, designers and architects.

Etymologically the word representation is an interesting puzzle. It has a lengthy history, and changing and vast meaning. Representation has played a central role in understanding literature, aesthetics and semiotics. It has been suggested that representation originates from the Greek word *mimesis*, which in art means to re-present, by showing rather than telling, human emotions in new ways (wikipedia). The debate in regard to the term representation focuses around the concern that it bridges a binary discrepancy. It can refer to something that embodies an idea, is a fiction or artificiality of the subject (in architecture’s case mostly a building) and / or is a reflection, reproduction, substitution or proxy (for a building) (Art & representation). The term also extends into explaining how people know and understand reality (wikipedia) and rather than being a reproduction it stands as ‘constructions’ that are
not 100% accurate portrayals of reality but are ‘versions of reality’ influenced by culture and peoples habitual thoughts and actions (O’Shaughnessy & Stadler 2002).

‘This attack on representation is basically an attack on the traditional way of thinking, that is, the other-worldly way of thinking originating in Plato and continuing to Kant through Christianity. In the search for the True World of Reality—the world of Idea, a permanent, eternal, unchangeable entity, a Logos that is to be cognized by human reason by way of concepts—this tradition has consistently undermined, subordinated the World of Appearance, the real world of senses in which people live and function as human beings’

Early contributors of the debate include philosophers Plato and Aristotle, where Aristotle argued toward the representations as reflections of reality in contrast to Plato who saw representations as illusion leading one away from the ‘real things’ which should therefore be ‘controlled’ to avoid fostering antisocial emotions or encouraging the imitation of evil (Mitchell 1990).

A fear within the representation is that they are in some way inferior due to binary discrepancies. That is they are always attempting to bridge an impossible contrast leading to ‘inappropriate inconsistency’. The types of contrasts include true-false, subjective-objective, genuine-fake reality-appearance (Art & representation p 11).

Moving forward in time in the 1980s the philosopher Derrida argued that; “Today there is a great deal of thought against representation. In a more or less articulated or rigorous way this judgment is easily arrived at: representation is bad.” (Derrida, “Sending,” p. 304).

At a similar time and drawing from the likes of Derrida’s comments, were Architects such as Eisenman who begin to enter the debate and argue that “those relying on technological infrastructure, capable of being medium in its own right, are relegating architecture to a pure technical extension of capital, that is, it denies creativity and architects are thus replacing all ideology for architecture and are extracting the ‘life giving sap to architecture” (Digital Eisenman).

Today this attack on representation continues into the Digital paradigm. It sees two contrasting parties either seeking a form of truth or control delivered by Digital technique that can validate an architectural form or those who question the static, determinant and fake nature of the image and acknowledge that the desire for control and truth is somewhat unrealizable creatively limiting and can thus open up new forms and validations of what architecture can be.

An example of a truth or control, that is, generating or basing the source of architectural form on theories of self organization and scientific processes, can be seen in the Beijing Watercube which was presented by Chris Bosse of PTW Architects at the UTS Transcapes Symposium. In this example his team took mathematical analysis of bubbles through various Digital processes to generate and procure a building that became ‘a box of bubbles’ (Transcapes Conference 2006).

In terms of the validation Anthony Burke discussed this at the same UTS Transcapes Symposium, discussing that he was trying to work in the ‘meta’ design. He argued that databases of information, generated by pragmatic infrastructure, enable this and are thus a worthy process for architectural form ideation and validation (Transcapes Conference 2006).

However, in contrast, Andrew Benjamin continues the interest in representation as an ‘illusion’ which could be used as a device to further the potentiality in architectural form. He argues that architects in their ideation should embrace the binary discrepancies which lead to indeterminacy and transience such that architecture may go beyond the limitations of style and re-imaging of reality and take advantage of the Digital’s ability to enable ‘non-representational’ representations that act as operative devices for design (Transcapes Conference 2006).

WHERE DOES TERROIR SIT IN THIS DEBATE?

This brings me to the TERROIR process. My own work is a designing process that needs to accommodate sources that originate in a conversation and can be diverse and inconsistent. To accommodate the individuality of each project my ideation visualizations are, as Benjamin argues, operative material that do not search for truth and go beyond just being a substitution for a building or a re-appropriation of an image, rather they are used as a trajectory for posing questions about and around ideas.
To ensure and assist this operative process occurs, we have extended our toolset into the Digital and endeavored to develop a certain savoir-faire, intuitive sensibility and familiarity in a variety of representation techniques. This has meant that we are getting to the point where our tools are becoming second nature. We focus on their instrumentality rather than the instrument and we do not privilege the representation or, as Marshall McLuhan would term, the ‘mediums’ we are using but question the messages that we are sending (the massage is in the medium).

This transience sees the perception of representations as not a static one. Rather it leads to an interactive debate within the design team where the representation, and the sources or rules that they are based on, is approached with a high level of skepticism and through this process our architecture emerges based on an multi-leveled and ethical agreement. In TERROIR we do not attempt to justify architecture by scientific truths.

The following case study presents an example of this approach.

**CASE STUDY: PRAGUE LIBRARY**

This project is a competition project in Prague for a New National Library that would house a modern library space, a protected archive collection and a series of public gathering spaces. The site was on the outskirts of Prague historical city on the corner of the flat Letna Park which sits on an escarpment overlooking the old town and which sits adjacent to the old castle.

The examples of representations I am going to talk about in this project include forms of diagrams and digital montages which are not meant to be static representations of a building but are put forward to the internal TERROIR design team as provocative engines for debate over what the idea of the project should be and digital renderings, and more traditional presentations devices, used to convey a message of design intent to an exterior party (the competition board) but which are still not seen as conclusive proposals but as suggestions or the potential form that the idea might take.

Before we manage to get to a visual representation in a project in TERROIR we begin with a conversation between myself and the directors. Discourse is of high importance in TERROIR as a primary aspect of the collaborative practice is conversation In Prague these conversations and the ideas began through gathering a comprehensive and wide ranging body of information about the project over TERROIR’s standard email based design process which we then distilled into a series of key headings mounted with detailed texts and images. This distillation process provided a trajectory for the formation of an opinion and gave a way into the problem.

From this my own contributions in finding the visual form begin. Due to the nature of ideation the first representations emerge in a scatter gun approach as I seek for the idea and a way to portray the idea of the project. They included photographs of a model (Figure 1) that was constructed in response to the interests that one of the director’s had in the paintings of Freidrich and the idea of creating a building about a violent rupture action.

![Figure 1. Friedrich painting and Photograph of Concept Model.](image)

As in several other projects these early models are not meant to be solutions but are questions. The model that was constructed did not have a scale and was not meant to be a building but by drawing on the abstracted discrepancies it was meant to capture an idea to provoke a debate over the validity of the violent rupture action. The outcome of the model was a debate that actually saw this idea and the line of enquiry defeated in favour of a new idea that emerged in the work that followed.
Throughout my research journey the ‘diagram’, a lightweight operative design device, has remained fundamental to my process. This is mainly because my tasks require lightweight, rough and suggestive techniques to complement my operation within a conversation and my duty to provide representations that ask questions rather than provide solutions. In the Prague competition the first series of visual representations were diagrams used in a productive capacity to discuss context and ideas about what the action of the building should be. So within the first set of images were figure ground diagrams used to clarify and critique the surrounding context.

As an advance on a 2 dimensional black and white figure ground I developed 3 dimensional Digitally generated figure ground studies (Figure 2) that represented the relationship of certain elements, for example the edge of an escarpment and a location of a freeway. These quickly allowed us to see that our argument about how a road wrapped up one of Prague’s valley folds was contrived. It again saw the line of enquiry defeated and the team revert back to find a different idea.

In TERROIR the story is a rich part of our process. The directors used storytelling to each other from very early in their practice as a way of describing things to each other and to find ways of gaining a common understanding. Today this still occurs and each story often features a metaphor. In Prague one visual metaphor was ‘velvet carpet’ which captured one of our stories about how we saw the Letna Park as a large carpet (Figure 3). These visual metaphors are used as a start point where we simply take their very obvious visual counterpart as a trajectory for generating a form and representation to critique. However after an agreement the metaphor falls out of the discussion as it has got us to where we want to go. Hence their use remains at a surface level and as a trajectory for progressing toward a cohesive formal and ideological design proposition.

Another metaphor in Prague emerged late one night at a point where the team seemed to be a little exhausted by the project. One comment by a director, who had just been reading Kafka’s Metamorphosis (Kafka 1992), that the precious archive collection should be protected within cases that took the quality of cockroach eggs that had emerged from the underground. This cue saw a series of representations develop trying to formalize this idea. We began with re-appropriating other images and tried animating a series of emerging egg forms through our digital model but as we sometimes find
these weren’t as successful as simply drawing what we thought we would want to see rather than try to get the computer to generate a form for us (Figure 4).

Figure 4. ‘Cockroach egg’ representations.

As often happens in the office, and has occurred in previous case studies, due to the interplay of people, an answer is not found in a representation but is coordinated or argued through them. This means that in TERROIR a project proposition emerges as the mediated opinion of the practice. My contribution in this is the curation and generation of many representations around which an argument can happen. An example of this coordination is the mixing of two re-appropriated visual metaphors. The first was a representation of a smooth form, that was referred to as ‘toothpaste’ compared to a jagged form, that was referred to as a ‘crowbarred landmass’. As the qualities of both were promising the project did not develop into either the toothpaste or crowbar, but it took the qualities of both and galvanized them (Figure 5).

Figure 5. ‘Toothpaste’ and ‘crowbarred landmas’ representations.

Not all of my representations are Digital; stopping and integrating traditional techniques are a fundamental way of understanding and finding new directions for a design. Fig 6. shows an example of using physical modeling materials to gain an understanding of how a material naturally acts. This was taken back into the Digital model and directed the choice of tools used to simulate the material in the Digital format (Figure 6).
After the team agrees on a direction the project advances into development. At this stage the idea and proposition is checked against the pragmatics of the brief. This process, a tic-tac between an agreed form and pragmatic realities, sees the scale and form of the building representation alter and continue to move away from a re-appropriation of a scientific or realistic idea. At this stage images of the proposal need to be repeatedly generated from a series of views and shared with the team to ensure that the project is not diverting from an agreed direction. It also ensures that the proposal is realizable and compositionally and contextually appropriate and not fabricated by digital tricks or delusions. With the major elements of the design in place the team started to discuss the materials of the project. Materiality in TERROIR architecture is a transient aspect. Projects are rarely conceived based on a material and are rarely driven by a material, rather the opposite is true. The buildings are normally conceived as cardboard. At this stage Digital representations do represent materials; for example grass is green and stones are stones, but the conversation of the design team centers on how surfaces and elements should relate to one another, that is, should the ‘roof’ be a part of the ‘park’ or the ‘freeway’ or something entirely new (Figure 7). This immateriality and virtuality affords a freedom for the team to investigate the discrepancy accommodated and enhanced by Digital tools.

At about this point the project turned from a process of generative designing to a process of preparing the presentation panels for the competition. The discussion changed from discussing the essence and qualities of what the idea could be to questioning the qualities and character and preparing a suite of representations or reproductions of the ideas.

The main representation for this competition was aimed at capturing the conversation and aspirations so as to sell the idea to the competition board. As the idea in TERROIR is primary, the idea image is a primary component of the presentation of a project. But the team was not looking for glossy presentation snapshots of a Digital or physical simulation of a building but an ideological and illusionary representation that would capture the essence of the idea and have a subtly that suggested more. Enigmatically this image needed to be an ‘answer’ to the competition that proposed a new set of questions.

In developing the image a level of debate centered on the image’s perspective, its content and its quality. At one point the image and debate hit a dead end and in pure frustration I took to a tablet PC and set about constructing a sketch in a more traditional sense (Figure 8). It led to the directors...
critiquing its subtle qualities, particularly the placement of shadings. It was noted that the subliminal and intuitive qualities captured a spirit appropriate for the idea image. Through this process a new knowledge was taken back into the development of the digital idea image.

Figure 8. Hand drawn representation.

Over its development the idea image was tweaked, added to and reduced until the team all believed that it encompassed the breadth of the idea (Figure 9). It therefore became far from a simple snapshot of a model and was highly curated and controlled. The team agreed that the final image’s manipulation and layered nature stood as a testament to how TERROIR designers work together. That is a collaborative artwork where discourse and diagram is galvanised together.

Figure 9. Idea image.

In addition to the idea images, four perspectives were required for the submission. The banality of the base photographs was deemed detrimental to the rest of the panels. So I set about deleting all colour and irrelevant information with the intention of reducing the core images to there essential ideas. Probably because of their banality I found that I was pushed to learn new techniques for manipulating Digital representations.

Other drawings for the panels included an interior view, a series of diagrams that went alongside the design strategy, building plans and a lazer cut model. Having captured the form into these representations the panels operated to convey the design intent to the competition board. Furthermore, rather than verifying the project against a Digital calculation or a comparison to a re-appropriation of an image, the presentation was also used as our tool to verify and judge the validity of the idea. That is, judgment of the poetic output becomes a self evaluation conducted by the team. This team may include TERROIR, consultants and clients and what that team deems as ‘good’ is that which has occurred via the just described negotiation and debated design process. So for each project the process becomes and generates a self-autonomous qualitative assessment system, which is there is no scientific truthful evaluation that takes place.

SUMMARY

The Prague competition was a project that chronologically fell into 3 stages. At an early stage the representation took second place to a verbal conversation. As the project developed the use and generation of representations increased and they became a primary and productive tool in the searching for an inherent action or idea and the formal language of the project. At this point the
representation was at its most dynamic and productive. Finally the 3rd stage saw the representation become a tool for capturing design intent.

As an architectural designer in TERROIR visual representations are my voice. I take advantage of binary discrepancies to generate architectural potentiality.

In TERROIR a representation is not just as a presentation device used for clients and consultants or a substitution or proxy for the building but as you have seen they are operational devices used in a conversation between members of staff about intention and ideas.

Furthermore, TERROIR's approach to the representation, both Digital and traditional, is not precious. It allows for the multiplicity of the design team and our familiarity with our tools has allowed us to become much more intuitive and comfortable in negotiating or moving between the different types not for production but for a productive concern.

REFERENCES

File Note from meeting with Andrew Benjamin. Professor of Architecture, UTS University, Sydney, Australia on 30th October 2006.
Mimesis (arts) From Wikipedia http://en.wikipedia.org/wiki/Mimesis
Transcapes Symposium arranged by Gavin Perin. UTS University, Sydney, Australia on November 3rd 2006.
APPENDIX M PROJECT STUDY: 86-88 GEORGE STREET COMMERCIAL BUILDING

Appendix M includes email conversations gathered over the research timeframe. In long documents, I have highlighted specific notes that I refer to in Volume One. I have included various email correspondence that I refer to in Volume One. The emails were made in private conversations. They may contain jargon and familiar synonyms coined within the TERROIR design team. The Appendix material has been censored. As per RMIT ethics requirements I have removed the identification of team members and asked permission to include the sensitive material. As the research involves the close collaboration with the directors of my industry partner firm, I have included the firm and the director’s identity. I have sought and gained their approval for its inclusion.

The following table categorises and codifies the material included in this appendix:

<table>
<thead>
<tr>
<th>TEAM MEMBER PARTICIPANT CODES</th>
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<td>Scott Balmforth</td>
<td>Reinmuth; Benton, Sarah; Blythe, Richard</td>
<td>TERROIR model tools</td>
</tr>
<tr>
<td>Thu 23/02/2006 20:09</td>
<td>Sarah Benton</td>
<td>'Scott Balmforth'; 'Reinmuth'; 'Blythe, Richard'</td>
<td>RE: TERROIR model tools</td>
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<td>Fri 24/02/2006 19:48</td>
<td>Richard Blythe</td>
<td>Scott Balmforth Cc: Sarah Benton ; Reinmuth; Blythe, Richard</td>
<td>Re: TERROIR model tools</td>
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PROJECT DESCRIPTION

The 86-88 George Street project is a redevelopment of a high-rise building at 86-88 George Street, Sydney. The project provided an opportunity for the Sydney Harbour Foreshore Authority (SHFA) to deliver an exemplar ‘boutique heritage office accommodation with high environmental sustainability credentials’ (TERROIR, 2007i, 17 December 2007). The 86-88 George Street foyer forms one section of a larger redevelopment of a heritage listed Sydney high-rise located in the historic precinct, The Rocks.

Figure 3: Image of the constructed 86-88 George Street Foyer
EMAIL

REFERENCES/DATE:
Wed 22/02/2006 18:08

DETAILS:
From: Scott Balmforth
Sent: Wednesday, 22 February 2006 18:08
To: Gerard Reinmuth; Sarah Benton; Blythe, Richard
Subject: TERROIR model tools

CONTENTS:
following is a quick and dirty summary on one issue we've been discussing around the last day or so
on a variety of fronts (i.e. not only sial related but rb's homofaber stuff)...and i think is getting good
development of thinking on what we do and what this means for further research...

naturally, these are not intended as commentary on the respective authorship!!:

Within minutes today, the following 2 images appeared in separate emails which both form part of a
very large discussion on each project...
again, with gross lack of appreciation of the degree of work going on by all parties in regards to these, the model still holds the opportunity in the project to me, and a view shared, more so than the rendering which still provides a basis for further commentary but via it's inherent exactness (or something we haven't been able to pinpoint yet) closes down opportunity which is important in the TERROIR psyche etc.

But this is not a ditty on anti digital of course, so an equal vox pop from me on a recurring digital image of relevance in enhancing the trajectory of the project's character (and a character that is then easily entered in to discussion by all of us) is;
Apologies for the simplification, but to me this poses more questions than riveting revelations, such as:

- does this simplified view expand to the wider TERROIR server/experience?

- What does it inform for maximum digital presence at a design level (i.e. more than rendered versions of card models or ghost-like imagery?)

REFERENCES/DATE:
Thu 23/02/2006 20:09

DETAILS:
From: Sarah Benton
To: 'Scott Balmforth'; 'Gerard Reinmuth'; 'Blythe, Richard'
Sent: Thursday, February 23, 2006 8:09 PM
Subject: RE: TERROIR model tools

CONTENTS:
the funny thing about your comments is that you are trying to say that the two images you received VIA EMAIL are different when actually they aren’t…both are snapshots are in a 2D format upon which you will sketch onto on your digital screen.

So is it not more about resistance, suspicion and fear of loosing something which you don’t have right now anyway?

Is it about those that are and those that aren’t used to seeing and fully understanding the digital model? Hence why I sent through the DWG reader – so you too can read the digital format…

TM12’ problem is that he tries to make a physical too good but actually just wants to be quick. We discussed that we are both finding that we are searching for perfection and are frustrated that we are just not achieving it…

REFERENCES/DATE:
Thu 23/02/2006 23:15

DETAILS:
From: Sarah Benton
To: 'Scott Balmforth'; 'Gerard Reinmuth'; 'Blythe, Richard'
Sent: Thursday, February 23, 2006 23:15 PM
Subject: RE: TERROIR model tools

CONTENTS:
i think the digital issue has something to do with scale...be it our ability to scale ourselves against the object (as we can with a card model say) or the actual object or image's representation of itself in a context...not made myself clear here, will think more about it.

re; your comment on TM12's trying to make things good but quick...i wonder (and hope) it's not entirely about digital = speed... such that the 2 images i just happened to pull out for comparison purposes of TM12’...i sense the George Street foyer concept in the context of the building (in ghost form) image may've taken longer and in fact had more detail in a technical manner?

...again, not using as a card v digital model debate, but another misc thought I’ve had is the comparison of sensation between card and digital is;
- Multiple images (say pics sent through on email) of a card model have a singular entity to them...with multiple views sensed of the SAME thing.
- whereas i can recall on many occasions the sense of being SPOILT by the array of digital images sent through conveying so many different aspects of say a project (refer Maitland, 86-88 George Street et al)...yet there is not the same wholeness of object again, a random thought on the run so haven’t filtered this with common sense!!

REFERENCES/DATE:
Fri 24/02/2006 19:48

DETAILS:
From: Richard Blythe
To: Scott Balmforth
Cc: Sarah Benton; Gerard Reinmuth; Blythe, Richard
Sent: Friday, February 24, 2006 7:48 AM
Subject: Re: TERROIR model tools

CONTENTS:
The 3d digital model exists only in the liminal thin space of the screen. It is one sided and has depth only through virtue of tricks of the eye generated by centuries of understanding perspective. It is no more advanced than perspective was several hundred years ago other than it renders a little faster. This is extremely different to a physical model that can be held in the hand and rotated etc

The big issue is how do we adapt these digital techniques to aid in our development of the conceptual richness of a project? What does the digital show us that a card model doesn't? How does it assist in moving the project forward?